Development and Factorial Validation of an Instrument for Measuring Executive Stress among Nigerian Oil Company Workers in Rivers State, Nigeria

Dr. I.E. Mkpaoro,
Department of Science Education UNN

Prof. S.A. Ezeudu,
Department of Social Science Education. UNN

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Abstract:
This study was designed to develop and factorially validate an instrument, Executive Stress Measurement Scale (ESMS) for measuring executive stress among Nigeria oil company workers in Rivers State. The study was instrumentation. Sample consisted of 120 executive workers. Four major constructs that constitute the elements of executive stress were identified. The four sub-scales are symptoms and main causes of executive stress, nature of job stress and work-load. 108 items drafted instrument was presented to two specialists and 5 experts for face validation. Ninety items survived the exercise. The 90 items were administered to executive workers in three Nigerian oil companies in Rivers State. Data collected from the field were subjected to factor analysis. 55 items after factor analysis were found to be well loaded. Cronbach alpha was used to determine the reliability of ESMS of 55 items. 0.89 reliability coefficients were obtained for the entire items and 0.86, 0.82, 0.81 and 0.70 for each factor. Further analysis was done to the data using factor analysis, correlation and t-test statistics. Validity of the ESMS is 0.80. Recommendations includes; that ESMS should be use by the Rivers State Education Commission, Directorate of Petroleum Resources, School Researchers, Oil Company Workers among others.

Introduction:

Education is the most important instrument for effecting optimal human capacity building necessary for national development. Indeed, most nations of the world have relied on it as the reliable weapon to improve on existing civilization. It is therefore crucial that impediments to it acquisition be removed and to do this involves finance (Safra, 2001). The Major source for financing Nigerian economy is the petroleum industry (that is, the oil sector). Petroleum products gave Nigeria an economic boost since the 1970s (Denga & Ekpo, 1994). The oil glut in 1978 which followed the oil boom brought stress and economic recession since the oil industry was the major source of revenue for Nigeria. This resulted in the near collapse of the Nigerian economy (Ikejiani – Clark, 2007).

The economy having not recovered has resulted to serious pressure on the oil workers to improve on their productivity levels, resulting in reported case of occupational stress (Pither, 1995).

McGrath (1990) viewed stress as an environmental situation perceived as presenting a demand which threatens to exceed a person's capability and resources for meeting it. It is a situation in which environmental events or forces called stress threaten an organism's existence and well being and the organism's response to the threat (Ubulom, 2009)

Chindobi (2004) defines stress as a condition which occurs as a result of a relationship that fails to produce expected rewards. Taylor (2007) viewed stress as the emotional difference between what we would like to be (ego/ideal) and what we really are (reality). For this work, the researcher sees stress as any favourable or unfavourable condition that keeps on bothering the psychological, physiological and behavioural existence of an individual. It affects all individuals, both junior and executive workers. The one that affects the executive workers is called executive stress. Executive stress is the stress which the top ranking or managerial staff are exposed to. The components of jobs exposed to could constitute the stressors (Ubulom, 2006). Agulama (1994) and Denga (1996) defined executive stress as one in the macro environment which bombards the Nigeria executive workers. Denga and Ekpo (1994) defined executive stress as that which an organisational leader, at any management level passes through. This level may range from the manager of a supermarket or of a coca cola kiosk to the managing director of a highly rated industry such as oil companies. The executive stress at most times, comes from the enormous workload of planning, organising, directing and controlling the affairs of the companies (Agbo, 1999). According to Agbo, some of the jobs stresses include the task of meeting up the required oil output, the responsibility of keeping the personnel happy and motivated; security and the financial matters of their units. Executive stress behaviour of Nigeria oil company workers cannot be measured by using a cognitive test instrument. A special instrument needs to be developed and validated for measuring such issues as time, pressure, nature of stress, workers' misbehaviour, administrative problems, symptoms of executive stress, junior workers rapport with executive worker (boss), satisfaction with oil company worker, rapport among colleagues, rapport among co-workers, executive workers' status, executive worker's salary, work overload, community pressure, job performance, anger and anxiety.

Development of an instrument involves the construction of statement/items geared towards eliciting information from respondents concerning their traits or attributes or characteristics for the purpose of carrying out a research (Ubulom, Uzoeshi and Amini, 2008 & Nworgu 2015). The process of developing and using an instrument can be divided into eight steps or stages as suggested by Ezugwu, (2006). The steps are:

(a) Identifying a programme objectives and the specific information to be obtained.

(b) Selecting a response format. (c) Identifying the frame of respondents. (d) Writing the items/questions. (e) Preparing a data summary sheet (f) Critiquing the items/questions, that is, trying them out and revising them (g) Assembling the instrument (h) Administering the instrument. After an instrument has been developed, there is need for such instrument to be validated. According to Ubulom, Uzoeshi & Amini (2008), and Nworgu 2015 validity of an instrument is the extent to which the instrument measure what it is intended to measure. In essence, an instrument that is valid is one that is truthful, accurate and relevant in measuring what it indents to measure. There are four (4) types of validity namely, content, construct,

criterion and face validity. Like tests, research instruments are constructed for specific purpose. In developing and validating an instrument to measure executive stress, it is necessary to apply all the steps involved in instrument construction. But for this work, we are mainly concerned with construct validity. The result obtained by using this instrument can be used to explain or measure executive stress among Nigerian oil company workers in Rivers State. It is on this note that the researchers carried out this research work on the Development and Factorial Validation of an Instrument for Measuring Executive Stress among Nigerian Oil Company Workers in Rivers State.

