



## Psychological Factors Influencing Attitude towards Genetically Modified Foods among Residents of Ibadan North Local Government Area, Oyo State, Nigeria

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### Abstract

The subject of genetic modification of foods has been an issue of overarching concern to people. The complexity of the issue stems from the fact that many foods consumed daily are genetically modified, and thus, making it nearly impossible to avoid eating genetically modified foods. This study aimed at determining factors that can influence people's attitude towards genetically modified foods (GMFs). A descriptive research design was adopted for the study. Data was collected using a structured questionnaire from 382 residents of Ibadan city in Oyo state. Data collected were analysed using the statistical package for social sciences (SPSS) version 20.0. Descriptive statistics was used to present data in tables and frequencies. A non-significant negative correlation with risk propensity ( $r = -0.97, p > .05$ ) and also a non-significant positive correlation with attitude to genetically modified food ( $r=0.60, p > .05$ ) were observed with respect to hypothesis one. Socio-demographic variables did not jointly predict attitude towards GMFs among residents of Ibadan North LGA [F (5, 377) = 0.818; P > .05; R = 0.114, R<sup>2</sup> = 0.013). Consumption of genetically modified foods was hinged mainly on high risk taking attitudes. Socio-demographic factors such as age, sex, level of education were not found to have effects on people's attitude towards GMFs. Also, health anxiety positively affected attitude towards GMFs, making it imperative to educate people appropriately about GMFs.

**Keywords:** *Psychological Factors, Attitude, Genetically modified foods, Health, Anxiety, Residents.*

### Introduction

Genetic modification of food involves the deliberate modification of plants' genetic material using innovative recombinant DNA technology (Craig, Tepfer, Degrassi, & Ripandelli, 2008). Biotechnology has become an important field in the global market. The term "biotechnology" refers to those techniques used by scientists that enable them to modify genes within an organism or transfer genes between organisms in a way

that would be impossible to happen in nature (Frewer, van der Lans, Fischer, Reinders, Menozzi, Zhang & Zimmermann, 2013). In other words, modern biotechnology does not include traditional breeding techniques, in-vitro fertilization or hybrids. Genetic engineering techniques have been envisaged as an opportunity to improve food production to fulfil consumer preferences for improved quality and diversity. The modification of

food genetically has the potential to increase yields and could lower the price of food, which would boost productivity in farming and increase the supply of food for the world's rapidly growing population.

The subject of the attitude of people towards GMFs has been of particular interest, given the number and variety of issues at stake. Interestingly, evidence suggests that some reluctance towards the introduction of GMF exists, even though the recent Euro barometer surveys also reveal evidence of a regressive recovery on people's support for GMF products from 1999 to 2002 (Bredahl, (2001); Grunert, Bech-Larsen, Lähteenmäki, Ueland, & Åström, 2004). A return to scepticism is found in the 2005 data (Gaskell, Allum, Bauer, Jackson, Howard, & Lindsey, 2003). The negative attitude of Nordic populations towards GM food has been confirmed in previous studies (Bech-Larsen, Grunert, & Poulsen, 2001; Honkanen, & Verplanken, 2004). However, the same conclusion is achieved in some surveys for consumers in Poland, who in general have a significant distrust of genetic modification, especially where this may occur in food products. Besides Europe, evidence from the US is insightful and suggests that opinions concerning GMF are not significantly different from those found in Europe. Particularly, US students mainly prefer non-GM products for chips, banana, corn flakes, and corn-beef (Lusk & Fox, 2002; Onyango, Govindasamy, Hallman, Jang, & Puduri, 2004).

Although genetic modification technology holds the promise to increase food security in developing countries, negative public acceptance can affect its adoption (Qaim, 2009). The public's main concerns relate to the uncertainties and possible negative effects of genetically modified organisms (GMOs) on human health and the environment (Dona & Arvanitoyannis, 2009). Despite the associated benefits of genetic engineering of food, its successful adoption can only become a reality if consumers accept the end-products. The

future advancement of gene technology very much depends on public acceptance. Previous studies reveal the following concerns among consumers about the possible effects of GMF: health hazards from consuming GMFs, including long-term effects, negative ecological impacts, effects on future generations, and limited purchasing options that may result from uncontrolled dominance of GMF (Colson, Huffman & Rousu, 2011; Frewer, van der Lans, Fischer, Reinders, Menozzi, Zhang & Zimmermann, 2013)

