

**PHYSIOLOGICAL BURDEN ON COGNITIVE PERFORMANCE
OF MIDDLE MANAGERS IN MODERN ORGANIZATION:
NIGERIAN EXPERIENCE**

Ule, Prince Alamina

Doctoral Scholar, Department of Management,
Niger Delta University, Wilberforce Island, Nigeria.
Email: ule.alamina@gmail.com

Friday Ogbu Edeh

Department of Business Administration
Faculty of Management & Social Sciences
Alex Ekwueme Federal University, Ebonyi State, Nigeria
Email: edeh.ogbu@gmail.com

ABSTRACT

This study investigated the effect of physiological burden on cognitive performance of middle managers in Nigerian work organization. Data was collected from 62 middle managers in manufacturing, banking and oil firms operating within Niger Delta States, Nigeria. Data collected were subjected to multiple regression analysis and the outcome indicated that physiological burden adversely affect middle managers cognitive ability to perform assiduously in the Nigerian work environment due to burden which translate into emotional damage on their physical and mental wellbeing. The study concluded that organizations need to build structures that would enable middle managers develop self confidence in order to function amidst stressful conditions, since mental workload proves to reduce individual ability to function effectively. The study recommends that Nigerian managers should discourage coercive behaviours for improving productivity because human beings are not animals but emotional creatures that perceive negative treatment as dehumanization of their personality in the workplace.

Keyword: Cognitive Performance, Middle Managers, Psychological Burden, Stress, Workload, Work Complexity.

INTRODUCTION

Global competition and advances in modern technology have continuously caused drastic changes in the tasks and responsibilities of managers as stiff competition for scarce resources has placed increased emphasis on how organizations' need to improve in its efficiency and effectiveness (Jones & George, 2008). Thus, top managers are encouraging their subordinates to think outside the box by taking a cross departmental view in order to identify new opportunities that will spur organizational performance (Hirte, 2018; Ule, Coker & Idemudia, 2019) but despite these efforts to aptly implement successful strategies amidst new entries using the right measures (Floyd & Woolridge, 1994) middle managers still perform below standard as they build structures to compensate for their weakness in macro design (Livijn, 2019) hence the attack on the roles they play in modern organization. Notwithstanding these negative attacks on the redundant nature of middle managers in modern organizations, they still play crucial roles in facilitating organizational restructuring (Balogun & Johnson, 2004) thereby accomplishing certain organization activities geared towards renewal (Floyd & Lane, 2000).

Although there is no denying the fact that middle managers in contemporary work organization face challenges ranging from stress related activities to physiological and psychological burden that adversely affect their cognitive ability to perform as well carryout their assigned tasks as a result of work complexities, workloads, social pursuits, work under-load that does not match employees level, etc (Blaug, Kenyon & Lekhi, 2007; Patrick, Lee, Raha, Pillai, Gupta, Sethi, Mukeshimana, et al, 2017; Kyung, Ho, Jae, Sang, Ye, & Hm, 2018). However, Ali, Abdiaziz and Abidqani (2013) argued that the performance and productivity of an employee in any organization is a reflection of his/her working condition which tend to influence its impact on service delivery because in a situation where such employee is exposed to stressful working conditions productivity is sure to be negatively influenced on the delivery system. Hence, Amah and Alamina (2015) in their study advocated that it is only when an employee have complete knowledge of his/her functionality (self awareness) that such employee can function effectively in organization amidst stressful working conditions and social influence and these awareness build in such individuals self confidence that will enable them have an accurate self assessment of themselves in order to be effective. In congruence with the above assertion, other scholars equally posited that the utmost desires of every organization is to increase productivity hence the need to create a healthy and stress free working environment becomes the desires of employees to assiduously perform their assigned tasks (Ibrahim, 2013; Job, 2014).