Statement of the Problem: Human stress is universal and affects individuals in all human professions including banking, trading, industries, government and education, among other. Stress has been identified as a serious disabling phenomenon that adversely affects the health and life style of workers. It could be considered as one of the administrative problems that continue to pose serious threat to the goal attainment of executive workers and thereby hinders workers productivity. For instance, the chief executives of different organizations and institutions are entrusted with the task of planning or organizing, directing and controlling all the affairs of their companies or institutions. The executive workers in Nigeria Oil Company in Rivers State work in stressful environment in trying to deal with the day to day work issues. This is because they are on daily bases battling with such problems as staff complaints (senior and junior), disciplinary problems, poor conditions of service, excess workload, local politics, domestic problems, administrative problems, staff rapport with executive officers, job satisfaction, rapport among colleague, executive status, staff salary, community pressure, community support of oil companies in their area and financial problems, among others. When executive workers' work environment appears uncomfortable, their personal and social goals may not be fulfilled.

Although several researches have been done on stress, none seems to have been done to develop and validate an instrument to measure executive stress in Nigeria oil companies. However, instruments have been developed in other field of study. There is therefore the need to develop and factorially validate an instrument such as Executive Stress Measurement Scale (ESMS) for measuring executive stress among Nigerian oil company workers in Rivers State.

Purpose of the Study: The main purpose of this study was the development and factorial validation of an instrument for measuring executive stress among Nigerian oil company workers in Rivers State. Specifically, the study sought to achieve the following purposes:

1. Determine the items of the instrument, Executive Stress Measurement Scale (ESMS) that survived factor analysis in terms of their factor loadings.
2. Determine the validity of the factors underlying the constructs addressed by the items of the ESMS as determined by the nature and magnitude of their factor loadings.
3. Establish the reliability coefficient (measure of internal consistency) of the instrument, ESMS.

Significance of the Study: Theoretically, the study viewed five theories of stress which are Taylor's, Selye's, House's, French and Erickson's theories.

Taylor's theory propounded that executive stress turn workers off or they postpone working. Selye's theory advocates that the way people react to environmental circumstances is

described from their personality, perception and the situational context of the stress. House's theory propounded that people who are subjected to the same stressful conditions perform differently. French's theory advocates that the more congruent the characteristics of the person and environment in which he is employed, the more favourable the work – related outcomes for the person. While Eriskson's theory provides information on individual response to stress. The findings of the study would help to strengthen the application of these theories among oil company workers. The identification of stressors in the work environment would assist policy makers to review working conditions. Awareness that everybody suffers some degree of stress would assist executive workers to cope with stressful conditions. Practically the study will be beneficial to the society because it may henceforth provide a basis for further researches in the field of executive stress and closely related constructs. The study will also provide instrument for the executive workers, Board of Directors, Rivers State Education Commission, Ministry of Petroleum Resources, Directorate of Petroleum Resources, and Guidance counsellors.

Educationally, the source of executive stress of this study would provide information which educational planners and higher institution educators may incorporate in their bulletin and curriculum as work habit to be taught. The result of this study will also be of help to the principal officers in secondary schools and tertiary institutions and other parastatals as the information will help to eliminate areas that are stressful to their workers in order to enhance quality productivity and learning.

Empirically, empirical evidence obtained in this study will be provided to relevant stakeholders (Ministry of Petroleum Resources, Directorate of petroleum Resources, Administrators, Researchers, among others), through publications and seminars on the topic of this study.

Scope of the Study: This study was carried out in Rivers State. The geographical scope of this study covered oil companies such as Shell Petroleum Development Company (SPDC), Nigeria Agip Oil Company Limited (NAOC) and Total Exploration and Production Nigeria Limited. (TEPN), operating in Rivers State. The content scope covered the area of developing an instrument to measure executive stress among Nigeria oil company workers in Rivers state. The study also factorially validated the instrument developed to measure the executive stress of Nigeria oil company workers as well as some of the components of executive workers' performance (main symptoms, main causes, nature of job and work load, among others) of executive stress among executive workers of Nigerian oil companies in Rivers State.

Research Questions:

1. Which items of the instrument, Executive Stress Measurement Scale (ESMS) Survived factor analysis in terms of their factor loadings?
2. What is the validity of the factors underlying the constructs addressed by the items of the ESMS as determined by the nature and magnitude of their factor loadings?
3. What is the reliability coefficient (measure of internal consistency) of the instrument, ESMS?

***Hypothesis*:**

Ho_1: The validity of the factors underlying the constructs addressed by the items of the ESMS as determined by the nature and magnitude of their factor loadings will not be significantly greater than zero at P <0.05.

Research Method:

Research Design: The design of the study is instrumentation. According to Ezeh (2005), and Nwogu (2015) instrumentation is the plan of a study that enable researchers develop and often times validates instruments required for effective execution of prescribed tasks in education. Ali (2006) defined it as a study which is purely geared towards the development and validation of a new instrument or for developing new techniques.

