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KUMASI, GHANA (KNUST)

KNUST
COLLEGE OF SCIENCE
DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY

CONSUMER STRATIFICATION IN RESPONSE TO COCOA PRODUCTS

PREFERENCE

THESIS SUBMITTED TO KNUST, DEPARTMENT OF FOOD SCIENCE AND
TECHNOLOGY, KUMASI, GHANA, IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

MASTER OF SCIENCE DEGREE IN FOOD QUALITY MANAGEMENT

BY

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JUNE, 2018

DECLARATION

I hereby declare that with exception of references made to other people's work, which have been duly acknowledged, this project work is entirely my own work under the guidance of my supervisor and neither part nor whole of it has been presented for another degree anywhere.

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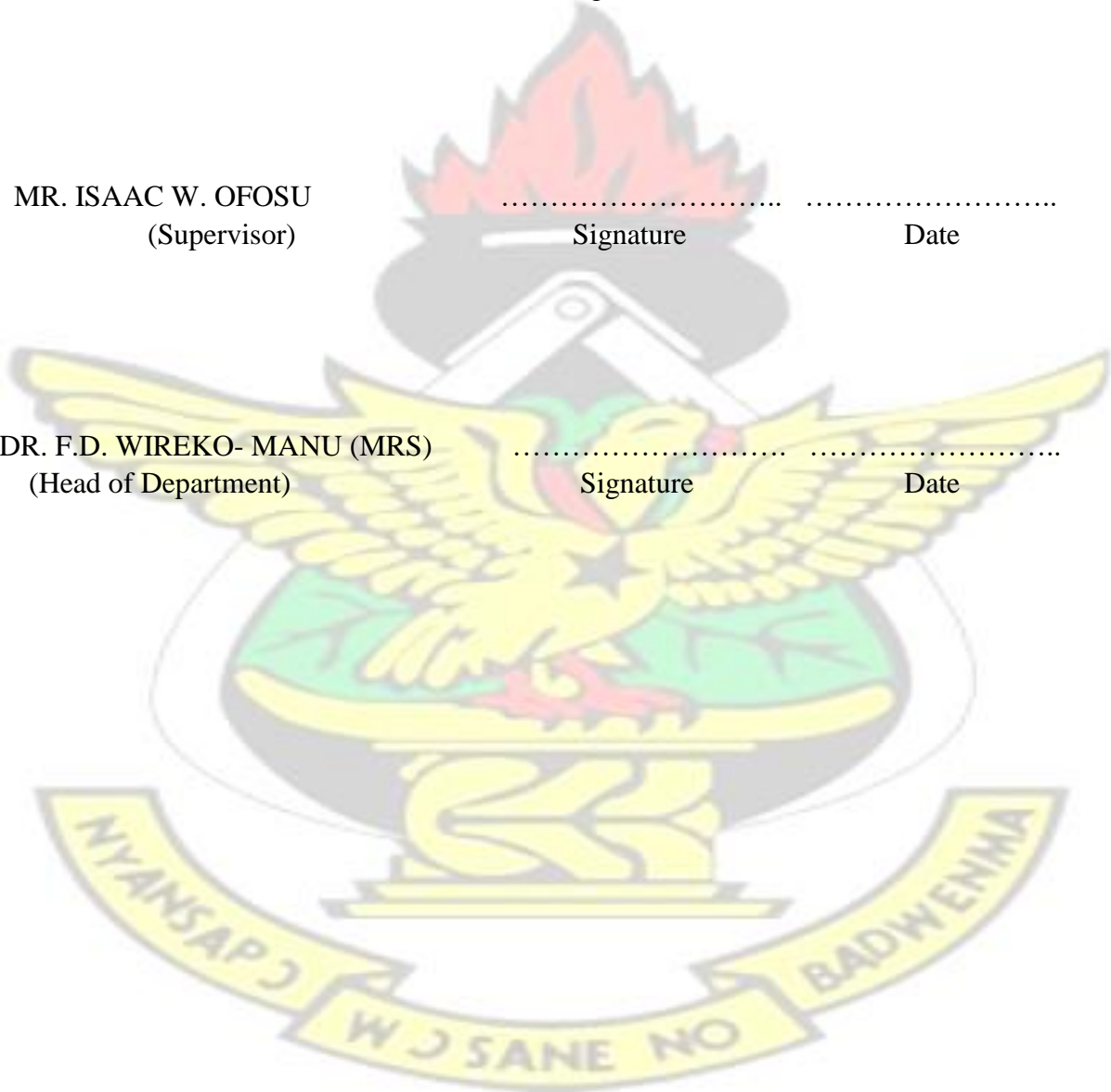
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ABSTRACT

Food stratification is a scientific approach of classifying consumers in accordance with unique characteristics that binds the individual groups together. Consumers are best served when they are grouped according to the social status and sensory preferences. The study seeks to establish the impact of demography and sensory evaluation in stratifying consumption pattern of cocoa products. Questionnaires and sensory assessment were used in collecting data from respondents. Trained and untrained panalists were used in measuring variations in consumer sensory attributes. Responses were inputted into SPSS statistical software for both descriptive and Chi-square cross-tabulation analysis. The results indicate that nearly 53.60% of the respondents consume cocoa products. It was establish that 40.40% of the respondents prefer GH¢5 bar chocolate. The results show that larger families (8-11) do not regularly consume cocoa products apparently due to the household income. The study confirmed about that 53.30% of the respondents patronise cocoa products during Christmas whilst 51.30% during National chocolate days. Moreover, respondents expressed much interest in products 245, 283 and 516 due to its sensory characteristics. The results from Chisquare and cross –tabulation shows significant ($p= 0.05$) association between consumption pattern of cocoa products,

sensory attributes and demographic characteristics of respondents. It was established that about 84.70% of the study population have no knowledge about the health benefits of consuming cocoa products especially dark chocolate and raw cocoa powder with its high antioxidant content. The results from both trained and untrained panalists did not vary much and therefore manufacturers of cocoa products could improve product quality by considering consumers sensory and demographic attributes as established by the survey report.



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DEDICATION

I dedicate this work to my wife, Mrs. Priscilla Asante and children, Anastacia, Nana Kwame, Prince, Michael and Emmanuel.



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ACKNOWLEDGEMENT

I wish to acknowledge all those who contributed in diverse ways toward my study and writing of this thesis. I am most grateful to Almighty God for his strength to go through the programme successfully. I am also grateful to my supervisor; Mr. Isaac W. Ofori for his immense contributions towards the completion of this work. I also want to thank Dr.

Emmanuel D.J. Owusu-Ansah for assisting me in analysing the data, Ms Selorm Success Agboado and Francisca Essuman - Quansah for their impressive support in data collection and organization.

To my wife Priscilla, children and mates, I say thank you and God bless you all for your words of encouragement, support and prayers. Lastly I want to thank Management of Cocoa Processing Company Limited especially Dr. Frank Asante (Deputy Director of Operations) for recommending me for the programme and Mr. Kwabena Frimpong (Quality Assurance Manager) for his motivation.

