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Career Development Challenges: The Role of Interest-Based Personality and Systemizing

Abstract. Choosing a career path is an important decision made in the course of life, a developmental task which every individual faces. Career indecision, however, is a challenge that has plagued young people who do not know the career options they have, or lack vital information on oneself that will help them make a course choice. Some factors that play a role in career decision including career guidance, interest-based personality and systemizing were investigated to predict students' course choice. The study involved 248 participants who completed the survey online. Results revealed that both the utility and deficiency subscales of career guidance did not predict the course choice. Enterprising personality type predicted course choice only when career guidance and interest-based personality were considered (OR = 6.36, p = .03, 95% CI = [1.11, 36.41]). However, topography subscale of systemizing predicted course choice, noting a decreasing odds of falling within the humanities category (OR = .64, p = .01, 95% CI = [.44, .91]). The study shows that career indecision is still one of the major developmental challenges that an individual faces while growing up, thus career counsellors are expected to play a vital role in providing solutions to these challenges by providing insightful guidance to individuals from an early stage.

Keywords: career development, personality, systemizing, career indecision, guidance

Słowa kluczowe: rozwój kariery, osobowość, systematyzowanie, niezdecydowanie dotyczące kariery, poradnictwo

INTRODUCTION

Career development is a vital developmental concern especially with the changing world of work (Maree, 2018), and choosing a career path is a developmental task that must be completed successfully. It is, therefore, one of the most important decisions made in the course of life (Fabio et al., 2013; Gati, Tal, 2008) which turns more serious in the late teens and early twenties (that is, within adolescence and early adulthood), as individuals explore different career possibilities before they stick to one (Santrock, 2011). For those who intend to undertake education beyond secondary school, this usually involves a case where they choose a course at

the post-secondary school level, designed to result in working in a particular field.

However, many young people at these crossroads face the challenge of career indecision because there is a need for vital information both on themselves and on their career options (see Xu, Bhang, 2019 for a critical review). The availability of such vital information is one of the challenges in career development faced in the Nigerian context. Career decisions in Nigeria are often made based on the prestige of the profession (Eremie, 2014; Ogunlade, Akeredolu, 2012), parental influence (Eremie, 2014; Olaosebikan, Olusakin, 2014), and gender roles (Adisa et al., 2021; Eremie, 2014). Indeed, some students make their course choices regardless of their skills, abilities or personal interest, only because it is believed to be highly prestigious in the society. Usually, such courses (e.g. medicine and surgery, pharmacy, law and most engineering fields) are highly competitive. Therefore, the institution's acceptance rate becomes the next influential factor, as many of them do not gain admission. Some opt for private universities because of their high acceptance rate, though at higher tuition costs. Others wait for the next academic year to apply again, while yet another fraction accepts admission for a course they hardly know or have interest in. It goes without saying therefore that their current course is not their preferred course and this affects their academic performance. Parental influence becomes a key factor when parents want to be proudly called the father or the mother of a doctor, lawyer, and the likes thereof, or when they are concerned about their child's career decision. This Nigerian context elucidated by the ecological theory of human development (Bronfenbrenner, 1986) shows the influence of the environmental systems and sociocultural relationships on the career decision making process.

An important information considered to illuminate one's career preferences and provide career guidance is the personality, especially because people are attracted to occupations that complement certain personality traits they have. John Holland identified six interest-based personality dimensions including Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C) personality type usually referred to as RIASEC (Gottfredson et al., 1993; Holland, 1966) and asserted that individuals perform better in work environments that balance their personality profiles with the environment characteristics (Lakhal et al., 2012). Holland's theory is regarded as one of the most influential theories guiding career counselling and practice (Nauta, 2013).

The six Holland's interest typologies are arranged in a hexagon in the order of RIASEC, and the similarities as well as dissimilarities are portrayed by the distance between corresponding types in the hexagon. The closer the types are on the hexagon, the more consistent the individual will be. When personalities opposite each other in the hexagon are compared, they seem to be farther from each other in their interests (Leung, 2008; Zunker, 2006). For example, the realistic and social personalities are virtually the opposite of each other while the social and artistic are not that far apart. The theory has been used to investigate the person-environment congruence among a sample of 292 doctoral students where the results indicated that students with high Realistic or Social vocational interests – and whose doctoral training programs had high Realistic or Social demands – were more satisfied with their training environment than students who were in unrelated departments (McMurray, 2013). The research confirmed that satisfaction is high when there is a person-environment fit. However, prediction of career certainty was not established in the study which implies that the participants are not entirely certain about their career choices. Further studies have investigated associations between Holland's model and general/vocational education preferences (Usslepp et al., 2020; Van Huizen et al., 2021).