Area of the study: The study was conducted in Rivers State of Nigeria, specifically among oil exploration companies. The justification for choosing the area was informed by the fact that most of the Oil Companies have their head or regional or Zonal offices in Port Harcourt, Rivers State.

Population of the study: The target population for the study was all the male and female executive workers in the three (3) Nigerian Oil Companies operating in Rivers State, that is, Shell Petroleum Development Company (SPDC), Total Exploration and Production Nigeria Ltd (TEPN) and Nigeria Agip Oil Company (NAOC). They were three hundred and sixty one (361); two hundred and twenty three (223) males and one hundred and thirty eight (138) females in numbers in the year 2011/2012 when the study was conceived (Department of Petroleum Resources Report, 2011).

Sample and Sampling Techniques: A sample of one hundred and twenty (120) executive workers (60 males and 60 females) out of three hundred and sixty one (361) executive workers was used for the study. The simple random sampling techniques (procedure) was adopted to draw 40 out of one hundred and twenty five (125) executive workers in Shell Petroleum Development Company, Rumubiakani, 40 out of one hundred and twenty (120) executive workers in Total Exploration and Production Nigeria Ltd, Trans-Amadi and 40 out of one hundred and sixteen (116) executive workers in Nigeria Agip Oil Company, Mile 4, all in Port Harcourt, Rivers State. The simple random sampling techniques was adopted because all the three (3) Nigerian Oil Companies operating in Rivers State have the characteristics of the population needed for the work and secondly to avoid selection biases.

The simple random sampling procedures was also adopted to draw 10 out of 15 executive worker in Shell Petroleum Development Company, Agbada Community, Igwuruta in Ikwerre Local Government Area in Rivers State and 10 out of 16 executive workers in Nigerian Agip Oil Company, Omoku in Ogba/Egbema/Ndoni Local Government Area in Rivers State and used as respondent for the pilot study. In all, the sample size for the pilot study consisted of twenty (20) respondent draw from the two Oil Companies (Human Resources- Information Management Report, 2011, Human Resources and corporate Affairs Report, 2011 & Human Resources Report, 2011).

Instrument for Data Collection: The researcher developed an instrument known as Executive Stress Measurement Scale (ESMS). The instrument was designed to elicit information from respondents about the symptoms of executive stress for executive workers, causes of executive stress, nature of executive stress and workload.

It consisted of 4 clusters with each cluster corresponding to a construct. The responses to the instrument were rated on a 4-point Scale to indicate their level of agreement and disagreement with various items. The Executive Stress Measurement Scale (ESMS) comprised of two sections. Section A elicited the personal data of the executive workers' Stress. The bench marks for scoring the instrument was in this order: Strongly Agree (SA) -4 (3.50-4.49) points, Agreed (A) -3 (2.50–3.49), Disagreed (D) -2 (1.50-2.49) point and Strongly Disagreed (SD) -1 (0.50-1.49) point for all positively cued items and the reverse was the case for negatively cue items.

Validation of Instrument: The instrument with 108 items was given to 5 experts in measurement and evaluation, 1 from Rivers State University of Science and Technology, Port Harcourt; 4 from University of Nigeria, Nsukka (UNN) and 2 experienced psychology lecturers, from the Department of Educational Foundations, University of Nigeria, Nsukka for face and contents validation. They were asked to comment on the adequacy of the instrument and suggest ways of improving the instrument. The validators' suggestions include making sure that the number of items are not less than sixty-four (64) and more than One Hundred (100) to enhance factor analysis and each section (construct) should have at least 8 items. The construct should be replaced with section so that the respondent will not be set on reading the construct as sub-heading in the final segment of the instrument. All their comments and recommendations were incorporated in the final version of the instrument; Executive Stress Measurement Scales (ESMS) which led to the development of the new instrument with 90 items. For construct validation of the instrument, the 90 items drafted instrument was subjected to factor analysis as recommended by experts (Plake and Parker, 1982). The principal-axes method with Varimax rotation option was applied using the SPSS Statistical Package. The criteria level of 0.50 factor loading standard as recommended by Plake and Parker, (1982) for accepting items in terms of item loading to a factor was adopted. According to Plake and Parker items that have a loading factor up to 0.50 are factorially pure and were retained and items not loaded into any of the factors, either did not meet the item loading standard of 0.50 or they have loading of up to 0.50 on more than one factors are factorially complex and was discarded.

Reliability of the Instrument: In order to ascertain the reliability of the instrument that was used in gathering data for the study, reliability co-efficient of the ESMS was established with the use of split halves technique. Copies of the instrument were administered to 20 executive workers in the Oil Companies, 10 in Nigeria Agip Oil Company, Omoku in Ogba/Egbema/Ndoni Local Government Area of Rivers State and 10 in Shell Petroleum Development Company, Agbada Community, Igwuruta in Ikwerre Local Government Area of Rivers State which were not used in the main study. Data generated in the administration of the instrument were correlated by the split half method. In this approach, the test is administered once. The result is divided into two halves, so each testee obtains two scores, one from each half of the test. The scores on the two halves were correlated using Spearman Ranking Order Correlation (r). A reliability co-efficient of 0.70 was obtained for the ESMS. Spearman Brown Prophecy was used to determine the internal consistency of the instrument and the value obtained was 0.82. With this co-efficient, the research instrument was

considered to be reliable for the measurement of executive stress among Nigeria Oil Company workers in Rivers State.