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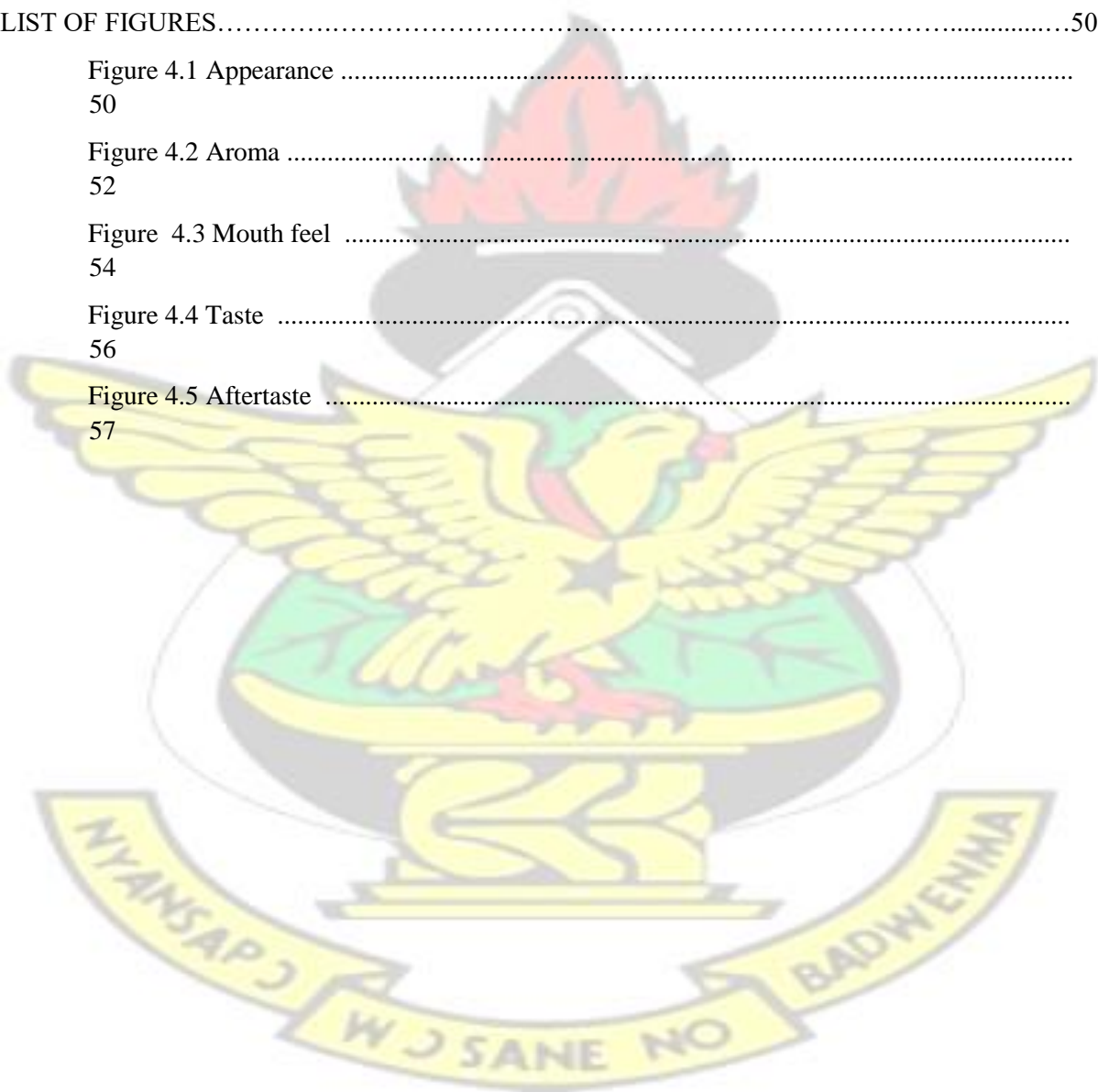
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CHAPTER ONE

INTRODUCTION

1.1 Background

Food stratification is a scientific approach of classifying consumers in accordance with their unique characteristics that binds the individual social stratum together. Societies are best served when consumers are grouped according to the social status and sensory preferences.

Consumers often buy goods and services similar to what their friends in the group buys. According to Loudon *et al.* (1993) stratification determines the buying patterns of consumers, where and when they buy. One way of addressing the implication of stratification for marketing of goods and services and its usefulness is to segment consumers according to the social status (Wedel and Kamakura, 2012) as well as sensory preferences. Consumer stratification has received a major boost in countries such as China, India, Brazil, Germany and many other countries (Sharma, 2010) producing goods and services with specific quality attributes to meet specific consumer groups. Mcnall (1990) examined the dormant function of consumption by focusing on self-identification, in which a consumer purchase and consume, engage in showcasing their goods and services as a symbol of socio-economic status. According to Mcnall (1990), stratification determines factors that motivate people to consume certain goods and services, that is clubs to join and societies to belong to. Such factors may differ from consumers to consumer.

Social sciences categorize consumers into strata, based on their occupation, income, wealth and social status. As such, stratification is the relative position of persons within a group, category, geographic location and social status. According to Sharon *et al.* (2016) consumer behaviour

could not be understood perfectly without the concept of stratification. Stratification influences almost everything in one's daily life. It portrays the social identity of the individual in a society on various aspects. Members within the stratum share similar belief and values with one another. The concept of stratification is widely spread in everyday decision making of individual lifestyle. Solomon (1999) viewed stratification as a combination of income, education and occupation. According to him, a good occupation generate good income which impacts on the income of the household to be better educated, impact on their purchasing power. Societies attempt to stratify consuming public largely according to their demographic environment characteristics they share in common. These characteristics determine the social groupings individuals tend to associate with.

Food research and development scientists rely heavily on stratification during products development of food for various consumer groups. Infant formulas as well as food for special category of people such as pregnant women and sick people are mostly different from the normal food for citizenry. Food manufacturers have the responsibility to produce food that meets religious and cultural groups. Certain foods are symbolic to Budhists, Muslims, Hindus and some Christians. Like Kosher and Halaal, food consumption is guided by strict dietary laws. According to Hussaini (1993), foods such as swine meat, the flesh of dead animal, blood in any form, alcohol and alcoholic beverages and any intoxicants are prohibited. In order to satisfy such markets certain assurances should be created by way of certification, by their experience scholars by way of audit before sales can be establish. People who are better resourced are able to afford quality education at premium leading to better jobs and livelihood compared to less privilege families in societies. They are able to afford higher education which

play an important role as a means of stratification for both developed and developing countries through the linkage between education and employment (Connell *et al.*, 1989).

In the view of Claassen *et al.* (1994), demographics alone does not clearly determine the true acceptability of the product. This is where sensory evaluation has become an indispensable tool in assessing quality attributes as a means of stratifying consumers' preference demographically as well as their sensory characteristics. According to Claassen *et al.* (1994), contemporary business environment does not rely solely on social stratification but a mix of social demography and sensory evaluation.

Sidel and Stone (1993) explained sensory evaluation as a scientific discipline used to evoke measure, analyse and interpret responses to products as perceived through the sense of sight, smell, touch, taste and sometimes hearing. Sensory quality is said to be a combination of different senses of perception coming into play in choosing and eating any food. Appearance, aroma, taste, mouthfeel and aftertaste determine the acceptance of the food. Food consumers are better served if food is produced in accordance with consumers' sensory preference. Preferences of cocoa products may vary from sugar and milk flavored, raw cocoa powder, sugar free chocolate and chocolate products as well as other food additives for enrichment. These markets will be met if manufacturing of cocoa products would factor consumer's demography as well as the sensory attributes.

Companies over the years have failed to successfully predict consumer preference for certain goods and services they churn to the market for various reasons. The study will address the relationship between sensory evaluation and consumer demography as a measure of determining customer preference. Janet (2014) viewed consumer sensory characteristics as

unique, deceptive and easy way to determine consumer preference. According to her, failure of the accessors to understand the science of the sensory would invalidate the whole concept.

1.2 Problem statement and justification

Social stratification has been a long awakening issue among companies producing goods and services to meet specific consumer needs and expectations. Stratification has been based on demographic and customer behavior. Putnam (2015) expressed concern on the importance of social stratification on consumption of goods and services. He was of the view that stratification of consumers is more pressing in present times than ever before as economic stratification reaches its peak. Roland *et al.* (2000) examined that social stratification on its own could not predict accurately consumers' preference for food without food sensory evaluation which gives more accurate perception of the consumer preference as compared with only social factors. According to them, demographic factors would not be able to vividly explain consumer preference of certain key quality attributes of food product. Like other scientific measurements, sensory evaluation is concern with precision, accuracy and sensitivity and avoiding false results. Sensory evaluation plays a vital role in the development of food since it determines how consumer will perceive the food.