The fact that many GMFs are typically products that are consumed daily (e.g. GM milk, and tomato) increases its complexity. Firstly, the valuation of a new good implies the provision of information from several sources: public and private, formal and informal, etc, while conditioning on the credibility and trustworthiness of each relevant information source. Given the information available, a further issue concerns altitude 'attitude' not 'altitude' expression and formation, which ultimately leads to the final question regarding product valuation and consumer preference (Frewer, van der Lans, Fischer, Reinders, Menozzi, Zhang & Zimmermann, 2013).

Moreover, there have been numerous attempts to classify the factors influencing consumers' behaviour (Lusk & Fox, 2002). Generally, all factors can be put into one of the three following classes: (1) Product-related factors: physicochemical properties, nutrient contents, sensory attributes, and functionality (convenience, availability, packaging, durability); (2) Consumer-related factors: demographic factors, metabolism (hunger, thirst), psychological factors (motives, personality, attitudes); and (3) Environmental factors, economic factors, social factors (social group, family patterns habits), cultural factors traditions, religions), and context (place, time and company associated with eating) (Qaim, 2009). Among factors that determine the quantity and sort of food consumed, the psychological factors play very important roles. Motives, attitudes, and

personality are considered as the key factors (Dona & Arvanitoyannis, 2009).

The dominant controversies associated with GMF in the United States pose questions regarding the implementation of mandatory labelling and public concerns about potential health hazards. However, genetically modified food is common in the United States but is not fully accepted in developing countries such as Nigeria. Food manufacturers estimate that 70 percent of processed foods contain at least one ingredient made from genetically engineered crops (Jaffe, 2012). Although the U.S. Food and Drug Administration approved the first GM salmon for human consumption in 2015, and released announcements responding to consumers' concerns about the reviewing process, environmental influence, and labelling issues, the idea that biotechnology poses risks to public health is still a concern for many, as many people have not totally accepted ingestion of GMFs, especially people in developing countries (Food and Drug Administration, 2015).

### Objectives of the Study

The objectives of this study were to:

- i. determine whether there is health anxiety influence risk propensity among the residents of Ibadan North LGA.
- ii. ascertain if health risk attitude influences risk propensity on attitude towards GMFs.
- iii. determine the differences in the attitude of the residents toward GMFs across the level of their risk-taking
- iv. investigate whether personality factors will have a significant influence on attitude towards GMFs among residents in Ibadan north LGA.

### Research Design

This study adopted a cross-sectional survey design. This was used to determine the influence of psychological factors on attitude towards GMFs. The independent variables were psychological factors which include health risk, and personality factor, and risk

propensity. Age, sex and educational status were the demographic variables of interest while the dependent variable is an attitude toward GMFs.

### Setting

This study was conducted in Ibadan North Local Government Area (LGA), Ibadan, Oyo State. Ibadan is a city in South Western Nigeria and the capital of Oyo State. It has an estimated population of 306,795 at 2006 census and became 308,119 as at the year 2010 through projection, with five local government areas namely Ibadan North, Ibadan North East, Ibadan North West, Ibadan South East, Ibadan South West. Ibadan North LGA has its headquarters at Agodi.

### Population of Study

The participants for this study were residents (men and women) of Ibadan North Local Government area, from Mokola, Sango, Ikolaba, Agbowo and Bodija areas of the local government. The purposive sampling technique was used to select participants with a total of 383 participants for the study.

### Instrument

A structured questionnaire was used to collect data for the study. The questionnaire was made up of five sections: Section A collected information on socio-demographic variables. Section B collected information on health risks. Section C collected information on personality factors. Section D collected information on risk propensity while section E collected information on attitude towards GMF.

### Sampling Method

The purposive sampling method was used for the study. Thus, men and women who met the criteria for the study were selected to participate in the study.

### Procedure for Data Collection

Data collection was conducted with the aid of one research assistant, who assisted in administering the questionnaires to the participants. Data collection spanned a total

of four weeks. The participants were approached directly and questionnaires administered to them, after due explanation of the purpose and obtaining informed consent. The questionnaires were retrieved immediately. Ethical principles of beneficence, confidentiality, and non-maleficence were obeyed.