Method of Data Collection: In collecting the data for this study, the researchers personally went to the three (3) Oil Companies involved in the study and administered copies of instrument to the executive workers in the Oil Companies. All the copies of the instrument administered were collected on the spot. The executive workers' responses were then scored and the data generated were analysed.

Method of Data Analysis: Data that were collected with the instrument were analysed using factor analysis, Cronbach alpha and Correlation. Research questions 1 and 2 were analysed using factor analysis, and research question 3 was analysed using Cronbach alpha. Hypothesis 1 was tested at 0.05 alpha levels with correlation through inter-correlation of result of ESMS.

Results:

Research Question One (1): *Which items of the instrument, Executive Stress Measurement Scale (ESMS) survived factor analysis in terms of their factor loadings?* The responses of the sample of executive workers in Nigeria Oil Companies in Rivers State on the 90 items of the drafted instrument were subjected to factor analysis using Principal Component Analysis. For the Executive Stress Measurement Scale, the Normal Varimax Method of Rotation was done with reference to the Principal Factor Solution for the 90 items. Four (4) factors were extracted. Summary of the varimax rotated factor loading for 90 items/variables is shown in Table 1 below. Varimax Rotated Component Matrix: Factor loading for 90 items.

Items	Factor 1	Factor 2	Factor 3	Factor4
1.	.371	**.810**	.284	.155
2.	.149	.221	**.909**	.075
3.	.180	.209	**.800**	.129
4.	.306	**.715**	.343	.152
5.	.154	.334	**.763**	.114
6.	.149	.221	**.909**	.075
7.	.186	.434	**.752**	.120
8.	.175	**.642**	.397	.149
9.	.261	**.644**	.412	.139
10.	**.634**	.461	.493	.145

11.	.188	.324	**.753**	.114
12.	.336	.658	.508	.079
13.	.551	.549	.500	.128
14.	.473	**.599**	.436	.081
15.	**.667**	.442	.381	.109
16.	.393	**.780**	.272	.150
17.	**.659**	.349	.340	.240
18.	.223	.461	.388	**.641**
19.	.455	.179	.510	.567
20.	.360	.400	.483	.461
21.	.214	.258	**.555**	.025
22.	.293	.678	.591	.143
23.	–.330	**.616**	.451	.387
24.	.115	.212	**.872**	.047
25.	.247	**.779**	.416	.165
26.	.654	.606	.147	.166
27.	**.798**	.337	.283	.222
28.	.453	.171	493	**.626**
29.	**.589**	.378	.389	.191
30.	.662	.164	.533	.393
31.	**.714**	.339	.497	.182

32.	**.644**	.396	.225	.158	
33.	**.791**	.232	.313	.286	
34.	**.564**	.468	.489	.197	
35.	.517	.137	.541	.571	
36.	.367	.198	.363	**.614**	
37.	**.761**	.311	.376	.217	
38.	.248	.471	**.688**	.119	
39.	.174	.374	.442	.467	
40.	–.324	_.110	_.391	_.644	
41.	–.163	_.150	.027	**.845**	
42.	–.178	_.714	_.395	_.028	
43.	**.515**	.295	.089	.213	
44.	.220	.455	.233	**.522**	
45.	_.385	_.109	_.353	_.483	
46.	.316	.685	.141	.504	
47.	.288	.373	.368	**.632**	
48.	.288	**.603**	.473	.067	
49.	**.796**	.237	.118	.206	
50.	**.735**	.148	.147	.443	
51.	**.856**	.340	.101	.219	
52.	.645	.630	.139	.153	
53.	**.747**	.467	.126	.160	

54.	**.757**	.117	.146	.416
55.	.505	.736	.204	.141
56.	.362	**.782**	.277	.163
57.	**.744**	.090	.124	.492
58.	.573	.038	.109	.679
59.	.508	.706	.193	.158
60.	–.705	_.136	_.138	_.444
61.	–.372	_.617	_.205	_.539
62.	–.231	_.632	_.303	_.558
63.	–.588	_.613	_.129	_.187
64.	–.311	_.204	_.509	_.687
65.	_.214	_.324	_.456	_.664
66.	.416	.546	.110	.510
67.	.193	.115	.000	**.682**
68.	_.503	_.559	_.269	_.399
69.	_.476	_.227	_.400	_.498
70.	_.275	_.705	_.293	_.421
71.	_.719	_.114	_.110	_.486
72.	_.817	_.322	_.075	_.270
73.	_.570	_.044	_.108	_.653
74.	_.531	_.571	_.065	_.500
75.	_.744	_.182	_.106	_.446
76.	_.832	_.221	_.113	_.348
77.	_.850	_.289	_.114	_.249
78.	**.873**	.346	.099	.230
79.	.452	.041	.082	**.788**
80.	.076	.198	_.070	**.771**
81.	.102	.195	**.827**	.142
82.	**.823**	.324	.120	.269
83.	.563	.037	.110	.726
84.	.452	.041	.087	**.788**
85.	.158	.160	.008	**.811**