Food sensory evaluation serves as an important measure to assess whether a particular product meets consumer expectations and if not how it can be improved. It is essential for maintenance of existing products, product optimization, new product development and evaluation of potential market arena (Meilgaard et al., 1991). In the view of Lawless and Heymann (2010), sensory evaluation attempt to isolate the sensory characteristics of foods to enable accurate

measurements of the human responses. This is done by minimizing potential biases such as information that could influence consumer perception. Researchers are of the opinion that to better understand consumers' preference and meet their needs and expectations, it would be better to stratifying them appropriately by considering their demographic status in conjunction with the product's quality and sensory attributes for effective stratification(Lawless and Heymann, 2010). Market Researchers have focused much of their attention segmenting consumers according to their behavioral characteristics toward a particular food product and paying less or no attention to stratify consuming public sensory properties in particular. Not much attempt had been made to stratify consumers by using their demographic factors well as their sensory properties in respect of the products in question.

The question is 'how has the several consumer studies help in addressing challenges associated with social stratification and consumer preference. Therefore this study is a serious attempt at addressing this question by investigating the impact of consumer stratification on the basis of consumer demographics and sensory attributes in response to cocoa products consumption.

1.3 Objective

To determine the impact of consumer demography and sensory characteristics in stratifying consumption pattern of cocoa products.

CHAPTER TWO

LITERATURE REVIEW

2.1 General overview of consumer stratification

Study has established that social class affect the thinking behaviours of most consumers which intend impact on how consumer information is processed for decision making.

According to Carey and Markus (2016), thinking style is shaped by one's cultural environment. Consumer behaviour could not be understood perfectly without considering social status and classification one belong to. Stratification and classification of consumers influence consumer choice on where to live, what to wear, what to eat or buy, schools to attend and even the music and social class to belong to. In the view of Putnam (2015), consumer characteristics such as gender, sex, education, religion, household income, culture and occupation have direct impact on consumption pattern. These factors reflects consumer resource availability and wealth accumulation such as social capital and professional opportunities and disposable income coupled with socio-economic status, cultural status and psychological functioning and behaviour of consumers (Kraus *et al.*, 2009). The more disposable income a household possesses the higher the chance to spend on certain products and services.

Ewa (2006) considered psychological factors as important determining factor influencing consumer behaviours and choices. Both the mind and the body form integral part in food sensory evaluation. The five body senses such as sight, smell, taste, hearing and touch are manipulated in the brain of individual before sensations are communicated to the sensory organs, as it is the field of psychophysics where most of the measuring and scaling techniques are developed for product acceptance.

According to Roland *et al.* (2000) many temporary changes that occur in an individual physiological state such as hunger, fatigue and illness influences consumer sensory perceptions. Any temporary state that makes a sensory panellist uncomfortable is likely to influence the precision and reliability of the sensory outcomes. Hungry, sick and fatigued people are shown to affect the sensory perception of food assessors. Roland *et al.* (2000) is of the view that mood swings reduces the reliability of sensory outcomes since senses, attitude, motivation and others factors influences the sensory analysis outputs. Consumer acceptability of product largely depends on the physiological and psychological attributes of the consumer. It is also important to note that health issues such as cold, asthma, hay fever, allergy, genetics, lack of concentration, female menstrual cramps affect sensory characteristics such as odour or smell and sometimes taste.

According to Lynn and Hans (2007) sensory science has played a key role in identifying factors food technologists and product development departments regarding food quality and (sensory) product optimization in meeting different consumer groups. The need to understand consumer stratification has expanded beyond product focus to incorporate investigation of the key determinants of consumer decision-making and purchase behaviour in the market place.

Business entities are striving to gain supremacy over others (Hewitt, 1994) and few successfully obtained that destiny. Hewitt (1994) examined that modern business is all about winning the stiff battle of competition with variety of business strategies at the right time Customer stratification and focus strategies are two key strategies businesses adopt in order to ensure competitive advantage over rivals.

Tarun (2012) asserted that market stratification help organizations to segment its market in an effective manner and thus immensely assist in delivering diversified and customized products

and services. According to Tarun (2012), stratification strategies assist firms in focusing on specific customers and make an effective market and customer driven value chain management.

Consumer taste and expectations is becoming more challenging than ever before and gaining competitive advantages in the market place is always the key attribute for higher successful (Garbarino and Johnson, 1999). Businesses are studying intensely to determine contemporary market preference in order to stay competitive and attractive. Effective value chain management is without any doubt a prolific business strategy in achieving corporate aims and objectives. Social stratification therefore refers to the hierarchical arrangement of groups of people on the basis of economic wealth, property, political power, prestige and social status. Social stratification has existed as far back as human civilization began.

Consumer behaviour could hardly be understood without considering social classification. Consumer social class is a real phenomenon prevailing in every society on various forms. It describes the social identity of a person in a society. The concept of social stratification influences the buying behaviour of people within a particular stratum. Stratification exists in every society, culture and shapes of life style accordingly (Marya *et al.*, 2011).

According to Marya *et al.* (2011), developed countries classify consumers on the basis of their purchasing power and social status. To best understand customers and serve them better, companies need to categorize consumers on the basis of frequency of usage of their products and services, quality specifications required, price individual groups are willing and able to pay for, levels of complaints and loyalty. The rationale is that premier customers are very important and organizations try to motivate or inspire them. Stratification helps service providers to

gather relevant and reliable information about their numerous customers for effective service delivery (Barry *et al.*, 2012).

Social stratification analyses the basis upon which groups of individuals are differentiated and ranked, on which income, occupation, education, power, prestige, economic and other rewards are distributed (Beeghley, 2016). According to Sharon *et al.* (2016), social hierarchies has direct impact on entire behaviour of one's daily life such as where they live, eat, wear, shop, drive and even the media they consume. The hierarchy and inequality is determined by values, norms and actual distribution of the limited resources and opportunities (Sharma, 2010). It is on these bases that the study seeks to investigate how these social disparities in resource distribution affect consumption patterns of cocoa products especially in Ghana.

Giddens (1981) describe the capital market intrinsically as market structured with power, in which the possession of certain key attributes of stratification of wealth exists. The social stratification involves the formation of members into a system of social strata that are distinguished from one another by particular causal mechanisms and life styles that are responsible for groupings (Giddens, 1981).

According to Scott (1996), social stratification is more than just social inequality. Structured social inequalities could occur around a variety of social differences, and they involve a wide range of resources, capacities and possessions. Age, gender, race are the other sources of inequality in a society. Social stratification occurs when structured social inequalities are systematically interrelated in the way that they shape people's life chances and are involved in the formation of large-scale collectivities that stand in hierarchical relations to one another. Scott (1996) defined social strata as the formation of large-scale collectivities as consequences of complex interaction within the power structure of the society. Through the demographic

processes of intra- and intergenerational mobility, informal interactions and household formation, people's life chances and lifestyle are mediated in both reinforcing and contradictory ways. Members of social strata may develop awareness of its composition and boundaries and at the same time, of its relations to other strata in the society (Scott, 1996).

2.1.1 Theories of stratification

Different researchers have different views and interpretations to social stratifications. Proponents of stratification have categorized stratification into conflict theories, functional theories and Weberian theory. According to Andrew (2014), conflict theories emphasizes on roles and responsibilities of social class, conflict arisen among classes, class solidarity and consciousness. According to Andrew (1957), stratification brings strife and division among social classes instead promoting class harmony in society (Andrew, 2014). It is also seen as a means of exploiting the poor and vulnerable in society instead of fostering and championing societal common goals and aspirations. Lipset (1926) viewed stratification as a function through which society encourages members within the strata to aspire to achieve the diverse position necessary in a complex social system. Lipset (1926) stratified consumers according to their skills, education, intelligence, commitment to work and willingness to exercise power and prestige.

According to Bernard (1957), Weber described stratification as concept of class, status and power. Weber explained the causal relationship between wealth distributions along the social hierarchy. Bernard (1957) highlight Weber stratification as a measure of livelihood, birth, family origin, ethnic, occupation, education, manners and also associated with traditions, norms and culture.

