NIGERIAN ONLINE JOURNAL OF EDUCATIONAL SCIENCES AND TECHNOLOGY (NOJEST)

NIGERIAN ONLINE JOURNAL
OF
EDUCATIONAL SCIENCES
AND TECHNOLOGY

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OKORIE, Agnes
aookorie@nda.edu.ng
Nigerian Defence Academy, Kaduna, Nigeria

GARBA, Jummai
piruwa@yahoo.com, jumaigarba@nda.edu.ng
Nigerian Defence Academy, Kaduna, Nigeria

To cite this article:

OKORIE, A & GARBA, J. (2021). Relationship between Cognitive Style and Gender of Science and Art Cadets in Nigerian Defence Academy, Kaduna. *Nigerian Online Journal of Educational Sciences and Technology (NOJEST), 3*(2), Pages 86-91

Nigerian Online Journal of Educational Sciences and Technology (NOJEST)

Volume 3, Number 2, 2021

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Okorie, A & Garba, J

Article Info

Article History
Received:
29th May 2020

Accepted:
21 September 2021

Keywords
Field independent/dependent, Cognitive Style, Cadets, Science, Art, Gender

Abstract

This study investigated the relationship between cognitive styles and gender of science and arts cadets in Nigerian Defence Academy, Kaduna. Two null hypotheses guided the study. Correlational survey design was used for the study. The population was 215 part 3 science and arts cadets of the academy out of which a sample of 50 students was selected through simple random sampling technique. Hidden Figures Test (HFT) was the instruments used to identify the cognitive styles (field independent or field dependent). Independent t test was used to analyse the data. Findings revealed that there was no significant difference in the cognitive styles (field independence-field dependence) of science and art cadets in NDA Kaduna. Similarly, the independent t test revealed no significant difference between cognitive styles of male and female cadets of NDA. Based on the findings, it was recommended that deliberate effort should be made to identify students' cognitive styles so that adequate planning can be made to take care of these individualistic differences for proper subject placement and specialization.
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Introduction

Introduction

Since the adoption in 1977 (revised 2014) of the National Policy on Education (NPE), Nigeria has been spending the great percentage of her resources on educational expansion and development. The fundamental objective of this huge yearly expenditure, is among others to discover, develop, maximize and utilize the potentialities of the growing generation so as to advance the nation forward. But potentialities per se do not influence behaviour more than the manner of intellectual functioning or stable individual idiosyncratic preference. A persons' reaction to a stimulus is to analyze and understand the situation; a function of his cognitive style.

Cognitive Style is information processing that characterizes the way an individual analyzes and organizes the world (Witkin et al 1977). Specifically, Field-independent individuals (FI) rely on an internal frame of reference in processing and organizing environmental information and are not susceptible to deceptive environmental cues. Otherwise, field-dependent individuals (FD) rely on an external frame of reference and are susceptible to deceptive cues when identifying known elements in unknown settings. Cognitive Style is usually assessed by using tasks requiring participants to detect embedded simple pictures in complex configurations, such as the Hidden Figures Test (HFT; or the Rod and Frame Illusion, requiring participants to align to the vertical midline a rod in the presence of a tilted surrounding frame. Both of these tasks are usually performed better by FI.

Cognitive Style affects a wide range of cognitive skills and tasks, especially those requiring to go beyond the information given by the setting, that is tasks requiring cognitive restructuring. Examples of cognitive restructuring are disembedding and perspectivism. The former refers to the ability to extract salient information from the surrounding field, whereas the latter refers to the ability to recognize and to adopt the perspective of another person (Witkin et al 1977). Thus, there is an empirical evidence that individuals differ substantially in their styles of thinking and modes of creative expression. We do not learn or make perceptual judgements in the same way even though we employ same basic processes. For example, learning to add 2 and 6 can be done in many ways by different persons. A person can start the addition by setting a place in his mind at zero and go up 2 and then 6 more units, another person may start with the larger number 6 and go up 2 more units or another way is to start with the small number 2 and go up 6 more units. Although the persons employ different 'styles' to add 2 and 6 the answer remains the same '8'. Thus, people differ in their approach to solve problems or to organize the information they receive.