**Statistical Analysis**

Data was analysed using the statistical package for social sciences (SPSS) version 20. Hypothesis 1 was analysed using Pearson moment correlation coefficient, hypothesis 2, 3, 5 were analysed with analysis of variance (ANOVA) and multiple regression statistics was

used to analyse hypothesis 4. Descriptive statistics was used to analyse and present socio-demographic variables.

**Results**

Hypothesis 1 was tested with correlation analysis Results from the study, presented in Table 1 shows a non-significant negative correlation with risk propensity ( $r = -0.97, p > .05$ ) and also a non-significant positive correlation with attitude to genetically modified food ( $r=0.60, p > .05$ ). Therefore, there was no significant relationship between risk propensity and attitude towards genetically modified food. The hypothesis was therefore rejected.

**Table 1:** Correlation Matrix Showing Relationship among the Dependent Variables

S/N	Variable	1	2	3
1	Health anxiety	-	-	
2.	Risk propensity	-.097		
3.	Attitude to Genetically modified food	0.60	.237**	-

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 2 below indicates that participants with health anxiety and high-risk taking had the highest mean score ( $\bar{x} = 33.56; SD = 5.40; n = 71$ ) on attitude to genetically modified food. This means that participants who have low health anxiety and high-risk taking will have a positive attitude towards genetically modified food. They were ranked 1st. They were followed by participants who are high in health anxiety and high in risk-taking ( $\bar{x} = 33.42; SD = 4.92; n = 112$ ).

**Table 2:** Influence of Health Risk Attitude and Risk Propensity on Attitude towards Genetically Modified Foods

Health Anxiety	Risk taking	Mean	SD	N	Ranking
Low	Low	29.23	6.48	74	4 <sup>th</sup>
	High	33.56	5.40	71	1 <sup>st</sup>
High	Low	31.77	6.61	126	3 <sup>rd</sup>
	High	33.42	4.92	112	2 <sup>nd</sup>

Table 3 shows that people with high risk-taking reported positive attitude to genetically modified food ( $\bar{x} = 33.49; SD = 5.09; n = 183$ ). It also showed there was a significant difference in the attitude of people toward genetically modified food across the level of their risk-taking (LSD - 2.992;  $p < .01$ ).

**Table 3** LSD Showing the Main Risk Propensity on Attitude towards Genetically Modified Foods

Dependent variable	Risk Taking	Mean	SD	N	LSD
Attitude to genetically Modified Food	Low	30.50	6.65	200	2.992**
	High	33.49	5.09	183	

\*P<.05; \*\*p<.01

Hypothesis 4 was tested with Regression analysis and the result is represented in the table below. Table 4 shows that the five personality traits significantly and jointly predicted attitude to genetically modified food among study participants delete [F (5, 377) = 7.287; P < .001; R = 0.297, R2 = 0.088]. The five dimensions of personality jointly accounted for 9% (R2 - 0.088) variation of the attitude of people towards GMF. However, only conscientiousness (p = 0.102, p < .05), and neuroticism (p = 0.272, p <.001) personality type independently predicted attitude of people towards GMF and were significant, therefore, the hypothesis was not rejected.

**Table 4:** Influence of Five Personality Dimensions on Attitude to GMDFs

Variable	Beta	t-value	Sig	R	R <sup>2</sup>	F	P
Extra-version	0.061	1.215	>.05	0.297	0.088	7.287	<.01
Agreeableness	-0.001	-0.018	>.05				
Conscientiousness	0.102	1.982	<.05				
Neuroticism	0.272	5.393	<.01				
Openness	0.12	0.250	>0.5				

Dependent Variable: Attitude to GMF

Hypothesis 5 was tested with Regression analysis and the result is represented in the table below.

Table 5 indicates that demographic variables did not jointly predict attitude towards genetically modified foods among study participants [F (5, 377) = 0.818; P > .05; R = 0.114, R2 = 0.013]. Also, none of the demographic variables reported an independent prediction of attitude to GMF. The R-value of 0.114 shows a very weak

positive relationship between the demographic variables and the dependent variables. In addition, the demographic variables accounted for only 1.3% variance in the prediction of the dependent variables. The remaining 99.7% could be explained by other alienated variables. Therefore, the hypothesis was not confirmed.