Onoyase and Onoyase (2009) in their study with Nigerian participants, investigated the relationship between the personality types and career choice. They reported that many students have little or no knowledge about their personality type, or job options in the world of work and so face a lot of problems in the choice of subjects that would lead them to their future careers. They also noted that students opt for prestigious courses such as Medicine, Engineer-

ing, Law and Pharmacy without the necessary knowledge of subject combinations and the career decision-making skills, while probably having incongruent personality types compared to their chosen combinations. As the researchers indicated, all careers have their subject combination requirements, personality characteristics and personal abilities, therefore, individuals should be assessed for these to fully fit into a specific career. The study involved 616 adolescents from 22 Federal Government Colleges, and the two instruments used for the study including Students' Personality Questionnaire (SPQ) and Students Career Choice Questionnaire (SCCQ) were adopted from John Holland's Self-Directed Search (SDS). Their results revealed that there was a significant mismatch between personality types and career choices as most students were ignorant of their personality type, and the subject combinations that lead to their careers. For example, most students with Artistic personality type chose science-related careers while Social personality type chose prestigious courses like Medicine and Engineering instead of those that match their personality type. Onoyase and Onoyase (2009), however, investigated the students' preferred courses while at secondary school which may likely change in the transition period between secondary school and postsecondary school. Therefore, the present research seeks to investigate students who have taken a course decision already.

In addition to personality, systemizing could be a predictive factor in one's course choice. Systemizing is referred to as "the drive to analyse, understand, predict, control and construct rule-based system" (Wheelwright et al., 2006). A system could be technical (e.g. machines), natural (e.g. water flow), motoric (e.g. spinning wheel), abstract (e.g. number patterns) or collectible (e.g. classifying DVDs by authors) as long as it allows for inputs, and delivers an output (Baron-Cohen, 2002). In systemizing, the underlying rules that govern the system are noted, thus, not only is the system understood but can be predicted to invent a new one (Wakabayashi et al., 2007) and can be controlled as well. This is in contrast to empathizing (a specific component of social cognition) which is defined as the drive to identify another person's emotions and thoughts and to respond to these with an appropriate emotion, a lack thereof is an impairment in people with autism spectrum disorder (Baron-Cohen, 2003; Wheelwright et al., 2006). The concept is established in the Empathizing-Systemizing (E-S) theory of sex differences which states that more females than males show the profile of stronger empathizing than systemizing while more males than females show the opposite profile which is stronger in systemizing, thereby, describing autism as a deficit in empathy together with superior systemizing (Baron-Cohen, 2002; Grove et al., 2013; Wakabayashi et al., 2007). Systemizing has also been reported to be significantly associated with executive function and vocabulary in children with autism spectrum disorder (Cascia, Barr, 2020).

Many studies (Caldwell-Harris, Jordan, 2014; Grove et al., 2013; Manson, Winterbottom, 2012; Naor-Ziv et al., 2021; Varella et al., 2016; Wakabayashi et al., 2007; Wheelwright et al., 2006) have established the relationship between systemizing and variables such as gender, autistic traits, intentions, interests and course choice. For example, Naor-Ziv et al. (2021) noted a negative correlation between empathizing and systemizing intentions when viewed as behaviour intentions rather than cognitive styles. Also, Manson and Winterbottom (2012) reported that individuals' scores on Empathizing Quotient (EQ) and Systemizing Quotient (SQ) were better predictors of degree subject than gender. The study by Varella et al. (2016) also revealed that exact sciences such as engineering had more males, whereas humanities such as journalism and bio-sciences such as medicine, had more females throughout the study period. Also, the study found that individuals in humanities and bio-sciences score higher on empathizing and lower on systemizing than those in exact sciences when gender is not considered.