86.	_.032	_.106	**.726**	.335
87.	.154	.434	**.763**	.114
88.	.133	**.713**	.331	.143
89.	_.657	**.606**	_.289	_.226
90.	_.669	_.374	**.762**	_.296

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 13 iterations.
The Criterion level of 0.50 was set for factor loading standard as recommended by Plake and Parker (1982) for accepting items loadings to a factor. As presented on the table above, items 10, 15, 17, 27, 29, 31, 32, 33, 34, 37, 43, 49, 50, 51, 53, 54, 57, 78 and 82 were loaded on factor 1. Items number 1, 4, 8, 9, 14, 16, 23, 25, 48, 56, 88, and 89 were loaded on factor 2. Items number 2, 3, 5, 6, 7, 11, 21, 24, 38, 81, 86, 87 and 90 were loaded on factor 3. Items number 18, 28, 36, 41, 44, 47, 67, 79, 80, 84 and 85 were loaded on factor 4. The items with 0.50 and above are factorially pure. The other items not loaded into any of the factors, either did not meet up the item loading standard of 0.50, that is items 20, 39, 40, 42, 45, 60, 61, 62, 63, 64, 65, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77 and 83 or they had loading of up to 0.50 on more than one factor, that is, items 12, 13, 19, 22, 26, 30, 35, 46, 52, 55, 58, 59 and 66 are factorially complex and were discarded. Also, from the table, according to Plake and Parker (1982), the minimum number of items for accepting a factor as being valid is four. In all, 55 items considered to be valid were built into the instrument. A total number of 55 items were retained while 35 items were dropped.

Research Question 2: *What is the validity of the factors underlying the construct addressed by the items of the ESMS as determined by the nature and magnitude of the factor loading?*

The responses of the research subjects on the 90 items were also subjected to data reduction procedure, that is, factor analysis. 4 factors were extracted. The 4 factors stand for symptoms of executive stress, causes of executive stress, nature of job stress and workload. A factor that has at least four items adequately loaded on it was accepted as valid. (Plake and Parker 1982). According to Plake and Parker, factors that have few items or no items loaded on them were eliminated. Table 2 below shows the four factors that are considered factorially pure and valid because they have at least 4 items loaded on it.

Table 2: The four factors and their corresponding items with their factor loadings.

Factors	Items	Items Loading Factors
1. Symptoms of Executive Stress	10	.634
	15	.667
	17	.659
	27	.798
	29	.589
	31	.714
	32	.644
	33	.791
	34	.564
	37	.761
	43	.515

	49	.796
	50	.735
	51	.856
	53	.747
	54	.757
	57	.744
	78	.873
	82	.823
2. Causes of Executive Stress	1	.810
	4	.715
	8	.642
	9	.644
	14	.599
	16	.780
	23	.616
	25	.779
	48	.603
	56	.782
	88	.713
	89	.606
3. Nature of Job Stress	2	.909
	3	.808
	5	.763
	6	.909
	7	752
	11	.753
	21	.555
	24	.872
	38	.688
	81	.827
	86	.726
	87	.763
	90	762
4. Workload	18	.641
	28	.626
	36	.614
	41	.845
	44	.522
	47	.632
	67	.682
	79	.788
	80	.771
	84	.788
	85	.811

The results of data analysis contained in Table 2 above revealed that four (4) factors were extracted and items were substantially loaded in them. Items 12, 13, 19, 20, 22, 26, 30, 35,

39, 40, 42, 45, 46, 52, 55, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77 and 83 were dropped completely from the second draft of the ESMS. Specifically, items 12 and 13 were loaded on factor 2 and 3 while items 13 loaded on factors 1, 2 and 3. Also, items 19 loaded on factors 3 and 4 while items 26, 52, 55 and 59 loaded on factors 1 and 2. In the same vein, items 35 loaded on factors 1, 3 and 4, while items 46 and 66 loaded on factors 1 and 4. Since they appeared on more than one factor, they are described as factorially complex. Items 20, 39, 40, 42, 45, 60, 61, 62, 63, 64, 65, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77 and 83 were not loaded on any factor and were also dropped. They are said to be factorially impure. Plake and Parker (1982) recommended that a loading of 0.50 should be the minimum level for accepting any item as being valid.

Data on Table 2, also shows that a total of four factors and 55 items emerged factorially valid. Factor 1 measuring items 10, 15, 17, 27, 29, 31, 32, 33, 34, 37, 43, 49, 50, 51, 53, 54, 57, 78 and 82 which implies symptoms of executive stress. Factor 2 measuring items 1, 4, 8, 9, 14, 16, 23, 25, 48, 56, 88 and 89 which imply causes of executive stress. Factor 3 measuring items 2, 3, 5, 6, 7, 11, 21, 24, 38, 81, 86, 87 and 90 which implies nature of job stress and factor 4 measuring items 18, 28, 36, 41, 44, 47, 67, 79, 80, 84 and 85 which implies nature of work load. Each of the factors contains more than 4 items with their corresponding factor loading in line with what Plake and Parker (1982) postulate.

