DEVELOPMENT AND VALIDATION OF INDICES OF FINANCIAL INTELLIGENCE AMONG A CROSS-SECTION OF A NIGERIAN PRIVATE UNIVERSITY STUDENTS

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Abstract—The study described the systematic processes involved in the development and validation of a self-report instrument tagged "Indices of Financial Intelligence" [IFI] designed to measure financial intelligence. A total of 250 undergraduate students randomly selected from 100 to 500 levels in a Nigerian private university participated in the study. The participants' age ranged from 15-29 years with mean age of 18.53. Indices of Financial Intelligence scale was used to generate data. The original scale has 34 items that were clustered into three dimensions of spending, saving and giving money. The result of a principal component factor analysis confirmed the three factor theoretical model of the IFI namely, spending, saving, and giving money but with 25 items loading significantly in the three factors combined. The obtained communality ranged from 0.186 to 0.622 while significant correlations between 0.351 and 0.880 were observed between the three factors. A Cronbach Alpha of 0.89 established the IFI as a reliable instrument for assessing the level of financial intelligence among undergraduate university students. Premised on these findings, the IFI appears to be a valid instrument for assessing financial intelligence and is therefore recommended as a tool for financial guidance of young people by psychologists, economists and allied disciplines.

Keywords—Financial intelligence, indices, private university, undergraduate students, Nigeria.

I. Introduction

University students are yet to understand basic financial management skills premised on savings, borrowing, and investments (Chen & Volpe, 1998). This is because the present generation of university students have been exposed to the acquisition and use of credit cards more than previous ones (Palmer, Pinto & Parente, 2001). This could be the reason they do not take the necessary time to develop their knowledge of personal finances or increase their level of financial literacy (Chen & Volpe, 1998).

Roberts and Jones (2001) and Roberts (1998) have reported a high level of compulsive buying among college students in America. This means that university students engage in random and indiscriminate buying without taking time to weigh the consequences of such purchases. A higher level of compulsive buying among undergraduates haves been found to be present especially when the students have credit cards (Roberts, 1998). When students engage in unwise use of credit card, they tend to manifest psychological, financial and academic trauma (Roberts & Jones, 2001) in the end. This seems to be in line with Norvilitis et al's (2006) finding that credit-card debt was associated with stress and decreased financial well being among college students. It has also been noted that students who own and use credit cards are not as financially literate as those who do not (Scott, 2010). This further accentuates the need for financial literacy or education among young people.

University undergraduates get into financial debts like credit card debt as a result of inadequate financial knowledge, inability to delay gratification and an attitude that is not good towards credit card use (Norvilitis et al, 2006). College students, especially females, blacks and Hispanics, do not find it easy to pay their credit card debts (Lyons, 2005). The indiscriminate use of credit cards which ultimately results in debt has been alluded to parental involvement or non involvement in young people's credit card acquisition and consumption (Palmer et al, 2001). Young people whose parents were not involved in their credit card acquisition had less credit card balance than those whose parents were involved before and after their credit card acquisition (Palmer et al, 2001). Coming from a stable family, that is, parents being married have been found to be correlated with financial fitness and high GPA (Cude et al, 2006). This further highlights the role of parents in enhancing the financial robustness of college students.

One question that seems to arise from the foregoing is "what are students likely or least likely to do concerning financial matters?" Cude et al (2006) in answer to this have found that college students were "least likely to save monthly, to have a budget, and to balance a checkbook" (p.104). This brings to the fore the need to engage in constant financial education of young people. Although people believe that with the rising

rate of education among young people and the use of information technology, financial literacy would be consequently acquired by young people. This seems not to be so because financial behaviours are predominantly learnt in childhood (Hira, 1997). In fact, financial education or socialization has been reported to start at home, pioneered by parents (Cude *et al*, 2006). In concurrence to this fact, Shim, Barber, Card, Xiao and Serido (2010) have found that university students who received financial education at adolescence from their parents handled their finances better than others. This means that when young people are socialized early financially, and learns financial basics early, their financial attitude is shaped which consequently leads to positive financial behavior (Shim *et al*, 2010).

The fact that young people are financially socialized at home does not undermine or rule out the role of formal financial education in schools. For instance, Peng, Bartholomae, Fox and Cravener (2007) reported that when students are exposed to personal finance course at college level, they tend to have high level of investment knowledge years later. They further noted that financial experiences emanating from attending finance course positively affected students savings rate. In acquiesce, Borden, Lee, Serido and Collins (2008) reported that when students attend financial seminars, "they have increased financial knowledge, have responsible attitudes towards credit, (have) more effective financial behaviours and fewer risky financial behaviours" (p. 23).

Since it has been reported that students who misuse their credit cards are emotionally unstable, introverted, materialistic or needs arousal (Pirog & Roberts, 2007) and it has also been reported that when students have positive financial behaviours, they also have financial satisfaction which results in overall life satisfaction (Xiao, Tang & Shim, 2009), these brought to the fore the need to have an instrument to capture the indices of financial intelligence so as to assess young people's financial intelligence and intervene with appropriate financial education if necessary. Financial intelligence is seen in this study as young people's ability to effectively manage their money along three dimensions *viz*: spending, saving and giving money.