These research results, therefore, reveal that there are established links between interest-based personality, systemizing and course choices. However, the nature of these relationships has not been established in the Nigerian

sample largely because of the little research attention it has received.

STATEMENT OF PROBLEM / RESEARCH QUESTIONS

A vital step in career development is basic training so as to build up knowledge needed for work. An individual's choice of a degree course reflects the career choice. For example, to be a pharmacist, one will have to study pharmacy at the university. However, many individuals find it difficult to make a decision on the course to study, which poses a problem at this developmental stage. Identifying factors that can guide students in making a more-informed decision on the course to study has thus become pertinent for successful career, and studies show that a person-environment fit is necessary for a successful career (Holland, 1966; Lakhal et al., 2012), which makes a translation of this fit into the individual's training pertinent.

Significant relationships have already been found between Holland's personality types and student's course of study, thus it has been used to guide students in making course choices. Also, relatively new as a tool for career guidance is systemizing, whose use the present study hopes to validate in Nigeria using the following research questions:

1. Does interest-based personality predict university course choice?
2. Does systemizing predict university course choice?

Extrapolations can be made from the study, forming a basis for guiding students at an early stage on course choices specifically, and career development in general.

METHOD AND MATERIALS

Participants: The study involved 248 participants, comprising of 128 males and 117 females from different departments at Nigerian universities. Three participants however, did not specify their gender. The participants were volunteers who responded online to the request for participation in the research. The mean age of the participants was 24.59 years (SD: 5.34) ranging between 17 years and 51 years. While 65.3% were undergraduate students, the rest were postgraduate students. Of the overall sample, 98 participants were in pure sciences departments such as computer science, medicine and surgery, mathematics, biochemistry, pharmacy, electronics engineering, and the likes while 150 participants were in humanities departments such as mass communication, law, psychology, social work, economics, and the likes.

Instruments: Interest-based personality was measured with brief interest profiler RIASEC scales, which is composed of 8 items for each profile, summing up to 48 items in all. The scale has a 5-point Likert response scale ranging from 1 (Strongly dislike) to 5 (Strongly like) which rates how the participant would enjoy a list of activities with a focus on careers. The highest scoring profile determines the individual's personality. The profiles include Realistic (items 1, 7, 13, 19, 25, 31, 37, 43); Investigative (items 2, 8, 14, 20, 26, 32, 38, 49); Artistic (items 3, 9, 15, 21, 27, 33, 39, 45); Social (items 4, 10, 16, 22, 28, 34, 40, 46); Enterprising (items 5, 11, 17, 23, 29, 35, 41, 47); and Conventional (items 6, 12, 18, 24, 30, 36, 42, 48). The instrument was developed by Armstrong et al., (2008) to address the limitations posed by other RIASEC measures. The brief interest profiler RIASEC scales have high reliability evidence, with reliability coefficient ranging from .79 to .93 with a mean of .87. A good convergence validity was also reported with Strong's Interest Inventory with correlation ranging from .56 to .72 with a mean of .64 (Armstrong et al., 2008). The reliability and validity of the scale using Nigerian sample revealed a Cronbach's alpha of .93 for the entire scale and .83, .87, .85, .82, .77, .86 for Realistic, Investigative, Artistic, Social, Enterprising and Conventional subscales respectively. Factor analysis with maximum likelihood extraction method was carried out, extracting six components as designed by the original authors.

Systemizing was measured with a short form of Systemizing Quotient (SQ) developed by Ling et al. (2009). It is an 18-item scale which

has a four-point response scale from strongly agree to strongly disagree, with participants given a mark of 0 for non-systemizing responses (slightly and strongly disagree), and a mark of 1 or 2 depending on the strength of the systemizing response. The scale has a good reliability evidence with Cronbach's alpha of .74. Both exploratory and confirmatory analyses as reported by the researchers, suggested a 4-factor, 18-item scale. The factors include Technicity (showing interest in technical information) comprising 6 items such as "If I were buying a stereo I would want to know about its precise technical features"; Topography (map reading) comprising 3 items such as "I can visualize how the motorways in my region link up"; DIY (Do-It-Yourself jobs) comprising 3 items such as "If there is a problem with electrical wiring in my home I would be able to fix it myself"; and Structure (interest in discovering the structure of things) comprising 6 items such as "When I look at a piece of furniture I do notice details of how it was constructed". The reliability index for Nigerian sample is a Cronbach's alpha of .71 while the validity test was a factor analysis with maximum likelihood extraction method extracting 4 components as reported by the authors.