Research Question 3: *What is the reliability coefficient (measure of internal consistency) of the instrument (ESMS)?* The measuring of internal consistency of the 55 items instrument was computed using Cronbach alpha technique. The result of the analysis is presented in Table 3 below:

Table 3: Reliability coefficient (Cronbach alpha) of ESMS computed using SPSS.

N	ESMS	No. of Items	Reliability coefficient (Cronbach alpha)
120	Over all	1 – 55	0.89
	Factor 1: (Symptoms of Executive Stress)	10, 15, 17, 27, 29, 31, 32, 33, 34, 37, 43, 49, 50, 51, 53, 54, 57, 78 and 82	0.86
	Factor 2: (Causes of Executive Stress)	1, 4, 8, 9, 14, 16, 23, 25, 48, 56, 88 and 89	0.82
	Factor 3: (Nature of Job Stress)	2, 3, 5, 6, 7, 11, 21, 24, 38, 81, 86, 87 and 90	0.81
	Factor 4: (Work Load)	18, 28, 36, 41, 44, 47, 67, 79, 80, 84 and 85	0.70

The result of the data in Table 3 shows that a reliability coefficient of 0.89 was obtained for the entire items of ESMS. Table 3 also shows the reliability coefficient of the four (4) factors. Reliability coefficient of factor 1 (Symptoms of Executive Stress) = 0.86, reliability coefficient of factor 2 (Causes of Executive Stress) = 0.82, reliability coefficient of factor 3 (Nature of Job Stress) = 0.81 and reliability coefficient of factor 4 (Workload) = 0.70.

Hypothesis 1: The validity of the factors underlying the constructs addressed by the items of the ESMS as determined by the nature and magnitude of their factor loadings will not be significantly greater than zero at $P<0.05$.

Table 4: Result of Data Analysis on Construct Validity.

Coefficient derived from its inter-correlation with the ESMS.

Categories	**Initial Test Result of ESMS**	**Inter-Correlation Result of ESMS**
Initial Test Result of ESMS	1.00 (0)	0.80 (120)
Inter-correlation Result of ESMS	0.80 (120)	1.00 (0)

N = 120 No. of items = 55 r = 0.80 df = 118 alpha = 0.55 Sign = 0.00

Table 4 above shows that the result of data analysis for testing the null hypothesis on the validity of the factors underlying the constructs addressed by the items of the ESMS as determined by the nature and magnitude of their factor loadings. The result shows that average community obtained through inter-correlation result of ESMS is 0.80 with associated probability of 0.00. Since the probability value was less than 0.05 levels of significance, the null hypothesis was rejected. Hence, it was concluded that the validity of the factors underlying the constructs addressed by the items of the ESMS as determined by the nature and magnitude of their factor loadings is significantly greater than zero at $P<0.05$. The construct validity of the ESMS is 0.80. Therefore, ESMS has high and significant construct validity coefficient.

Discussion:

Items of the Instrument: Items of the result shows that four (4) factors were extracted and items were substantially loaded on them from the 90 items which were used for the study after data reduction procedure. Factor 1 loaded the following items 10, 15, 17, 27, 29, 31, 32, 33, 34, 37, 43, 49, 50, 51, 53, 54, 57, 78 and 82 (19 items) which implies symptoms of Executive Stress; Factor 2: 1, 4, 8, 9, 14, 16, 23, 25, 48, 56, 88 and 89 (12 items) which implies Causes of Executive Stress; Factor 3: 2, 3, 5, 6, 7, 11, 21, 24, 38, 81, 86, 87 and 90 (13 items) which implies Nature of Job Stress and Factor 4: 18, 28, 36, 41, 44, 47, 67, 79, 80, 84 and 85 (11 items) which implies Workload. The items with 0.50 and above are factorially pure. The other items not loaded into any of the factors, either did not meet the item loading standard of 0.50 or had loading of up to 0.50 on more than one factor are factorially complex and were discarded. A total of 55 items were retained while 35 items were discarded.

According to Plake and Parker (1982), the minimum number of items for accepting a factor as being valid is four and that item will be accepted based on two things; each items met the 0.50 minimum loading in one and only one factor. In all, the 55 items considered to be valid were built into the instrument. This is against the view of Schuster and Millard (1978) who recommended 0.30 as the criterion level standard for loading items into factor. Meredith (1969) recommended 0.35 as the criterion level standard for loading items into factor. And Leak (1982) recommended 0.40 as the criterion level standard for loading items into factor. Meredith (1969) and Schuster and Millard (1978) also shared the same opinion of Plake and Parker (1982) that the minimum number of items for accepting a factor as being valid is four.

This study is in line with Nwaka (2002) who opined that factor explains the maximum variance in all the test items while factor loading represent the correlation of each item to the factor and is the factorial validity of their item. According to Nwaka (2002), factors analysis is sometimes used when the researcher has a large set of variables and suspects that they could be summarized more concisely by a few underlying factor but is not certain what these factors would be. According to Oche (2008), factor analysis involves the dimension of inter-correlation of a series of test scores or other measures so as to determine the number of dimension the test space occupies or their type and of variance. According to Ezugwu (2006), when an instrument is developed and presented to some experts or specialists, the instrument requires a further statistical exercise known as factor analysis.