Although the gross inability of some mangers in Nigeria to effectively execute their responsibilities can be traced to low cognitive ability caused by stressful condition attached to their jobs which results from physiological burden as the work

environment in Nigeria is clouded with uncertainties thereby forcing organizations to adopting stringent measures in order to increase productivity without recourse to the individual psychological state of mind. Perhaps, this scenario spurred Eketu (2018) to the thinking that the fear of an unpleasant consequence by Nigerian employee compels a desirable behaviour which he/she believes is capable of generating normative and continuance commitment as against affective commitment. Thus middle managers ability to function effectively amidst psychological and physiological burden and other related factors that could affect their cognitive ability to perform becomes the focal point of this paper, considering the paucity of research on the possible effect of physiological burden on cognitive performance in Nigeria.

LITERATURE REVIEW

Nature and Concept of Physiological Burden

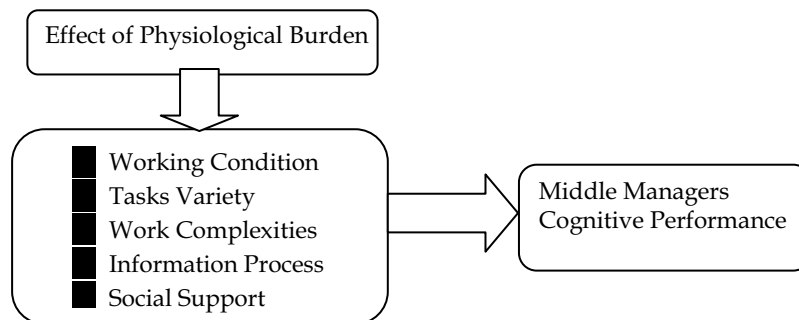
As the workplace becomes more tensed due to increasing rate of technological advancement, managers tend to reorganize themselves in order to remain viable in their jobs. This reorganization have triggered impaired psychological work environment that have adversely generated health consequences among their workforce (Kivimaki, Vahtera, Ferrie, Hemingway & Pentti, 2001). Surprisingly, the pathological mechanisms linking this impaired psychosocial work environment is caused by prolonged physiological stress reactions (Rikke, 2014). However, the ability of middle managers to recognize their cognitive role amidst the increasing workload creates negative effect on their health thereby increasing physiological distress, musculoskeletal disorders, fatigue and or accident that often give rise to poor quality work performance within the organization (Fournier, Montreuil, Brun, Bilodeau & Villa, 2011).

Thus, organizations in contemporary time only pursue complex and diverse aim in order to increase their profit base (Kyung, *et al.*, 2018) without recourse to man who perhaps experiences high work intensity due to these pressures. Volkoff, Buisset and Mardon (2010) argued that pressure experienced by employee at workplace often affect their health even at fifties and above. Hence, the mental workload of an individual in organization reduces his/her cognitive ability to function effectively which aid in affecting such individual performance due to pressure, responsibility and or job interruption (Fournier, *et al.*, 2011; Morris, & Leung, 2006) and such psychological burden not only hinders work performance but also have direct bearing on workers (Kyung, *et al.*, 2018) wellbeing.

The concept “physiological burden” as introduced into workplace organization is borrowed from the clinical sciences and as such cannot be fully comprehended in management literature without recourse to its root and components thus the concept has no unified definition. Although, some scholars view it from the angle of

stress that triggers depressive behaviours felt by employees as a result of their concern for the success and or failure of their work and safety (Kyung, *et al.*, 2018). However, Crespo-Ruiz, Rivas-Galan, Fernandez-Vega, Crespo-Ruiz and Maicas-Perez (2018) additionally added that the response of the individual body to the stressors must correspond to a set of mechanism of escape whose magnitude of enrolment must depend on specific need and duration of the body.

Therefore, the physiological processes that instigate such stress must be understood in order to implement better strategies necessary for management. Hence, this study tend to define the concept as the physical, psychological and mental load employees' house in their heads in a work environment that impede on their cognitive ability to perform assigned tasks in relation to their delegated duty. This definition adopts work complexities, tasks variety, working conditions, information processing and social supports as the proxies to measure physiological burden. Although, Kyung, *et al.*, (2018) viewed some of these variables as determinants to psychological burden which they believe are pertaining to work performed by employees in organization. Below is a model we proposed to aid upcoming scholars in this knowledge domain.