Increased interest in the ways that people process information has also stimulated the curiosity about the relationship between individual's information processing habit and being a male or female. Do the ways that cadets process information have anything to do with their gender? Studies have found different results as to whether cognitive styles (field independent-field dependent) are related to gender of an individual: Oginga 2020 and Garba, 2019, found no statistically significant difference between cognitive styles (field independent-field dependent) and gender. On the other hand, Okoye (2016), Onyekuru (2015) Musya (2015) and Jantan (2014) found disparity in field independent-field dependent cognitive styles in male and female subject with some in consistencies. For example, Onyekuru (2015) and Jantan (2014) reported that males were found to be field independent with females exhibiting field dependency. Okoye (2016 and Musya (2015), revealed that females tend to be field independent while the males showed field dependency but the inconsistency may not be unconnected with the nurture and nature factors affecting individual's way of processing and organizing mental activities.

Research Questions

1. What is the difference between the cognitive styles (field-dependent/field-independent) of NDA cadets?
2. What is the relationship between cognitive style (field-dependent/field-independent) and gender of NDA cadets?

Hypotheses

1. There is no significant variation in students' cognitive styles (field-dependent and field-independent) among NDA cadets.
2. There is no significant relationship between students' cognitive styles (field-dependent and field-independent) and gender among NDA cadets

Methods

Research Design

This research design is correlational study of cognitive styles and gender. According to in Correlation studies allow for relationships to be established. The design could simply establish the extent to which variables differ in a given way as per given condition and characteristics. Mivanyi, in Garba (2020).

Population

The target population for the study was 215 year-three cadets of Nigerian Defence Academy, Kaduna. The choice of year cadets was because they readily available and accessible for the study.

Sampling Technique

Simple random sampling technique was used to select 50 cadets from both art and science. All the female cadets were purposively selected because of their few number.

Instrumentation
The instruments used in collecting data were:
Hidden Figures Test (HFT) Developed by (Witkin, Goodenough & Karp 1962) and published by educational testing service in 1962. The test consisted of thirty-two (32) items in two sub-sections of 12 minutes each.

Validation of the Instrument
The Hidden-figures Test was given to the supervisors and other lecturers in the department for validation and they all approved the use of the instrument in the research. Weissenberg (1973) also established the concurrent validity of Hidden-figures Test by measuring psychological differentiation among groups of samples. The concurrent validity information derived from 12 studies showed the existence of a median correlation of .51 between the Hidden-figures and either the Individual Embedded-figures Test, the Rod-and-frame Test or Witkin's Figure-drawing Scale. It was concluded that given the need to test large numbers of subjects at one time, the Hidden-figures Test appears to be a reasonably efficient and effective instrument.

Reliability of Instrument
A pilot study was conducted to assess the adoptability of the instrument. A sample of thirty (10) students were used for the pilot study. During the administration of the test it was found that the 24 minutes allowed for the completion of the test was too short. This corresponds with the general observation that Africans are slower in such tests than the Americans and Europeans. To this effect, the time was adjusted to 20 minutes each per section. Thus, the completion time allowed became 40 minutes. The researcher, with the help of the school guidance counsellor administered the instrument. The test re-test reliability of HFT is found to be 0.94 as measured using Cronbach's alpha coefficient (Cronbach, 1951).

Procedure for Data Analysis
The data were analysed using independent t test to validate the hypotheses.
Results
Table 1: The Independence t test statistics on difference between Field dependent and Field independent cognitive styles of science and art cadets in NDA.

Variable	N	Mean	Std. dev	Mean Diff.	df	Computed t	Critical t	P
Field Independent	32	17.56	4.704					
				12.56				
					48	10.406	1.96	0.000
Field dependent	18	5.00	2.657					

The outcome of the independent t test statistics revealed significant difference exist in cognitive styles (field dependent and field independent) of art and science cadets in NDA Kaduna. Reasons being that the calculated p value of 0.00 is lower than the 0.05 alpha level of significance and the computed t value of 10.406 is greater than the 1.96 t critical value at df 48. Their computed mean cognitive scores were 17.56 and 5.00 by the field dependent and field independent cadets respectively with a mean difference of 12.563 in favour of the field independent cadets, indicating that the field independent cadets have significantly higher mean cognitive score than the field dependent cadets. Hence, the null hypothesis which stated that there is no significant difference between field dependent and field independent, cadets is hereby rejected.