Methods

This study employed cross-sectional survey design. A total of 250 undergraduate students with age range between 15 and 29 ($M = 18.53$) were selected from different departments within the 2 Colleges in a Nigerian private university. The selection procedure was done in two stages. The first stage involved the researchers informing the participants about the research and asking for voluntary participation. In the second stage, participants were selected from the students who voluntarily agreed to participate in the study. The even numbered participants selected for the study using a simple random sampling, method of odd and even technique were administered the Indices of Financial Intelligence (IFI). The IFI is a 33 item self-report four (4) point likert type questionnaire developed to measure financial intelligence among undergraduate students. This scale was developed following scale construction procedure of generating items through a detailed literature search, giving the items to a panel of experts to evaluate for face validity, subjecting the responses to the items to an empirical factor analysis and finally establishing the reliability and validity of the instrument. The IFI, with 4 Likert format of response of 1=Almost Never; 2= Sometimes; 3=Often; and 4= Always, measures three aspects of financial intelligence viz: Spending money, saving money and giving money. Spending money (items 1 – 11) measures money spending activities. The three (subscales of IFI when summed up produces a global financial intelligence score while each subscale also has its own individual score. The data collected was analyzed using the Statistical Package for the Social Sciences (SPSS) Version 20 after double-checking for errors. Means (and Standard Deviations), were used to assess the average response score while correlations were used capture the relationship between the test, the retest, the subscales and internal consistency. Factor analysis was used to determine the factor structure of the IFI.

Results

Preliminary investigations suggested that the data was fit for a factor analysis with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy at .873, the Bartlett's test of Sphericity showing a significant Chi value of 3400.304 (561, $p < .001$) and communalities ranging from .186 to .622.

Three factors emerged from the factor analysis. Factor 1 explained 26.66% of the total variance, factor 2 explained and 8.37% of the total variance and factor 3 explained 6.66% of the total variance. Factor loadings below .30 were suppressed so as to obtain a minimum higher factor loading of .30 and above. The three factors explained a cumulative percentage of 41.80% of the total variance.

Three factors emerged with some items significantly loading on more than one factor for instance, items 2, 11, 20, and 21 loaded on factor 1 and 2, items 9 and 3 loaded on factors 1 and 3 while items 25, 16, and 15 loaded on factor 2 and 3. The factor analysis revealed different item-factor loadings from the items clustered together in the developed scale. For instance, during scale development, subject matter experts clustered items 1-11 together as the spending money subscale, items 12 – 22 as the saving money subscale and items 23 – 34 as the saving money subscale. However, the factor analysis although revealing a three factor structure had the items in different factor loadings (Table 1).

The naming of the factors were retained as Spending money, for factor 1, saving money for factor 2 and giving money for factor 3. The items with ambiguous or double loadings were removed from the factor items for each of the three factors. For factor 1, items 1, 6, 7, 8, 10, 12, 14, 18, 19, 24, and 30 (11 items) were selected with pure factorial loadings to make up

the spending money factor of the IFI. For factor 2, items 13, 17, 22, 26, 27, 28, 32, 33, and 34 (9 items) were selected with pure factorial loadings to make up the giving money factor of the IFI and for factor 3, items 4, 5, 23, 29 and 31 (5 items) were selected with pure factorial loadings to make up the saving money factor of the IFI. The total items on the IFI after factor analysis was 25 with items which loaded on two factors (items 2, 3, 9, 11, 15, 16, 20, 21, and 25 (9 items)) were discarded.

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Table 1: **Factor loadings and communalities of the IFI**

Variable	Factor1	Factor2	Factor3	Communalities
Var8	.715			.539
Var24	.701			.505
Var10	.697			.565
Var18	.687			.512
Var19	.664			.502
Var2	.635	.326		.539
Var12	.642			.439
Var30	.586			.457
Var14	.545			.399
Var7	.527			.366
Var21	.487	.450		.454
Var6	.418			.253
Var1		.366		.219
Var27			.786	.622
Var28			.651	.448
Var33			.639	.483
Var26			.586	.423
Var22			.578	.420
Var20		.389	.538	.442
Var13			.536	.378
Var17			.530	.354
Var34			.528	.324
Var11		.377	.505	.399
Var25			.477	.389
				.387
Var32			.310	.186
Var31				.627
				.561
Var5				.669
				.517
Var16			.327	.580
				.446
Var23				.560
				.345
Var9		.336		.534
				.436
Var15			.386	.519
				.465
Var3		.351		.502
				.377
Var4	.450		.262	.323
Var29				.187