Source: Researchers' Conceptualization (2019).

Middle Managers Challenge in Contemporary Era

With the intense challenge resulting from the digital transformation taking place globally, middle managers roles are becoming blurred (Hirte, 2018) as organizations are keen in pursuing goals that will enable them remain in business. Hence, middle managers who are scheduled with the responsibility of finding solutions to achieve organizational efficiency (Jones & George, 2008) are continually being confronted with the issues of increasing expectations of their involvement in organizational activities (Tarakci, Heyden, Floyd, Raes, & Rouleau, 2019) thereby bringing to the fore, the role managers play since most of their activities are been substituted with modern technologies (Gratton, 2011) bringing their relevance to obsolete in contemporary era. Nevertheless, considering the

unpredictable advancement in technology and the need to transforming organizations for increase productivity, middle managers are continuously confronted with the issues of psychological burden which adversely affect their cognitive ability to perform (Patrick, *et al.*, 2018; Blaug, *et al.*, 2007) effectively. This low cognitive ability elucidate the partway leading to poor physiological function such as vision, peripheral sensation and strength (Martin, Blizzard, Srikanth, Wood, Thomson, Sanders & Callisaya, 2013) to function due to stress related burden and social pursuits.

However, considering the continual financial losses organizations incurred in recent time due to the increasing pathologies of stressors, depression and or anxiety (European Agency for Safety and Health at Work, 2015) coupled with the mental and physical consequences aggravating the risk of suffering cardiovascular diseases as well reducing the value and quality of individual work life (Backe, Scidler, Latza, Rossnagel, & Schumann, 2012). It becomes expedient to understand the physiological processes that triggers stressors among managers in order to adopting strategies relevant for its management (Crispo-Ruiz, *et al.*, 2018) hence, the need to prioritize strategies that could aid in improving emotional wellbeing and adaptation since emotions has both positive and negative valence (Izard, Woodburn, Finlon, Krauthamer-Ewing, Grossman, & Seidenfeld, 2011).

EMPIRICAL REVIEW IN RELATION TO THE STUDY

With the nascent attack on the role of middle managers in contemporary organizations, Livijn (2019) examined how middle managers adapt macro design through navigating in a hierarchy. The study whose base is drawn from a case study on reorganization in a leading food production company sort to re-examine the role of middle managers in organizational design with an iterative approach that demand active involvement. The research came up with the position that lateral interaction and coordination leads to effectiveness of organization as it creates micro level elements organization needed to realize it intent behind top management strategy.

Furthermore, Hirte (2018) in a study re-evaluated the role of middle managers in order to aid them with the tool needed to succeed in a German automotive company. The study whose focus was sort to identify the role of middle managers in the implementation of a corporate incubator revealed that managers ability to influence top management and employees' was aimed at avoiding failure and resistance, thus the study becomes relevant to managers and organization who were often confronted with the challenges of transforming their firms due to unpredictable development and digitalization taking globally.

Sub and Kretzschmar (2018) conducted a study on the impact of cognitive abilities and prior knowledge on complex problem solving performance, empirical result

and a plea for ecologically valid micro world. The study was divided into two segments with the first focusing on 137 students under replicated tailoring shirt factory and the second 152 students completing a forestry scenario. The outcome of the study revealed that problem solving performance in the tailoring shop is greatly influenced by prior knowledge and reasoning. It was also found in the first category that the performance of complex problem solving is predicted by different types of system specific knowledge independently. However, the result of the second category indicates that working memory capacity has no incremental validity beyond reasoning. Based on these outcome, the researchers concluded that the performance of complex problem solving are predicted by prior knowledge and cognitive abilities as there are insufficient proof to consider complex problem solving as unique construct, therefore consider valid micro-worlds as indispensable tool for future complex problem solving research.