2.2 Understanding consumer behaviour

2.2.1 Consumer sensory behaviour

According to Claassen and Lawless (1992), the traditional method of judging consumers' preference has a number of subjectivities. They are unable to predict consumers' preferences, their quality assessments are subjective, and assigning quality score is difficult and biased.

Claassen and Lawless (1992) observed that product developers in the food industry use different tools and systems in developing products. These may vary from chemical test, microbiological analysis and physical examination to determine intrinsic attributes such as viscosity, hardness, colour, fat content and many others. According to them these tests are unable to determine consumer acceptability and preference on consumption of products.

In their view product choice is an individual affair and not a prediction by any method or assumption. Users of products experience their quality preferences holistically with their senses and with equipment or test.

Lawless *et al.* (2010) examined that without sensory evaluation, development effort reflects personal feelings, views and choices of the product developer, development team, marketers and even top management. Sensory evaluation has become the bench mark upon which product development trade-off decisions, development success and timelines are determined. Sensory evaluation in the opinion of Lawless *et al.* (2010) facilitates the process of product development and launch of new product to the market. Sensory science reduces the risk of product failure where customer needs and expectations as well as company requirements are met. Lawless *et al.* (2010) defined sensory evaluation as “a scientific discipline used to evoke, measure,

analyse and interpret those reactions to the characteristics of products as they are perceived through the senses of sight, smell, touch, taste and hearing’.

According to Janet (2014), the combined understanding of human behaviour, the physiology of the senses as well as knowledge of experimental design and statistics is essential for obtaining actionable consumer information for decision making. Roland *et al.* (2000), defined sensory evaluation as ‘identification, scientific measurement, analysis and interpretation of the properties or attributes of a product as they are perceived through the five senses of sight, smell, taste, touch and hearing’. Sensory evaluation and consumer behaviour are concerned with obtaining information particularly to the perception of product quality and consumer preferences. Sensory quality is considered Heldman (2004) as the most important characteristics of consumers. The degree of consumer acceptance or rejection of a particular food depends on whether the food quality characteristics satisfy consumers’ sensory attributes or not.

Shepherd and Sparks (1994) examined consumer behaviour towards food as largely dependent on the interaction between the consumer and the food at a particular time as well as environmental conditions. Food characteristics such as chemical and nutritional composition, consumer traits such as genetic, age group, gender, physiological and psychological state and external environment such as family and cultural habits, religious believes, education, fashion, price, packaging and convenience to use influence consumer preference in accepting or rejecting a product to other.

2.2.2 Sensory evaluation and the food industry

According to Grunnert and Harmsen (1997), consumer's decision making process may be explained by the attitude linked with cognitive, affective, conative and economic considerations. The factors in their view may be jointly assist marketing, research and development (R and D) experts in developing new products that will meet the needs and expectations of its consumer. To satisfy customers and also again some level of competitive advantage, organizations are integrating sensory evaluation as a core function in their operations in improving product quality and business performance. According to Grnnert and Harmsen (1997), neither study and development nor market orientation is expected to have direct effect on business performance, however they could both influence innovation process. They observed consumer sensory tests play a major role in the food industry.

Lesser (1983) viewed sensory evaluation as an instrumental, physiochemical and sensory analyses to evaluate intrinsic characteristics of physical product as such as colour, taste, appearance and other food attributes. Van Trijp and Schifferstein (1995) perceived sensory analyses factors such as physical concentration, perceived concentration, coded sensation and overt response and important response in determining consumer preference. They argue that in a laboratory setting, products are coded and the environment far from market place which may not reflect the actual consumer behaviour. Such approach contributes to the establishment of quality assurance and quality control processes in the organization.

2.2.3 Sensory evaluation and food quality

Consumers 'primary objective for choosing any commodity of food item is most often based on palatability or eating quality and nutritional content, wholesomeness and other quality attributes of the product may be secondary (Meiselman and MacFie, 1996). Lawless and Heyman (1998) admonished food and beverage manufacturers to ensure food and beverages

they churn out to the market are of higher quality, appealing and appetising or more specifically of eating quality attributes of aroma, taste, aftertaste, tactual properties and appearance is acceptable to the consumer so they crave more. Food and beverages should meet consumer's expectations in order to be successful and gain some level of competitive advantage in the industry.

Lawless and Heyman (1998), defined food quality as that 'which the consumer likes best' and that the grades of quality are understood more by the degree of desirable attributes and absence of undesirable characteristics which are primarily detected by the consumer's sensory organs, then, a good method of deciding food quality is through sensory evaluation.

Side land Stone (1993) defined sensory evaluation as a scientific discipline used to evoke, measure, analyse and interpret those responses to products as perceived by their senses of sight, smell, touch, taste hearing.

According to Sidel and Stone (1993) sensory analysis is an interdisciplinary science that uses human panellist's sensory perception related to threshold of determination of sensory attributes. The variances in sensory responses are used to measure sensory acceptability of food products as well as other sensory tools. Scientists have not been able to develop one instrument capable of replicating or replacing human psychological and emotional responses, sensory evaluation has been considered as the most reliable and important in study and development of new products and existing products (Meiselman *et al.*, 1999).

According to Lawless and Klein (1998), sensory evaluation is essential during raw materials inspection, product development, product improvement, cost reduction, quality control, and selection of packaging materials, shelf life studies and determination of storage conditions. Meilgaard *et al.* (1999) observed that for sensory evaluation to be reliable and provide valid reports, assessors should be treated as scientific instrument, that is panalists should be screened, calibrated and validated (Meilgaard *et al.*, 1999). According to them, tests involving sensory panels should be conducted under controlled environment using appropriate experimental designs, test methods and statistical analyses.

2.2.4 Stratification by Sensory Evaluation

According Lawless and Heyman (1998) sensory experts have categorized sensory evaluation into so many forms with the key ones being descriptive analysis and consumer acceptance testing. The descriptive is further grouped into triangle test where panellist attempts to isolate the old one from the two. The second descriptive analysis is in their view (Lawless and Heyman, 1998) is the duo-trio tests. Here panalists compare samples with known standard. Descriptive sensory evaluation seeks to discriminate between a ranges of products based on their sensory characteristics and also determine sensory quantitative description of the sensory differences that can be identified and not just the defects. No firm decisions are made whether good or bad, most preferred or least preferred which is not the purpose of assessment (Diary Industry Technical Review, 2005).

In the consumer acceptance, preference and hedonic are used to determine the degree of likeness which is popularly used to determine consumer acceptance of a given product. The

consumer test method is applicable where untrained assessors are employed. Srilakshmi (1990) observed that food quality could be evaluated by means of sensory or organoleptic or psychometric methods. It involves human sensory receptors such as odour, taste, smell and other sensory characteristics in deciding which food to be eating. Consumers feel empowered to demand products that fit their needs and expectations and food manufacturers will be willing to produce to meet it. Sensory scientists (Koster and Mojet, 2015) indicated that consumers are better understood by examining their sensory preferences rather than considering consumer demographics responses such as age, family status, educational status, social status, income levels and shopping traits (Koster and Mojet, 2015).

2.2.5 Consumer behaviour

Consumer decision making process is complex and important in determining purchase behavior. Many researchers have tried to identify how consumers make purchasing decisions. Consumer behavior is influenced by several factors such social status. The study tries to examine how social class affects consumer behavior. Sociologists are of the view that social class is conceptually complicated, philosophically upsetting and methodologically challenging, yet it continue to offer proactive insight into consumption choices (Coleman, 2013). In the view of Coleman, the fundamentally differences among social classes is the self-image, social horizons and consumption goals continue irrespective of changes in income distribution, family demographics composition and life-style of consumers.

According to Yakup *et al.* (2014), consumer behaviour is complex and important process of determining consumer buying behaviour. Consumer behaviour is influenced by several factors such as culture, family, attitude towards objects and lifestyle (Mckinney *et al.*, 2004).