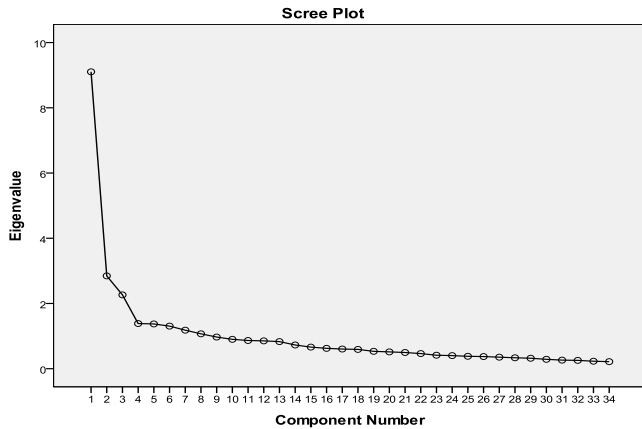| Eigen values	9.10	2.85	2.26
% of Variance	26.77	8.37	6.66
Mean Scores	27.84	28.08	12.36
Cronbach α	.863	.825	.590

Figure 1: Scree plot of the IFI

The IFI showed a significant correlation for both the Cronbach Alpha and split-half reliability coefficient. The IFI total score yielded a Cronbach Alpha coefficient of .887 and a Spearman-Brown split half coefficient of .846 for equal and unequal length. An intrinsic validity of .942 was also obtained for the IFI. The scree plot (figure 1) shows the existence of 3 factors with the point of inflexion occurring in the third factor which suggests retention of the 3 factors of IFI. When the subscales of the IFI were also correlated amongst themselves, a good correlation coefficient was observed with correlations ranging from .686 to .895 (Table 2).

***Table 2:* Correlations between IFI Variables**

Variable	IFI Total	Spending	Saving	Giving
FI Total				
Spending Money	.351**			
Saving Money	.540**	.382**		
Giving Money	.880**	.599**	833**	

The males and females mean score were calculated for the total score and the subscales of the IFI. Generally, females (*M* = 69.37, *SD* = 15.16) performed better than males (*M* = 66.42, *SD* = 16.30) in the total IFI mean scores. It was also found that females manifested a higher level of financial intelligence as measured by the IFI from the mean scores of the subscales (Table 3).

***Table 3:* Gender comparison of mean scores for IFI**

Variable	Males		Females	
	M	SD	M	SD
Spending Money	26.75	8.96	28.48	8.55
Saving Money	27.49	7.49	28.42	6.55
Giving Money	12.18	3.58	12.47	3.71
IFI Total	66.42	16.30	69.37	15.16

Discussion

The IFI as a valid tool will assist in guiding adolescents in making financial choices after assessing their index of financial intelligence. It has been found that students who are not financially literate are prone to making wrong decisions and this is more among students who are under 30 years of age (Chen & Volpe, 1998). Incidentally this age group of below 30 years alone was represented within the sample used for this study. Although it has been reported by authors (Mandell, 2006; Mandell & Klein, 2009) that increased level of information giving to young people on financial issues does not necessarily assist them in being better with regard to financial issues and management that those who have not been taught. Other authors like Carlin and Robinson (2012) are of the opinion that even less than 20 hours of financial literacy education induces frugality, delayed gratification and other positive behaviours that enhances good financial behaviour among students. Although there are still differing perspective on the role of financial education in enhancing good financial behaviours, it is suggested here that efforts should be made towards coming up with better methods of passing information about financial issues to young people otherwise the level of financial issues being observed in the present generation, with all the available knowledge, might dwarf the awaiting challenges in time to come.

The finding of the present study that females demonstrated more financial intelligence than males seems to be in contrast with findings by other authors like Fonseca, Mullen, Zamarro and Zissimopoulos (2012) who reported a slight disparity in financial literacy among men and women with men manifesting higher level than their female counterparts. The finding is also in contrast with the finding by Chen and Volpe (2002) who noted that male college students manifested more financial literacy than their female counterparts.

Gender differences could exist with regard to financial literacy as have been found by Fonseca *et al* (2012) with the scale tilting towards the men but the present study investigated

intelligence which is a different construct. Hence, further studies should examine this finding using a combination of both intelligence and literacy among the genders. In explaining the reason for their observed gender differences, Fonseca *et al* (2012) noted that: "A possible mechanism through which gender differences are produced is household specialization: men specialize in making household financial decisions thereby acquiring financial knowledge and women specialize in other household functions" (p. 105).

This reason adduced by Fonseca *et al* (2012) could have held sway in the 20th century but not in the 21st century where women are empowered to take charge of families. It is important to note that an integral part of the educational system at the moment is entrepreneurial development studies which assist students in thinking independently with regard to financial issues hence our finding is not surprising. However, intense focus towards educating young people concerning financial issues is encouraged by the authors.

Conclusion and Recommendation

The IFI has been found to be a reliable and valid instrument in measuring financial intelligence in this study. It is strongly recommended that financial education be embarked on in educational institutions. It is also recommended that financial education be vigorously taught in secondary schools since university students have shown low level of financial knowledge (Avard, Manton, English & Walker, 2005).

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