Kyung, *et al.*, (2018) carried out a study on developing a basic scale for workers psychological burden from the perspective of occupational safety and health. The study while adopting a 48 item instrument distributed to a sample population of 572 workers. The outcome after a confirmatory, exploratory and correlation factor analysis conducted on the new scale indicated that work attitude, safety and healthy workload, human error, negative self assessment and organizational activity had significant correlation with stability and reliability of the model as well confirmatory factor analysis. Based on the outcome, the study concluded that psychological burden scale can measure workers psychological burden in relation to health and safety and can be applicable to small size questionnaire.

Also, Crispo-Ruiz, *et al.*, (2018) examined executive stress management: physiological load of stress and recovery in executives on workday. The researchers recorded the heart variability rate during 48 hours from which the relationship was established between recovery quality and stress which was obtained at three different time interval (work, after work and night). Their result revealed a negative stress balance during the workday measurement and after work but report positive at night. They therefore perceived the need to prioritize strategies in order to improve stress management among executives since; stress generated outside work homes correlates with low level of quality recovery.

Furthermore, Patrick, *et al.*, (2017) in their study investigated the effect of sleep deprivation on cognitive and physical performance in University students. The study adopted a randomized control patten selected 64 participants with the aim of investigating the effect of night sleep deprivation on cognitive and physical performance. Hence, the outcome from the two tailed T-tests and MANOVA indicates that acute sleep deprivation have significant impact on student physical performance but not on their cognitive ability although, it has linkage to poor academic performance and physical dysfunction of the individual.

Martins, *et al.*, (2013) also investigated how cognitive function can modify the effect of physiological function on the risk of multiple fall. This population based study underlined the interplay between physiological function and cognitive performance with a randomized population of 386 adults between the age ranges of 60-80 years. Their findings indicate that adult continuous fall is as a result of their poor cognitive function due to a decline in their physical and physiological impairment.

Finally, considering the pervasive influence of individual cognitive ability to the performance and function of an organization, Deniz, Stephan and Chockalingam (2012) examined cognitive abilities and its usefulness for personnel selection using tasks performance, job satisfaction, leadership, work behaviour, job performance, contextual performance, innovation and creativity as an instrument for validation. The authors concluded that cognitive ability as an outstanding predictor should not only be used for selecting employee for a given job but rather use for the generality of workplace assessment.

However, in summary to these empirical investigation, the study contended that middle managers ability to function effectively in the contemporary work organization stem from their ability to effectively manage stressful working conditions as well adapting to strategies that could enable them overcome depression and disruptive tendencies in their cognitive ability to concentrate in executing their assigned task. Also, considering the increasing expectations of middle managers involvement towards organizational activities and processes, management of organizations' should not take for granted the exchange relationship that is expected to flourish in the interaction between the duo because why employers seek for increased productivity, employee desire in return fair treatment that could set the base for beneficial consequences (Alamina, 2017; Cropanzano & Mitchell, 2005) since one cannot function without the other (Goulder, 1960). Thus, the need to pay specific attention to issues bordering on manager's psychological being becomes ineluctable as a joke on their emotions plays out in their work behaviour which if not given due consideration would result to negative consequences in the form of depression and even disruption in their cognitive ability to function effectively.

METHODOLOGY

The positivist philosophical perspective was employed in this study as it involves the use of questionnaire to elicit middle managers experience and opinion on the effect of physiological burden on their cognitive performance. Data was collected using Morgeson and Humphery (2006) work design questionnaire and Annuziata, Muzzatti, Lorena and Lucchini (2011) cognitive functioning self assessment scale. These questionnaires were modified to suit the study in line with the Nigerian work environment. A cross section of sixty two (62) middle managers were selected from

manufacturing firms, deposit money banks and oil companies operating in Bayelsa, Rivers, Delta and Akwa-Ibom states respectively. The reasons behind the concentration in these aforementioned states was due to the fact that the researchers believed that managers in these localities are mostly confronted with several issues ranging from frustrating work environment as a result of youth restiveness, kidnapping and perceived neglect by the government due to the activities of militancy. These factors are believed to affect the cognitive ability of managers thereby generating low performance rate as it creates lack of concentration in their operating environment.