Table 2: Independent t test statistics on difference between cognitive style of science and art cadets of NDA Kaduna

Variable	Gender	N	Mean	SD	MD	df	Computed t	Critical t	P
Cognitive styles	Male	45	13.0	7.25	0.04	48	0.013	1.96	0.990
	Female	5	13.0	8.80					

Calculated p > 0.05, t computed < t critical at df 48

The outcome of the independent t test statistics revealed no significant difference between male and female students from the Armed force staff college. This is because the calculated p value of 0.990 is greater than the 0.05 alpha level of significance and the computed t value of 0.013 is lower than the 1.96 t critical value at df 48. The computed mean cognitive scores were 13.04 and 13.00 for male and female students respectively with an insignificant mean difference of 0.044. This clearly showed that both male and female students have the same level of mean sores indicating that the students gender status does not significantly determine the cognitive mean score. Consequently, the null hypothesis which stated that there is no significant difference between male and female cadets from NDA, is hereby accepted and retained.

Discussion of Finding

The result of the study indicated significant variation in cognitive style among the cadets, some showed field independency while some were field dependent. This concur with Toker et al. (2013) who reported significant variation of cognitive abilities, such as perceptual speed and verbal working memory, on the user's gaze behavior. Further studies by (Nisiforou and Laghos, 2013, 2016) identified differences between the FDI cognitive abilities in terms of search tasks time completion and eye gaze patterns. Although the trend of cognitive style is almost world-wide with more field dependent respondents than field independents yet some factors may not be un-connected with it. The result of this study also found no difference between cognitive styles of science and art cadets in terms of gender, this result corroborated with findings of Oginga 2020 and Garba, 2019 who found no statistically significant difference between cognitive styles (field independent-field dependent) and gender. But Okoye (2016), Onyekuru (2015) Musya (2015) and Jantan (2014) found disparity in field independent-field dependent cognitive styles in male and female. Studies of Onyekuru (2015) and Jantan (2014) reported that males were found to be field independent with females exhibiting field dependency while Okoye (2016 and Musya (2015), revealed that females tend to be field independent while the males showed field dependency.

Conclusion

The study concludes that cadets differ in their cognitive styles, which majority of them exhibiting field independency while a few are field independent. Field dependent/independent cognitive style was not significantly different between male and female cadets, but there are studies that reported disparity in cognitive styles (field dependent/independent) of males and female learners.

Recommendations

The study recommends that:

1. Deliberate effort should be made to identify students' cognitive style with the help of the counsellors and psychologists so that adequate planning can be made to take care of these individualistic tendencies.
2. The relevance of cognitive styles on learning relates to the current emphasis on individualized instruction, programmed learning and computer-based education. Our educational planners should consider this especially with the issue of coronavirus pandemic.

References

Aggarwal, I., & Woolleyb, A. W. (2019). Team creativity, cognition, and cognitive style diversity. *Management Science,* 65 (4), 1586–1599. https://doi.org/10.1287/

Azizi, Y., Asmah S., Zurihanmi Z., & Fawziah Y. (2005). "Aplikasi Kognitif Dalam Pendidikan." Edisi pertama.Bentong, Pahang: PTS Professional.

Babalola B. A. (1979). Relationship between field dependent and field independent cognitive style and school achievement in maths and science subjects. *Journal of science teachers' association of Nigeria.* (1) 1-7

Behnam, B. & Fathi, M. (2009). The Relationship between Reading Performance and Field Dependence/ Independence Cognitive Styles. *Journal of Teaching English as a Foreign Language and Literature:* 1 (1), 49-62.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika* 16, 297–334. doi: 10.1007/bf02310555

Evans, C., Richardson, J. T. & Waring, M. (2013). Field independence: reviewing the evidence, *British Journal of Educational Psychology* 83, 210-224.

Evans, C. & Waring, M. (2015). Understanding pedagogy - Developing a critical approach to teaching and learning, New York: Routledge

Federal Ministry of Education (2014). National policy on education.

Garba, J. (2020) Relationship between cognitive styles and academic achievement among secondary school Students. *Journal of Research in Arts and Social Science Education*, ABU Zaria.

Gusau. N. M. B., Mohamad M. M., & Jamali. A. R. (2018). The effect of cognitive style on problem solving skills in final year undergraduate project: *Herald NAMSCA* (1) 498-506

Idika, M. I. (2017). Influence of Cognitive Style and Gender on Secondary School Student's Achievement in and Attitude to Chemistry. *Advances in Social Sciences Research Journal*, 4 (1) 129-139

Jantan, D. H. (2014). Relationship between students' cognitive style (field independent-field dependent) with their mathematical achievement in primary school. *International Journal of Humanities, Social Sciences and Education (IJHSSE)*, 88-83.