**Table 5:** Summary of Multiple Regression Showing the Influence of Demographic Variables on Attitude to GMFs

Variable	Beta	t-value	Sig	R	R <sup>2</sup>	F	P
Marital status	-0.019	-0.94	>.05	0.114	0.013	0.818	<.05
Occupation	-0.081	-1.168	>.05				
Sex	-0.011	-0.200	<.05				
Education	0.044	-0.751	<.05				
Age	0.003	0.041	>0.5				
Religion	-.006	0.122	>.05				

Dependent Variable: Attitude to Genetically Modified Food

## Discussion

Hypothesis one predicted a significant relationship between risk propensity and attitude towards genetically modified foods among residents of Ibadan North Local Government Area. The results from the study showed that health risk attitude had no significant negative relationship with risk propensity and non-significant positive correlation with an attitude towards genetically modified foods. The results of this hypothesis were therefore supported by Wierenga, (1983), who noticed a non-significant correlation of risk propensity to attitude towards risk-taking.

Hypothesis two predicted that health risk attitude and risk propensity will significantly influence attitude towards genetically modified foods among residents of Ibadan north local government area. This hypothesis was confirmed because the result depicted significant influence of health risk attitude and risk propensity on attitude towards GMFs among residents of Ibadan North Local Government Area, and this was supported by Babicz-Zielińska, (2006), who showed that an individual's personal capitals, such as schooling, age, religion, and social capital and health risk attitude significantly influences or predicts their preference for GMFs, also found level of risk propensity to be a significant factor in determining which consumers were accepting or disapproving genetic GMFs (Sturiale & Scuderi, 2017). Hypothesis three predicted that health risk attitude and risk propensity will have main and interactive effects on attitude towards GMFs among residents of Ibadan North Local Government Area. This hypothesis was confirmed because the result depicted that health risk attitude and risk propensity had main and interactive effect on attitude towards genetically modified foods among study participants.

Hypothesis four predicted that personality factors will have a significant influence on attitude towards genetically modified foods among residents of Ibadan North local

government area. This hypothesis was confirmed because the finding depicted that the five personality traits significantly and jointly predicted attitude towards genetically modified foods. However, a poor positive relationship was noted between the personality dimensions and the dependent variables.

Hypothesis five predicted that demographic variables will significantly jointly and independently influence attitude to genetically modified foods among study participants. This hypothesis was rejected because the result indicated that demographic variables such as age, sex, religion, educational attainment, marital status, and occupation did not jointly predict attitude towards genetically modified foods, likewise, demographic variables did not independently predict attitude towards GMFs among participants in this study.

## Conclusion

Findings from the study depicted that a significant relationship exists between health risk attitude, risk propensity, personality and attitude towards genetically modified foods among residents of Ibadan north local government of Oyo state. More so, other demographic variables such as age, sex, religion, educational attainment, marital status, and occupation did not jointly and independently predict attitude towards genetically modified foods among study participants

## Recommendations

The government and non-governmental organizations can help in shaping a positive attitude of residents in Ibadan North local government through some enlightening or educating programmes on the benefits and advantages of consuming genetically modified foods. Marketing firms can also be of help to the manufacturers of genetically modified foods by incorporating in their marketing strategies, those benefits, and advantages of genetically modified foods. Quality control organisations such as National Association for

Food and Drug Administration and Control (NAFDAC), Standard Organisation of Nigeria (SON) and Consumer Protection Right can help to regulate the quality of genetically modified foods because the respondents viewed genetically modified foods as lacking quality, hence the negative attitude towards it.

### Limitations and Indications for Future Research

During the period of this study, the researcher experienced some constraints, especially during the administration of the

questionnaires. Some women were reluctant to fill the questionnaire as they felt it was a waste of their time, while some didn't complete the questionnaires making them invalid. The researcher also encountered some financial difficulties during the administration and retrieval of the questionnaires. Another limitation of this study was the small sample size; 383 people in one local government and one city in Nigeria, so the result to be obtained for a wider generalization was hindered.

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