The preferred course, the undergraduate and postgraduate students choose during undergraduate and postgraduate school application process classified respectively as pure sciences such as mathematics, pharmacy, etc. and humanities such as law, psychology, mass communication was also used for the research analysis.

Procedure: The survey was designed in digital format and hosted on esurv.org website. The participants were also vast in use of electronic devices and the internet. Snowball sampling technique, a common sampling technique in electronic surveys (Benfield, Szlemko, 2006), was adopted whereas the survey link was advertised in Class WhatsApp groups and on other social media sites as the students were encouraged to participate. Participants' responses were exported from the website into SPSS workspace. It was then followed by data cleanup which involved using IP addresses and demographic information to remove multiple entries and incomplete responses. Most were a result of technical snags such as fluctuating data network. Also, entries by participants which were not part of the survey were removed; e.g. entries by students outside Nigeria. Items which required reversals were first reversed before data was transformed for each scale into the author's Likert format for analyses.

Statistics: Because the dependent variable is categorical (2 categories), binary logistic regression was used to test the hypotheses. Logistic regression predicts categorical outcomes from continuous or categorical predictors (Field, 2013).

RESULTS

Table 1 shows that the Social personality with 48.8% (N=121) has the highest frequency amongst the participants, compared to other personality types (Realistic, 4.8%; Investigative, 13.7%; Artistic, 19%; Enterprising, 5.6%; Conventional, 8.1%) determined by the highest score in the participants' personality profile.

Table 1. Frequency table for interest-based personality.

	Frequency	Percent	Cumulative Percent
Realistic	12	4.8	4.8
Investigative	34	13.7	18.5
Artistic	47	19.0	37.5
Social	121	48.8	86.3
Enterprising	14	5.6	91.9
Conventional	20	8.1	100.0
Total	248	100.0	

Source: own elaboration.

For the logistic regression, SPSS dependent variable coding was '0' for pure sciences and '1' for humanities thus results were predicted for membership in humanities category. The model prediction increased from 59.6% chance of correct classification in the first model (Null model) to 75.5% correctness in the overall model, and all subsequent models with additional variables had an increasing Nagelkerke R^2 score which should be so if adding those variables improves the fit of the model. The order of entry was (1) career guidance as a control variable (Nagelkerke R^2 = .002, % correctness of the model = 59.6%); (2) personality types (Nagelkerke R^2 = .127, % correctness of the model = 68.6%); (3) systemizing subscales (Nagelkerke R^2 = .220, % correctness of the model = 71.8%).

For each predictor, odds ratio (OR) is the multiplicative amount by which the odds of being in the humanities category change per 1 point of change in the predictor. Results from the models showed that in model 2 with career guidance and personality types as variables, Enterprising personality (OR = 6.36, p = .03, 95% CI = [1.11, 36.41]) significantly predicted an increased odds of a participant falling within the humanities category. However, with the addition of systemizing in model 3, only topography (OR = .66, p < .001, 95% CI = [.55, .81]) significantly predicted a decreasing odds of falling within the humanities category.

Table 2 shows the overall model with variables predicting the membership in humanities category as against pure sciences category. Because the personality types are categorical, Conventional personality was used as the basis of comparison for other personality types. Results revealed that the Realistic (OR = .01, p = .20, 95% CI = [.00,14.77]), Investigative (OR = .23, p = .62, 95% CI = [.00, 81.00]), Artistic (OR = 2.88, p = .73, 95% CI = [.01, 1287.71]), Social (OR = .47, p = .76, 95% CI = [.00, 61.50]), and Enterprising (OR = .00, p = .13, 95% CI = [.00, 476.71]) personality types when compared to conventional personality, did not significantly predict the odds of being in the humanities category in the overall model.

The Topography (OR = .64, p < .01, 95% CI = [.44, .91]) subscale of systemizing significantly predicted a decreasing odds of being in humanities category though the Technicity (OR = 1.04, p = .82, 95% CI = [.75, 1.43]), DIY (OR = 1.04, p = .81, 95% CI = [.73, 1.48]) and Structure (OR = .97, p = .85, 95% CI = [.71, 1.32]) subscales did not reveal a significant prediction.