Consumer buying behaviour in the view of Rossiter and Foxall (2008) is influenced by initial stimuli, monetary motivation, habit or belief, attitudes, values and external incentives. According to them, social class constitute one of the greatest learned force which influences consumer buying behaviour. Rossiter (2012) considered social class is as a major factor influencing consumer buying behaviour. According to Yakup *et al.* (2014) researchers between 1950's and 1960's confirmed the significance of social stratification in understanding consumer behaviour. According to Fisher (1987), consumers relied heavily on position and prestige of their families within relatively small and self-contained communities. Kotler and Armstrong (2008) defined consumer buyer behaviour as 'the buying behaviour of final consumers' individuals and households who buy goods and services for personal consumption'. In order to offer an effective service, Patwardhan *et al.* (2010) identified the importance of consumer segmentation, taking into account the benefits which the consumer seeks. Organizations are paying more attention on gathering information on consumer stratification and segmentation. Gherasim (2013) examined that people within the same social class or group have certain similar behavioural characteristics such as their preferences for clothes, housing, furniture, leisure services, and the mass media. These characteristics depend largely on variables such occupation, income, wealth, education and the position or prestige and power one occupies.

2.2.6 Social stratification and consumer purchase behaviour

Abraham (2013) examined that societies are stratified according to the values and norms its members hold in high esteem. People within a social group share common characteristics such as reasoning, speaking and behaviour. According to Abraham, consumers interact mostly with people of their own social class so that each class has about the same values and patterns of behaviour. Social stratification is seriously felt in societies where classification is

extreme. Stratification affected where people live, choice of cars, choice of food and the markets where they shop as well as colleges they attend. In the case of Denmark and Canada, the situation is entirely different (Hollensen, 2010). Riesman *et al.* (1950) establish that stratification on consumer behaviour starts from childhood as a result of the social class of their families belongs. Other researchers such as Moschhis and Moore (1979) share similar views that young people from upper socioeconomic backgrounds develops greater awareness and preferences for commercial stimuli in their consumption choices than those from middle and lower classes. They are of the view that younger people from upper class families develops stronger brand equity and likely to seek information faster and quicker than their lower class counterparts. Engel *et al.* (1990) identified that lower class consumers prefer face to face shopping where they get some discounts or credits and mostly unable to purchase quality products and services. In the case of upper to middle class consumers they feel more confident in their shopping abilities and may venture into new places to explore new ranges of products and services (Engel *et al.*, 1990). Consumer demographic

Rozin *et al.* (2003) observed that age has a predictive value when young children and the aged were compared, but for the middle adult, age has not proven to be a major predictor.

Gender is of some importance, and is associated with modest differences in food preferences. Gender difference is associated with body weight, which manifests in dieting and food choice, in most developed countries. There are substantial differences across social class in both food preferences and attitudes. According to Rozin *et al.* (2003), primarily the upper- middle and upper classes have shifted to healthier and organic foods. It is therefore food manufacturers responsibility to meet these varied consumer groups. In the view of Rozin *et al.* (2003) not much work have been establish concerning the relations between consumer personality traits and food preferences and attitudes. According to Frewer and Salter (2003) scientists associates

food preferences to the relation between diet and health, trust in government and technology as key influence of consumer preferences (Rozin *et al.*, 2003). Vegetarians base their food preferences on health features and ethical immorality of consuming animal foods (Beardsworth and Keil, 1992). This has a major effect on all aspects of eating, including the social context of eating.

The ever ageing populations across the world especially Europe has resulted in majority of the population falling into an average of 65years (Mintel, 2000; Bass *et al.*, 1999). The ageing population has necessitated changes in food demand from farm to fork as population life-style and demand for food continue to change. Consumer taste and preference of the ageing population has called for convenience foods instead of takeaways (IGD, 2001).

According to IGD (1998), by the year 2021, the 60 year old will be more accustomed to grabbing a quick meal and eating out than cooking at home. They also anticipate that future retirees will demand foods in smaller packages because it convenience to uses and effective minimization of food waste (Senauer *et al.*, 1991). The average size of the household is decreasing across the globe with most families reducing to three people or four maximum (IGD, 2001; Mintel, 2000). The implications of declining household size include a greater demand for smaller pack sizes and single servings, for ready prepared food and for eating out (IGD, 1998).

2.2.8 Physiological influences on consumer food choices

Drewnowski (1997) attributed children's food choices to be influenced by sensory perceptions than those of adults, which are more likely to take on cognitive, economic or even practical

influences. According to Nicklaus *et al.* (2005), children between 2 and 3-year-old tend to avoid vegetables, probably because of their tough texture or their strong flavor, but adults find vegetables, even the bitter ones, more likely to be consumed, perhaps they believe that they are beneficial to health (Drewnowski, 1997). Schaal (2005) confirmed that children olfactory system is functional at birth and are capable of finely discriminating odours such as the odour of human milk and formula milk (Marlier and Schaal, 2005) or even of two lactating mothers. The relationship between taste perception and preferences was particularly studied in the case of bitter taste. Bufe *et al.* (2005) observed that individual levels of perception of two bitter compounds of close chemical structure may vary greatly in the population. These variations in perception were tentatively related to variations in liking for bitter foods.

2.2.9 Consumer health and food choices

According to Kristiansen (2001) many countries across the world have taken strategic steps in dealing with food insecurity, food is therefore in abundance and variations in food consumption are largely between social classes and populations. Households spend greater amount of their income on food. Consumers are becoming health conscious and tend to be selective when making food choices. Old men and women in making food choices consider the nutritional information as well as any health effects to prevent illness.

Records indicate that women are more health conscious regarding their food choices than men (Wardle *et al.*, 2004). Women are more concerned with the amount of calories they consume as a means of monitoring their body weight, they eat a lot of fruit and vegetables, and they consume less food than they probably would like to do. Rozin *et al.* (2003) observed that 78% of younger American women sampled were concerned with how food intake might influence

their appearance. Rozin (2003) confirmed that older people make good healthy decisions regarding food choices.

A study conducted at the New York University by Conley and Glauber (2005) showed that there was a direct negative correlation between level of overweight and expected income, ability to acquire a job or having a family life. Health beliefs as measured by the International Health Gender differences in food choice 317 Behaviour Survey (Steptoe and Wardle, 1996) found up to 40% of the differences in food choices between women and men (Wardle *et al.*, 2004). One recurring argument for women choosing healthier foods has been attributed to their role as the main provider in the household; it is their duty to ensure the healthiness of the family (BaÈckstroÈm *et al.*, 2004)

Studies have shown that women pay more attention in acquiring health food information than men do and they often comply with dietary guidelines in their food choice and are more often considering health aspects of foods when they make a choice (Schafer *et al.*, 1999). Women display more positive attitudes and are committed towards consumption of foods perceived more natural than men (BaÈckstroÈm *et al.*, 2004). Men's on other hand view healthy food with respect to diet and also tend to differ from the views of women. For example, men choose more carbohydrate-rich foods and meats than do women (Berg, 2005).

Studies conducted in Norway revealed that both genders regard fish as a healthy food (Wandel, 1999), an equal proportion of men and women reported to have changed their diet in a more healthy direction. However, while men changed from regular fat alternatives to low-fat alternatives of the same foods, the dietary changes reported by women consisted of increasing the consumption of healthy foods already present in their diets.

2.2.10 Consumer assurance and food allergen control

According to Robinson (1998), food consumers continue to rely on the information on food labels to ensure that they do not consume products containing potentially allergenic proteins. Mills *et al.* (2004) advocate that food manufacturers should disclose all ingredients in a food on the label in a clear and understandable manner for consumers' decision making in accordance with food labelling requirements. According to Mills *et al.* (2004) information delivery in the retail environment may need to become more sophisticated in order to tailor the information to the needs of different customers. Mills *et al.* (2004) advise food producers to ensure labelling systems are traceable to allergenic ingredients being introduced throughout the food chain. A study by Vierk *et al.* (2002) in North America indicated that, in 1999, about 40% of undeclared allergens in foods resulted from unintended contact of the food with a substance containing the allergens. Five percent of undeclared allergens resulted from errors made by manufacturers within the supply chain. Vada and Perelman (2003) observed that 31% of chocolate bars from Western Europe and 62% of those from Eastern Europe were found to contain undeclared peanut proteins. To meet consumers' needs and preferences, food producers should disclose allergen contents in food to save consumers from reacting to it also to limit legal suit (Crevel, 2001).