The Validity*:* The result shows that a total of four factors and 55 items emerged factorially valid and 35 items were dropped. Each of the factors is of more than four items with their corresponding factor loadings in line with what Plake and Parker (1982) postulate. They recommended that a loading of 0.50 should be the minimum level for accepting any item as being valid. According to Oche (2008), the choice of values in the diagonals also differs. Some used unities while some used squared multiple correlations as initial communality estimates. The number for accepting an item in terms of its factor loadings varies among authors. The acceptable level is the sole choice of the instrument developer. In other words, before an item is accepted, it has to meet certain criterion level. This is in disagreement with the recommendation made by Schuster and Millard (1978) who recommended that 0.30 should be the minimum value for accepting any value as being valid. Meredith (1969) recommended 0.35 while Leak (1982) recommended 0.40 as the minimum values for accepting an item as being valid. The four constructs representing the four factors in which the items were loaded are symptoms of executive stress, causes of executive stress, nature of job stress for executive workers and workload. According to Plake and Parker (1982), items will be accepted based on two things; each item met the 0.50 minimum loading in one and only one factor.

The findings is in line with that of Onyeizugbo (2007b) who carried out a research work on the Univesity of Nigeria Stress Symptom Scale (UNSSS) which was developed to access an individual's response to stress in a holistic manner. That means that one reacts to stress physiologically and psychologically producing physical and psychological symptoms using a sample of 233 participants on 50 items of UNSSS were factorially valid. Okafor (1991) developed and validated an instrument known as Mathematics Test Anxiety Scale (MTAS), 28 items were factorially valid.

This study is also in line with Nwaka's (2002) work on Administrative Listening Skill Inventory (ALSI). 60 items were developed and validated with a sample of 257 Secondary School Principals. 24 items survived factor analysis and are factorially valid. Chukwudolue (2002) also worked on the construction of Teacher Motivation Assessment Scale (TMAS) for Secondary School Teachers in Anambra State. 9 factors were extracted and 22 items were factorially valid. This study is also similar to the work of Arubayi (2003) who developed and factorially validated a 40-item instrument titled: Evaluation Form Standardized (EFS) for Nigeria Academic Environment in Universities. A sample of 150 Education students in State

College of Education in Nigeria responded to a 40- item instrument designed to assess the instructional effectiveness. 7 factors are factorially valid.

Reliability of the instrument (ESMS): The result of Cronbach alpha indicates a high reliability coefficient of 0.89 obtained in the entire 55 items of the instrument and reliability coefficient of the 4 factors from 1 to 4 as 0.86, 0.82, 0.81 and 0.70 respectively.

Reliability coefficient of any instrument, according to Ubulom, Uzeoshi and Amini (2011) and Anastasi and Urbina (2010), is the degree of consistency such instrument has. According to Anastasi and Urbina (2010), to obtain a high reliability shows that the instrument measures dependability, consistency, predictability and accuracy. Since the instrument is of the four point scale, the Cronbach alpha test of internal consistency was considered most. Also with high reliability coefficient, it is a confirmation of high inter-item consistency which is very dependable. Consequent upon that, the implication is generally acceptable degree of consistency with items not less than 15 (Gordon, 2002).

This work is line with Chukwudolue (2002) whose instrument title; Teacher Motivation Assessment Scale (TMAS) for Secondary School Teachers in Anambra State. The 22 items developed and validated were administered to 476 secondary school teacher in Anambra State. On analysis, to test the reliability coefficient of TMAS, the 22 items were subjected to test of internal consistency using Cronbach alpha. The result is 0.74 reliability coefficient and the reliability coefficient of the factors' one of the other was also obtained. The result is equally in line with Ezugwu (2006), whose instrument titled; Student Appraisal of Technical Effectiveness in College of Education had a high reliability coefficient of the entire instrument as 0.96 and the reliability coefficient of each factors as 0.50, 0.70, 0.86, 0.97, 0.52, 0.84, 0.50 and 0.77. He also reported that greater values indicate greater reliability.

The result of this study agreed with that of Buker (2006) who developed and validated an instrument known as laboratory-Based Test for Assessing Practical Skills of Higher National Diploma Students in Electrical Maintenance and Repairs.Task analysis was used in generating items of the instrument. A 20 task and 459 practical skills were developed. The result revealed reliability coefficients of 0.71, 0.85 and 0.47 respectively.

The findings is similar to that of Onyeizugbo (2007b) whose work reported on the development and validation of a scale that measures stress reactions – the University of Nigeria Stress Symptom Scale (UNSSS). The 50 item UNSSS is a single factor scale that measure symptoms of stress from physiological, psychological and social perspectives. The UNSSS has an alpha coefficient of 0.91, split half reliability of 0.90 and test –retest reliability of 0.63. The study is in agreement with Nwaka (2002) work on Administrative Listening Skill Inventory (ALSI). A 24- item was developed and validated with a sample of 257 Secondary School Principals. The reliability coefficient of the 24 items that survived factor analysis was computed using the Cronbach alpha solution. The result showed that the reliability coefficient of the 24 variables that survived factor analysis is 0.76.