Table 2. Logistic regression table predicting the odds of falling within the humanities category.

	B	Wald	OR	Sig	95% CI
Personality type					
Realistic	−5.25	1.68	.01	.20	[.00,14.77]
Investigative	–1.48	.24	.23	.62	[.00, 81.00]
Artistic	1.06	.12	2.88	.73	[.01, 1287.71]
Social	.77	.09	.47	.76	[.00, 61.50]
Enterprising	–22.04	2.35	.00	.13	[.00, 476.71]
Conventional[a]	____	____	____	____	____
Systemizing (SQ)					
Technicity	.04	.05	1.04	.82	[.75, 1.43]
Topography	–.46	6.12	**.64	.01	[.44, .91]
DIY	.04	.06	1.04	.81	[.73, 1.48]
Structure	.03	.03	.97	.85	[.71, 1.32]

Note: a = conventional was the basis of comparison for other personality types; ** = p <.01; B = logit; OR = Odds Ratio; CI = Confidence Interval; SQ = Systemizing Quotient.

Source: own elaboration.

DISCUSSION

The different personality types of the participants did not significantly predict the preferred choice in the overall model of the study. However, Enterprising personality, compared to Conventional personality, significantly predicted the increased odds of a participant falling within the humanities category by a multiplicative factor of 6.36 times when career guidance and personality types were considered. This means that the Enterprising personality types are more likely to be found in humanities than in pure sciences. This is consistent with Holland's theory which noted that individuals with the Enterprising personality are usually real estate agents, lawyers, insurance agents, human resource managers, etc. and train in humanities courses such as law, mass communication, business administration, etc. The result was however not significant when the systemizing quotients of participants were added to the equation. Findings in the overall model were inconsistent with that of Porter and Umbach (2006), and McMurray (2013). Incongruence between personality type and training programme may perhaps account for such findings since Hirschi et al. (2011) reported that incongruence may result in career indecision.

Also, the topography subscale significantly predicted a decreasing odds of a student being in the humanities category. This means that a one unit increase in the topography score leads to a 0.64 decrease in odds of being in humanities. Topography involves such details as the ability to read and understand maps, finding one's way around a new city and understanding how roads link up. These results are therefore consistent with the findings of Manson and Winterbottom (2012), Ling et al. (2009) and Varella et al. (2016). Systemizers are known to be drawn more to things than to people; to machines and rules rather than to feelings and words, the latter describing empathizers. They easily discover patterns and can predict them if need be. It is, therefore, a cognitive style that is more common in students studying pure sciences than in humanities, although individual differences definitely apply. Little wonder most students in humanities avoid electives that involve equations and formula and would prefer to write long essays, while students in pure sciences would prefer long sentences summarised in equations.

The social cognitive theory proposed by Lent et al. (1994, 2000) explains the findings of the research. The theory notes that not only do person inputs affect career choices, but the background contexts too. In this study, the Nigerian context is believed to play a role in students' course choices. The limited career guidance practices in schools are revealed in students' lack of information about oneself with regards to career development. Therefore, though interest-based personality has been established to predict particular career clusters that relationship, in the Nigerian context, is still difficult to establish.

The study has important career development implications. Since career indecision is one of the major developmental challenges faced by an individual, career counsellors are expected to play a vital role in providing solutions to these challenges by offering insightful guidance to individuals from an early stage. Interests can be discovered as early as one's childhood and proper guidance can lay a foundation for the growing child to explore career options around his/her field of interests, and train in the most appropriate way suitable for him/her. Thus, whether to choose 'sciences' or 'arts' at the secondary school level or even the course to study at the tertiary level, will not be a difficult decision for an individual properly guided. Also, the topography scale of the systemizing quotient can be used by career counsellors to determine if a student will be more appropriately placed in pure sciences or humanities amongst other tools. One's understanding of road linkage, geographical areas and general interests in rules guiding such, can be helpful in making an appropriate choice of the course to study.

For future research, we recommend a comparative study of students in tertiary institutions with secondary school students to discover if these predictions are true in their career choices. The participants in this study were students already in tertiary institutions which were necessary to study the course choice already made.

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