Food manufacturers should exercise professional due care during food labelling if a product contains a specific allergen when the content is so low as to pose an infinitesimal risk of reaction (Crevel, 2001). As a consequence, the industry has no choice but to implement precautionary labelling.

2.2.11 Household income

Stafford and Wills (1979) attributed demand for food as well as other goods and services to money available to household. This according to them has a direct relationship with the number of people in the household who are working. Somogyi (1990), Senauer *et al.* (1991) and Traill (1997) identified household income as one key factor driving demand for goods and services such as foods. According to IGD (1998), technologies have had considerable impact on the type of food consumed, and how and where it is being purchased and eaten. In the view of Bonke (1992), income determines the consumption of pattern of food.

2.2.12 Education as achieved status

Becker (1962) saw education as an achieved status, claims that of adult statuses, linking family background to them by way of acquired skills and knowledge. According to Becker (1962), education is interpreted to mean a personal investment that improves an individual's mental skills. Education serves as a conduit for general skills training, as well as specific and targeted programmes (Becker 1962). Status attainment identifies education in contemporary industrial societies as the principal means through which social origins are translated into occupational achievements, that is, occupational success is increasingly determined through educational attainment that is "technological progress has created a need for advanced knowledge and skills on the part of a large proportion of the labour force" (Blau and Duncan 1967). Education is seen in order words as key determining factors for stratifying consumers in these challenging markets. Societies play considerable emphasis on socioeconomic status; however, they affect achievement indirectly through knowledge, skills, aspirations and socialization (Sewell and Hauser 1975).

According to Aronowitz and Giroux (1993) "education is the precursor of societal inequality" to pass on high status jobs and good incomes to individuals of higher academic background. Aronowitz and Giroux (1993) viewed educational attainment as a symbolic marker used for the legitimation of the intergenerational transmission of social class. It does not confer meaningful skills that lead to subsequent achievements; instead, education is a credential that privileged groups use to limit access to their ranks to those from similarly high status backgrounds (Bourdieu 1977; Bowles and Gintis 1976). According to Bourdieu (1977) employers based their screening process by educational degrees applicants possess even though it does not affect work performance (Collins, 1979).

2.2.13 Psychological attributes of consumers

Studies have attributes food choices to the genetics based on universals and culture-based rules, attitudes and practices, individuals develops particular sets of food-related beliefs, preferences, and practices (Sobal *et al.*, 2006; Furst *et al.*, 1996; Connors *et al.*, 2001). Genetically, cultures universally determined the kind and features of food choice, such as preferences for sweet or bitter individuals chooses. As the child grows up, its tendency to consume anything that goes in the mouth is mostly dependent on the family background, (culture) (Rozin *et al.*, 1986) experience and instructions, so that the culture-wide practices are communicated and maintained. Some cultures are developed per the environmental influences to determine their food preferences. Connors *et al.* (2001) observed that the early food environment has a powerful effect on later food preferences and attitudes. Furthermore, given that milk, the first food of humans and other mammals, is unavailable as a food for adults in the pre-cultural environment, it would be maladaptive for mammals to develop a strong preference for their first foods.

2.2.14 Ethical considerations of food choices

Concerns for ethical foods have received much attention in recent times and have become the centre for international economic debate according to report by Global Report on Food Tourism in Madrid-Spain (UNWTO, 2012). The report stressed on the need for food manufactures to consider ethical and sustainability values based on consumers cultural and social backgrounds. According to the UNWTO 2012 report, consumers are becoming conscious of ethical food choices for themselves and their families. The growing awareness of consumers has provoked an increase in the demand for ethical foods, resulting in demand for organic foods. Kroger (1992) expressed the high growing concern for ethical issues facing the food industry which includes fair and just treatment employees in the food industry, especially as disproportionate numbers of minorities take jobs in food processing and food service. According to Kroger (1992) Nutritional Food Labelling Act has mandated food manufacturers to provide consumers with consistent information on ingredients list that will be useful in dietary planning. A case in question is the injection of cows with Bovine Somatotropin hormones (BST) to produce more milk which serves as motivation for thinking about ethical issues. It has been established that BST hormones poses health risk to the cow. In contrast, there is virtually no scientific support for questioning the safety of BST milk according to (Kroger, 1992).

2.2.15 Outlook

This chapter highlights the key study works on consumer stratification and the factors that influences them. None of the reviewed articles highlight stratification using consumer sensory characteristics as well demography. Stratification of consumers by demography and sensory

has become a necessity in contemporary business. Manufacturers are able to deliver specific consumer needs and expectations when they are segmented according to social class and sensory preferences. Proponents of social stratification focused much attention on worth control, power and class. The upper class control most of the resources in the society such as worth, power, education, respect and authority. These affect their consumption patterns as well as household expenses. The less privileged in societies are limited to power, key resources, good education and occupation as well certain good and nutritious foods for healthy growth. The study sought to identify the various consumer groups in society based on the demographic and sensory characteristics.

CHAPTER THREE

METHODOLOGY

3.1 Research design and questionnaire administration

The chapter presents the methodological framework suitable for conducting the study. It discusses the methods and tools of analysis employed in the study. It presents a detailed description of the study design, theoretical and empirical specification, variables, data sources and data type, estimation techniques as well as statistical tool for analysis. The study employs both qualitative and quantitative data from primary sources in the analysis. Primary data consist of in-depth interviews and questionnaires which were converted into quantitative data for analysis. Data were drawn from Goldentree-Accra and Ghana Cocoa Board-Adum, Kumasi as well as University of Ghana-Legon. The study measured factors such as respondent's bio-data, behavioural attributes, family size and household income, physiological attributes, seasonal

sales and health attributes. Five cocoa products with codes 245, 306, 407, 283 and 516 were presented to respondents for sensory evaluation. The respondents were asked to rate the products according to their degree of preference on a ten points continuous scale. To measure the consistency and reliability of the sensory reports, thirty trained panalists from Cocoa Processing Company Limited were also presented with the same products under controlled conditions for sensory evaluation. The respondent's responses were inputted into an SPSS Statistical Software for analysis. The study combined consumer's demographic factors as well as sensory attributes in determining the consumption pattern. The sensory attributes were used to determine whether a difference existed between the products presented to the respondents. The coded samples were examined on following characteristics; appearance, aroma, mouth feel, taste and after taste.

3.2 Sampling size

Structured questionnaires were used to collect consumer data from respondents regarding the role of demographic factors on consumption of certain selected cocoa products. Four hundred and fifty (450) questionnaires were distributed among respondents to collect information on demographic and sensory characteristics. Respondents were selected using simple random sampling techniques.

3.3 Variables

Six specific demographic characteristics were analyzed: age, marital status, religion, educational background, occupation and gender. Sensory evaluation was analyzed by studying product's attributes such aroma, mouthfeel, taste, after-taste, appearance and flavor.

3.3.1 Gender

Researchers have established significant differences between men and women in relation to their shopping decisions. Women considers shopping as a core function and spend more time performing this duty and also by getting more information than men do which confirms that there is a difference in retail among gender (Ndubisi, 2006). The study employs both males and females from different demographic origin.

3.3.2 Family size

According to Bawa and Ghosh (1999) the size of a family and its structure determines the overall number of people and the distribution of resources among them. According to them, the bigger families size the higher consumption rate. The study considered respondents with different family sizes ranging from 1-11 in a household.