The Validity of the Factors Underlying the Constructs Addressed by the Items of the ESMS: The result revealed that construct validity obtained from average communality through inter-correlation of results of the ESMS is 0.80 with associated significance value of 0.00. Since the probability value was less than 0.50 levels of significance, the null hypothesis was

rejected. Hence, it was concluded that the validity of the factors underlying the constructs addressed by the items of the ESMS as determined by nature and magnitude of factor loadings is significantly greater than zero which shows that the construct validity coefficient of ESMS is 0.80.

The finding is in line with that of Onyeizugbo (2007b) who carried out a research work on the University of Nigeria Stress Symptoms Scale (UNSSS) which was developed to access an individual's response to stress in a holistic manner. Using a sample of 223 participants on 50 items of the UNSSS on a single scale in measuring stress reactions, it is obvious that the UNSSS is a valid measure of stress reactions as exhibited in high predictive validity with the Enugu Somatisation Scale –Reactions (r=0.73), high concurrent validity was STAI forms y-1 and y-2 (r=0.56 and 0.58 respectively).

This study is in line with Taylor (2004) who constructed the Student Problem Inventory (SPI). The construct validity of the instrument was determined through inter-correlation with other instruments such as the Test Anxiety Scale which produced a value of 0.45. The construct validity (of the SPI) was able to distinguish between groups that were known to differ on the construct measured the inventory.

The finding agreed with that of Bakare (1977b) who developed a 100-item Vocational Interest Inventory (VII) for identifying the vocational interest area of Secondary School students. The construct validity of the scale was determined through inter-correlation procedure. The value obtained ranged from 0.09 to 0.75. The work is also similar to that of Bakare (1977d) who developed a 16 - item Motivation for Occupational Preference Scale (MOPS) for identifying the motivational factors behind students' choice of occupations. The instrument was validated with a sample of 28 classes 4 Secondary School Students on a test – retest basis with a resulting value of 0.89.The finding of this work is similar to that of Nworgu (1985) who developed a 65 – item instrument in the area of Physics and validated with 564 students in Secondary Schools in Anambra State. The inter-correlation among the sub tests in the Physics Achievement Test (PAT) was all positive. Both the reliability and validity of the Physics Achievement Test (PAT) was found to be 0.06 and those of the sub-tests ranged from 0.05 to 0.08.

Conclusion: Out of the 90 items of ESMS subjected for factor analysis, 55 items met the requirements and acceptable as valid for inclusion into the items instruments, ESMS. The remaining 55 valid items that survived the factor analysis were distributed along the 4 factors which explain Executive Stress Measurement Scale (ESMS) Constructs. An inter-item consistency analysis was carried using Cronbach alpha. The result of this shows that the entire instrument ESMS has high internal consistency and therefore very reliable. The construct validity of the instrument was carried out. The result shows that the instrument (ESMS) has a high inter-correlation coefficient and therefore very valid.

Educational Implications of the Study

The findings of the study have the following educational implications;

1) Now that the ESMS, a valid and reliable instrument is available, the Ministry of Education, Ministry of Petroleum Resources, Directorate of Petroleum Resources as well as Counsellors could use it in measuring the Executive workers in Nigerian oil companies in Rivers State.

2) It could also serve as a self evaluation measuring scale.
3) Haphazard ratings of executive workers are no longer necessary. Availability of ESMS enhances effective performance of evaluation of executive workers in this skill domain. This will help the government, Ministry of Education and Petroleum Resources in making decision on personal issues like who will be deployed in a particular school, organization and industries to administer.
4) With the availability of the ESMS supervisors of education, administrators and managers of organizations could make a regular check on Executive Stress Measurement Scale of Executive workers. Based on the outcome of such checks, aspects of ESMS where executive workers are deficient could be readily identified. Consequently, the deficient areas could form the basis for in-service training and counselling services to remedy such deficiencies.

Recommendation:

Based on the findings of the study, the following recommendations are made;

1) The instrument, ESMS should be used by the Rivers State Education Commission, Port Harcourt, all Principals, Educator, Schools, Researchers, Students, oil companies workers among others in measuring the executive stress among their executives.
2) The instrument should be given at the end of each year/contact in order to find out how effective workers are coping with the stress level.
3) Executive workers and other heads of Parastatals should also use the ESMS for self-evaluation.

Limitations of the Study

1) Inadequate Sample: One hundred and twenty (120) out of the three hundred and sixty one (361) executive workers were used as respondents for the study. This shows the level of inadequacy of the respondents' representation in the study.
2) The use of Executive Workers Self-Rating Scale: This may probably lead to error responses which may be different from the opinions of the respondents.
3) Problem of Entrance: It is difficult to have access into the companies due to the state of insecurity and militancy in the State/Nigeria.
4) Data Collection: It is difficult to assert that the responses of the executive workers are free from pretention. This may probably arise from personal biased of a respondent.
5) The present study was limited to only Rivers State. Result into similar investigations in other States of Nigeria may or may not confirm the present findings.
6) Some Executive workers seem to be too busy to respond promptly to the questionnaires and as such, will ask you to come again for the collection.
7) Inadequate empirical study for review.

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