Kozhevnikov, M., Evans, C. & Kosslyn S. M. (2014). Cognitive Style as Environmentally Sensitive Individual Differences in Cognition: A Modern Synthesis and Applications in 27 Education, *Business, and Management, Psychological Science in the Public Interest* 15 (1), 3–33.

Khodadady, E., Bagheri, N. & Charbgoo, Z. (2016). Primary School Students' Cognitive Styles and Their Achievement in English as a Foreign Language. *Journal of Language Teaching and Research*, 7 (5) 851-858 DOI: http://dx.doi.org/10.17507/jltr.0705.04

Muhammad, T., Daniel, E.G. S. & Abdurauf, R. A. (2015). Cognitive styles field independent /field dependent and scientific achievement of male and female students of Zamfara state College of Education, Maru, Nigeria. *Journal of Education and Practice*, 6 (10) 58-63.

Musay N. M. (2015). Cognitive styles and academic achievement among secondary school learners in Kenya. Unpublished M. Ed thesis.

Nezhad, G. R. H. P. & Shokrpour, N. (2012). The impact of task type and cognitive style on vocabulary learning. *English Language Teaching*; 5 (9) 4742 -4750.

Nisiforou, E. & Laghos, A. (2016). Field dependence–independence and eye movement patterns: investigating users' differences through an eye tracking study. *Interact. Comput.* 28, 407–420. doi: 10.1093/iwc/iwv015

Nozari, A. Y. & Siamian, H. (2015). Relationship between field independent-field dependent cognitive style and understanding of English text reading and academic success. *Materia Socio Medica,* 27 (1) 39

Oginga, J.M. (2020). Cognitive style in secondary schools in Kenya: Comparing gender and discipline areas (M Ed thesis).

Okoye, P.O. (2016). Influence of gender and cognitive style on students' academic achievement in biology. *An International Journal of Science and Technology*, 5 (1) 59-65.

Onyekuru, B. U. (2015). Field dependence–independence cognitive style, gender, career choice and academic achievement of secondary students in Emohua Local Government Area of Rivers state. Journal of Education and Practice, 6 (10) 76-65.

Parkinson, A. & Redmond, J.A (2002a). Do Cognitive Styles Affect Learning Performance in Different Computer Media? Dublin, Ireland: Department of Computer Science, Trinity College.

Parkinson, A. & Redmond, J.A (2002b). The Impact of Cognitive Styles and Educational Computer Environments on Learning Performance. Dublin, Ireland: Department of Computer Science, Trinity College.

Sealesa, O. J. & Moalosi, R. (2012). Cognitive and learning styles of the Faculty of Engineering and Technology students: University of Botswana. Gaborone, Botswana. *World Transactions on Engineering and Technology Education*,10 No. 2.

Souzandehfar, M. (2011). Seyyed Ali Soozandehfar. Califonia Linguistic Notes, 36 (2)

Tinajero, C. Lemos, S. M., Araujo, M., Ferraces, M. J. & Paramo, M. F. (2012). Cognitive Style and Learning Strategies as Factors which Affect Academic Achievement of Brazilian University Students. www. Scielo.br/scielo.php?script=sci_arttext&pid=50102-79722012000100013

Umaru, Y. & Tukur, H. A. (2013). The influence of dependent and independent cognitive style on achievement in mathematics among secondary school students in Bida educational zone of Niger state, Nigeria. *Journal of Research in Education and society*, 4 (2) 63-72.

Weissenberg, P. (1973). Concurrent Validity of Hidden Figures Test (Cf-1). *Perceptual and Motor Skills*, *36*(2), 460–462. https://doi.org/10.2466/pms.1973.36.2.460

Witkin, H. A., Dyk, R. B., Fattuson, H. F., Goodenough, D. R., & Karp, S. A. (1962). Psychological differentiation: Studies of development. New York: Wiley.

Witkin, H.A., Moore, C.A., Goodenough, D.R., & Cox, P.W. (1977). Field dependent and field independent cognitive styles and their educational implications, *Review of Educational Research* 47 (1) 1–64.

Author Information

OKORIE, Agnes
aookorie@nda.edu.ng
Nigerian Defence Academy, Kaduna, Nigeria

GARBA, Jummai
piruwa@yahoo.com,
jumaigarba@nda.edu.ng
Nigerian Defence Academy, Kaduna, Nigeria