3.3.3 Age

Homburg (2001) concluded that older people make purchase decisions based on their previous experience and the level of satisfaction they derived from using the products or service. According to him decision are made based on perceived utility they are likely to get from its usage. Younger generation rely mostly on the sales personnel testimony for products or service information for purchase decision making. In the view of Solomon (1999) young people spend so much money and time in satisfying their taste preferences for confectionery products. Age of consumers in the view of East (1995) is a key determining demographic factor. For the purpose of this study, ages between 15 -70 and above was considered.

3.3.4 Household income status

Income presents the worth which a household receives from all their sources of income. It is an important demographic factor influencing household's consumption of goods and services. Household income determines the market one chooses to shop from, quantities they are able to afford, quality and the brand of products or services they select from. Haste (1997) observed that more disposable income means more purchases leading to high sales and profit. Bawa and Ghosh (1999) confirmed that people with high disposable income get better education, increases frequency of shopping and consumption of certain classified confectionery products (Bawa and Ghosh, 1999). The study used income levels ranging from average minimum wage to middle income and high income earners.

3.3.5 Social class

According to Solomon (1999) combines income, education and occupation are major drivers of consumption of goods and services. Study considers good occupation as a precursor to good income which affords households better education and therefore good consumption of key foods.

3.4 Data analysis

Descriptive statistics was used to study both the demographic behaviours as well as sensory preferences of respondents using SPSS version 16 statistical software. Chi- square and crosstabulation was used to study the level of significance and relationship between the variables. The suitability and reliability of the data collected was tested using Cronbach alpha. The sensory evaluation outputs from the SPSS statistical software was used in plotting graphs and tables for easy comparison and analysis. Trend analysis using the demographic and sensory

evaluation outputs was done. The data presents respondent's preferences pattern in relation to the cocoa products.

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CHAPTER FOUR RESULTS AND DISCUSSION

4.1 Consumer survey analysis

4.1.1 Consumer demographic

The descriptive statistics from Table 4.1 indicates that majority of the respondents representing 69.80% of the sampled population were males whilst 30.20% were females. The results indicate that 77.6% of the respondents were singles and 20.70% married, 0.70% had divorced and 1.10% was either widow or widower.

Table 4. 1: Consumer demography

Gender	Frequency	Percentage %	Age (years)	Frequency	Percentage %
Male	314	69.8	15- 20	55	11.6
Female	136	30.2	21- 30	280	62.2
Relations			31- 40	52	11.6
Single	349	77.6	41- 50	39	8.7
Married	93	20.7	51- 60	9	2.0
Divorced	3	0.7	61- 70	18	4.0
Widow/ Widower	5	1.1			

Religion			Occupation	Frequency	Percentage %
Christian	382	84.9	Student	202	44.9
Islam	24	5.3	Farmer	3	0.7
Traditional	3	0.7	Actor	3	0.7
Hindus	40	8.9	Academia	3	0.7
Buddhist	1	0.2	Others	3	0.7
Level of education			Trader	33	7.3
Informal	33	7.3	Civil Servant	20	4.4
JHS	4	0.9	Public Servant	28	6.2
SHS	27	6.0	Business	62	13.8
Diploma	21	4.7	Unemployed	8	1.8
Tertiary	335	74.4			
Post Graduate	30	6.7			

The results show that 74.40% of the respondents were either in tertiary or had tertiary certificates. This figure represents 335 out of the 450 respondents sampled. Most of the respondents were of Christian origin representing an average of 84.90%. About 5.30% were Muslims, 8.90% Hindus, 0.70% Traditionalists and 0.20% Buddhists as indicated in Table 4.1. Nearly 44.90% of the respondents were students and 13.8% in business and others in various fields. Most of the assessors were within the ages of 21 years and 30 years representing 62.20%, 11.60% were within 15 to 20 years, 31 to 40 years represented 11.60%, 41 to 50 years were 8.70%. Others were 2.00% for 51 to 60 years and 4.00% representing respondents above 70y.

4.1.2 Consumption statistics

The survey reports show 53.60% of the respondents consume various brands of cocoa products most often, 37.60% occasionally buy cocoa products, 7.80% consume cocoa once a week whilst 1.10% do not eat cocoa product at all as indicated in Table 4.2.

Table 4. 2: Consumption statistics

Eating of cocoa products	Frequency	Percentage %	Time of eating	Frequency	Percentage %
Not at all	5	1.1	Early morning	210	46.7
Once a week	35	7.8	Late morning	57	12.7
Occasionally	169	37.6	Noon	68	15.1
Most often	241	53.6	Evening	63	14.0
Amount eaten			Late evening	10	2.2
1 cedi	51	11.3	Night before bed	13	2.9
1.5 cedis	28	6.2	Any time	29	6.4
2 cedis	82	18.2			
3 cedis	107	23.8	Type of cocoa product eaten	Frequency	Percentage %
5 cedis and above	182	40.4	Any	195	43.3
			chocolate	99	22.0
			Chocolate flavored drinking powder	136	30.2
			Raw Cocoa powder	18	4.0
			Chocolate coated nut	2	0.4

The results indicate that majority of the respondents consume GH¢5 or more per day. This figure represents 40.40% of the respondents, 23.80% consume averagely GH¢3.00 per day.

The Table shows that GH¢2.00 and GH¢1.00 representing 18.20% and 11.30% respectively per day. Just a hand fold of the respondents consumes GH¢1.50 (6.20%) per day.

It was evident that most of the consumers of cocoa and cocoa products consume them in the early morning representing 46.70%. The study found that 22.00% of the respondents consume chocolate as shown in Table 4.2 whilst 30.20% consume mostly chocolate flavored drinking powder. Majority of the respondents were not loyal to any specific products of their choice. According to them, the time of the day and the product type didn't matter to them. Their main driving force was how to satisfy their hunger and not necessarily what to consume. This group

represents 43.30% of the sample population. Table 4.2 shows the consumption trend. Raw cocoa powder and chocolate coated nuts represented 4.00% and 0.40% respectively as illustrated in Table 4.2.

The results also indicated that Chocolate bars and Drinking Chocolate are best consumed in the afternoon. This figure accounts for 15.10% of the respondents. Late breakfast consumers represented 12.70% of the total respondents. The table indicates that 14.00% of the respondents consume cocoa products after lunch. Late evening and before bed consumers represented an average of 2.20% and 2.90% respectively. These are mostly aged who drinks natural cocoa powder (4.00%) before start of the day's work or go to bed. The study found that 6.40% of the respondents did not have any specific period of the day when they eat or consume cocoa products. Raw Cocoa Powder consumption accounted for 0.40% of the total consumption patterns. The low consumption rate could be due its bitterness and unappealing appearance after preparation.

4.1.3 Consumer behaviour

Two schools of thought are off opposing views concerning smoking and sensory performance of consumers. Bartoshuk *et al.* (1997) was of the view that smoking does not influence the sensory performance of consumers. Others are of contra-view that smoking impairs the sensory behavior of sensory assessors. The survey (Table 4.3) indicates that 99.10% of the assessors do not smoke cigarette or tobacco or related products. The results indicate that 0.90% of the respondents smoke. Table 4.3 shows that 80.00% of the respondents neither drink alcoholic beverages or wine. Occasionally few individuals drink some level of alcohol or wine. This number representing 16.00% of the total population sampled. Therefore smoking and drinking

does not have any significant impact on the survey report or consumption cocoa products as indicated by Bartoshuk *et al.* (1997).

The study suggests that pre-exercise nutritional practices for athletes prior to exercise benefits post-exercise mood and subjective appetite ratings. It is widely accepted norm that regular exercise influences consumption especially breakfast. The results of this study indicates that 26.40% of respondents exercise regularly, 58.90% of them occasionally exercise on special days such as organized programmes by their companies as illustrated in Table 4.3.