In this study, physiological burden is measured with working condition, task variety, work complexity, information process and social support. All these variables tend to pose some kind of psychological burden on employee in their work environment as it involves a kind of mental demand on employee's that give rise to managers ability to function effectively.

RESULTS

Table 1.1 Managers demographic details

S/no	Item	Categorization	Frequency	Percentage
1.	Managers Sex	Male	44	71.0%
		Female	18	29.0%
		Total	62	100%
2.	Managers Age	18-30 Years	4	6.5%
		31-40 Years	33	53.2%
		41 years/above	25	40.3%
		Total	62	100%
3.	Marital status of Managers	Single	12	19.4%
		Married	32	51.6%
		Others	18	29.0%
		Total	62	100%
4.	Academic qualifications	NCE/Equivalent	7	11.3%
		B.Sc/Equivalent	39	62.9%
		Above first degree	16	25.8%
		Total	62	100%

As seen in the demographic table above, it indicates that out of the sixty two (62) middle managers that partake in the study 71% were male and 29% were female; 6.5% were between the ages of 18-30 years; 53.2% were between 31-40 years and 40.3% were between 41 years and above. Also 19.4% were single; 51.6% were married and 29.0% fall under other categories. Finally, 11.3% had NCE and its equivalent; 62.9% had B.Sc and its equivalent while 25.8% had degrees above first degree qualification.

Descriptive Statistics				
Variables	No. of items	Mean	Std. Deviation	Alpha Coefficient
Working Condition	5	1.76	.717	.702
Tasks Variety	4	3.03	1.639	.740
Work Complexity	4	2.11	.977	.849
Information Processing	4	3.53	1.544	.716
Social Support	6	3.94	1.266	.824
Cognitive Performance	7	3.16	1.528	.869

The descriptive statistics shows the mean scores and standard deviations of physiological burden dimension and managers cognitive performance with social support having the highest mean value of 3.94 with a standard deviation of 1.266 followed by information process with 3.53 as mean and 1.544 as standard deviation. Also tasks variety with a mean value of 3.03 and a standard deviation of 1.639; work complexity have 2.11 as mean value and .977 as standard deviation While working condition has a mean value of 1.76 and a standard deviation of .717 and finally cognitive performance has a mean value of 3.16 and a standard deviation of 1,528 respectively.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.738 ^a	.545	.504	1.076

a. Predictors: (Constant), Social support, Task variety, Information process, Working conditions, Work complexity

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	77.532	5	15.506	13.389	.000 ^b
	Residual	64.855	56	1.158		
	Total	142.387	61			

- a. Dependent Variable: Cognitive performance
 b. Predictors: (Constant), Social support, Task variety, Information process, Working conditions, Work complexity

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error				Beta	Lower Bound
1	(Constant)	2.697	1.251		2.156	.035	.191	5.203
	Work condition	-1.018	.430	-.478	-2.366	.021	-1.880	-.156
	Task variety	-.149	.113	-.160	-1.320	.192	-.374	.077
	Work complexity	.198	.340	.127	.583	.562	-.482	.879
	Information process	.228	.129	.231	1.773	.082	-.030	.486
	Social support	.376	.179	.312	2.096	.041	.017	.736

- a. Dependent Variable: Cognitive performance

A multiple regression analysis was conducted to examine the effect of physiological burden on cognitive performance of middle managers in the contemporary Nigerian work environment. The result as indicated in the ANOVA shows the fitted regression equation with F value of 13.389 indicating the goodness fit of the model. However, all physiological burden variables puts together statistically predict middle managers cognitive performance $f(5,61) = 13.389$, $p < 0.05$ and $R^2 = 0.545$. This outcome reveals that 55% of middle managers cognitive performance in the Nigerian work environment can be explained by physiological burden they encounters while the remaining 45% cannot be accounted for by the dimensions of physiological burden as adopted by this study and therefore considered as error term.

The independent result of this regression analysis indicates that work complexity, information process among middle managers and social support given to managers all significantly predict and influence the variance in their cognitive performance at 95% confidential level with social support having a beta value, $\beta = .312$ and $t = 2.096$ followed by information process with a beta value, $\beta = .231$ and $t = 1.773$ and work complexity with a beta value, $\beta = .127$ and $t = .583$ while working condition and tasks variety negatively predict the change in cognitive performance with working condition having a beta value, $\beta = -.478$ and $t = -2.366$ and tasks variety having beta value, $\beta = -.160$ and $t = -1.320$ respectively.

DISCUSSION OF RESULTS

The study made an attempt to investigate the effect of physiological burden on cognitive performance of middle managers in modern organization with specific interest in the Nigerian work environment. The general outcome from the analysis revealed that physiological burden predicts middle managers cognitive performance in the Nigerian work environment.

This outcome is not surprising as it has been noticed that the Nigerian work environment is always plagued with countless challenges such that middle managers cognitive ability to function is impaired with several factors ranging from stress related outcomes to work pressure, work overload and or work strains, etc. In line with scholarly positions, Patrick, *et al.*, (2017); Martin, *et al.*, (2013); Blaug, *et al.*, (2007) opines that physiological burden adversely affect middle managers cognitive ability to perform effectively because these burden in most cases translate into emotional damage on middle managers mental and physical wellbeing hence, impaired on their cognitive ability to even recognize basic responsibility as well as vision and peripheral sensation talk more of performance. This position perhaps instigate Amah and Alamina (2015) argument that organizations can only increase productivity when employees' in their working environment ably understand their selves amidst stressful working conditions and social influences in order to

function effectively due to the fact that these understanding would enable such individual to build in self confident to withstand external pressure. Thus the increasing pathologies that trigger stress related symptoms in organizations can be curbed or reduced in order that middle managers could add value to organizations. It is equally pertinent to note that social support, information process and work complexities positively explains middle managers cognitive performance while on the contrary, working condition and tasks variety negatively contribute to the change in middle managers cognitive performance.

The implication in these assumptions indicate that if organizations support middle managers in executing their responsibilities through information sharing with guided activities towards work related outcome, middle managers in these environment would be strengthened to face the increasing expectation of their involvement towards organizational processes, even when the working conditions and tasks of such activity seems not to be favourable. Although, the argument here is in opposite direction with the work of Ali, *et al.*, (2013) who posits that employee's performance and increased productivity in an organization is the reflection of an individual working condition which they believe have direct bearing on service delivery because when such employee is exposed to stressful working conditions, the outcome has negative influence on his/her cognitive senses. These stressful working conditions create a sense of poor cognitive function irrespective of the work environment as it adversely affect other physiological factors (Martin, *et al.*, 2013) that hinders performances among organizations.

CONCLUSION AND RECOMMENDATION

The increasing quest for the reorganization of middle managers role in order to remain in business as well maintain their jobs is not a new phenomenon in the Nigerian context, considering the increasing rate of technological advancement globally. In fact, middle managers have been identified to facing confrontations with issues of increasing expectations of their role involvement in organizational process on daily bases thereby increasing managers' physiological burden on cognitive performance. Thus, middle managers tend to build in structures to compensate for their weaknesses since most organizations no longer pay attention to their wellbeing rather on how to increase productivity without recourse to managers exerted effort towards achieving this productivity.

The study therefore, conclude that since stress is relative to man's individual and social life, it becomes a prerogative for organizations and employers of labour in the Nigerian work organization to build in structures that would enable middle managers to develop self confidence in order to function amidst stressful working conditions because increase mental workload reduces individual cognitive ability to function effectively. In line with the conclusion, the study recommends that

Nigerian managers should discourage coercive acts of increasing productivity because human beings are not animals but emotional beings that perceive negative treatment as a call to dehumanization of their personality in the workplace therefore, the need to support middle manager morally and emotionally become ineluctable.

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