Table 4. 3: Behavioral attributes

Smoking	Frequency	Percentage %	Type of exercise	Frequency	Percentage %
Not at all	446	99.1	Athletics	38	8.4
Sometimes	4	0.9	Football	142	31.6
Drinking alcohol			Spiking	14	3.1
Not at all	360	80.0	Jogging	241	53.6
Once a week	18	4.0	Racing	7	1.6
Sometimes	72	16.0	Hockey	3	0.7
Exercising			Table tennis	4	0.9
Not at all	22	4.9	Singing		
Once a week	43	9.6	Yes	256	56.9
Sometimes	265	58.9	No	59	13.1
Regularly	119	26.4	Not often	81	18.0
Time of exercising			Occasional	54	12.0
Early morning	314	69.8	Duration of Exercising		
Late morning	31	6.9	1-2 hrs every morning	274	60.9
Afternoon	28	6.2	1-3 hrs every evening	30	6.7
Late evening	66	14.7	1-2 hrs any day	60	13.3
Night	10	2.2	1-4 hrs any other weekend	32	7.1

	Others	53	11.8
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A visit to the second Seat of the Government –Peduase Lodge revealed that Athletes whilst exercising from Ayi –Mensah to Peduase Lodge drinks mostly chilled cocoa drink to boost their energy to make up to the end. Most of the respondents constituting 53.60% exercise by jogging, 31.60% are also actively involved in football. Personal interviews with them revealed that cocoa and cocoa products are mostly consumed during exercise sometimes after exercise to replenish the lost energy. Evidence from the study confirms that 69.80% of respondents exercise in early mornings and 14.70% late evening. The study also revealed 61.00% of the sampled population spends between 1hr and 2hrs during exercise. On weekends 7.10% of athletes spend around 1hr to 4hrs depending on the type of exercise (Table 4.3).

According to Duke Voice Care Center, vocal hygiene” can be thought of as the care and feeding of the voice. It refers to the things we do to keep the voice healthy. The result indicates that 56.90% of the sampled population sings regularly either as chorister or ordinary singers. Chocolate and chocolate drinking powders are mostly consumed by them.

4.1.4 Consumer household

Results of the survey indicate (Table 4.4) that about 46.20% are in families of between one and four in number. It also shows that 44.00% are either made up of families between five and seven membership, large families consisting of eight and ten represented an average of 7.10%. The extremely large families represented about 2.70%.

Table 4. 4: Consumer household

Family size	Frequency	Percentage %	Income	Frequency	Percentage %
1-4	208	46.2	Below 500	94	20.9
5-7	198	44.0	500-1000	170	37.8
8-10	32	7.1	1000-2000	77	17.1
11 and above	12	2.7	2000-3000	90	20.0
Accommodation			3000 or more	19	4.2
Single room	77	17.1	Buying Cocoa Products		
Chamber and hall	43	9.6	Yes	222	49.3
Chamber and hall self-contain	31	6.9	No	43	9.6
Single room self-contain	33	7.3	Sometimes	175	38.9
Two bed room self- contain	74	16.4	Weekly	10	2.2
Three bed room self-contain	147	32.7			
Others	45	10.0			

The size of the family determines whether certain key products with high nutritional content such as cocoa with high antioxidant property should be consumed. The result indicates that 32.70% of the respondents live in three-bedroom self-contained apartments, 17.10% are in single room apartment whilst 16.40% are mostly two-bed room apartment. The study found that majority of the respondents live on incomes between GH¢500 and GH¢1000 per month. This figure represents 37.80% of the sampled population, 17.10% lived above GH¢1000 and GH¢2000 per month. Household income directly influence general consumption, 20.00% of the respondents lived above GH¢ 2000 and GH¢ 3000 whilst 4.20% above GH¢3000 per month. The lower income respondents earn less than GH¢500 per month and this figure constitute as high as 20.90% of the sampled population. The earnings of respondents have great influence on consumption. The results further suggest that 49.30% of the population spend some amount of their earnings on cocoa products on regular basis. Quite a huge number of

respondents are occasional users of cocoa and cocoa products. This number accounted for 38.90% of the respondents as indicated in the Table 4.4.

4.1.5 Consumption at occasions

Consumer's response during occasions as Easter, Christmas, festivals and National Chocolate days were assessed. Many people present cocoa products in a form of special gifts to friends and loved ones during these occasions.

Table 4. 5 Consumption at occasion

Easter Holidays	Frequency	Percentage %	Traditional days	Frequency	Percentage %
Yes	130	28.9	Yes	134	29.8
No	192	42.7	No	201	44.7
Sometimes	128	28.4	Sometimes	107	23.8
Christmas			Valentine's Day		
Yes	240	53.3	Yes	231	51.3
No	111	24.7	No	99	22.0
Sometimes	99	22.0	Sometimes	120	26.7

Results from the study (Table 4.5) revealed that 53.30% of the respondents present cocoa products as gifts during Christmas, 51.30% during National Chocolate days, 28.90% on Easter holidays and approximately 29.80% on traditional or cultural day celebrations as illustrated in Table 4.5. The low patronage of the products during Easter according to some of the respondents was as result of how Easter is celebrated. Easter is seen as a time of mourning and not a time of merry making. Cultural day celebrations on other hand are not seen by most respondents as times to share but times to display their rich cultural heritage. The results show that about 42.70% do not present cocoa products on Easter holidays. In the same manner 44.70% do not present cocoa products during cultural day celebrations. Sales trend of Cocoa Processing Company Limited indicates that sales trend upward during Christmas and National Chocolate days (Sales Reports for 2016/17). A sharp decline was observed during Easter and cultural day's celebrations.

4.1.6 Consumption and health

As indicated by literature, consumers are becoming more health conscious regarding their food choices (Wardle *et al.*, 2004). Women especially are more concerned about the amount of calories they consume as a means of monitoring their body weight, they eat a lot of fruit and vegetables, and consume fewer carbohydrates than they probably would consume. The survey results revealed that 84.70% of sampled population has no knowledge about the nutritional benefits of consuming cocoa and cocoa products, 7.60% are sparingly informed of the health benefits and 7.80% were indifferent as indicated in Table 4.6.

Although allergic reactions can occur to virtually any food, most reactions are associated with limited number of foods such as milk, eggs, fish, shellfish (crustacea and mollusks), soy, wheat, peanuts and tree nuts others. Food allergy according to Wardle *et al.* (2004) is any adverse reaction to an otherwise harmless food or food component that involves the body's immune system. The survey results show that 85.10% of the respondents are not allergic to cocoa consumption, 2.90% claim to show some symptoms of reaction upon consumption, 12.00% are unsure about reactions after consumption.

Table 4. 6: Consumption and health

Advised by Health Professional	Frequency	Percentage %	Milk Intake	Frequency	Percentage %
Yes	34	7.60	yes	341	75.80
No	381	84.70	no	27	6.00
Not that I know off	35	7.80	sometimes	82	18.20
Advised by Health Professional to eat Cocoa Product			Quantity of milk intake		
Yes	134	29.80	1-2 table spoons	128	28.40
No	272	60.40	3-4 table spoons	190	42.20
Not that I know off	44	9.80	5-6 table spoons	68	15.10

Sugar Intake			7 spoons or more	37	8.20
Yes	346	76.90	not applicable	27	6.00
No	34	7.60			
Sometimes	70	15.60	Milk Allergy		
Level of sugar intake			Yes	44	9.80
1-2 cubes	266	59.10	No	328	72.9
3-4 cubes	126	28.00	sometimes	78	17.3
5 cubes or more	16	3.60	Average Body Weight		
Not applicable	42	9.30	20- 50 kg	17	3.8
			51-75kg	352	78.2
Health benefits of eating Cocoa Products			76-90kg	68	15.1
Not at all	58	12.9	90 -100kg	13	2.9
Not well	95	21.1			
Quite well	155	34.4	Any Cocoa ingredient allergy		
Very much	142	31.6	Yes	13	2.90
			No	383	85.10
			Not sure	54	12.00

Table 4.6 indicates that nearly 76.90% of respondents do not have any health implication consuming sugar flavored products, 7.60% were sugar free whilst 15.60% occasionally consume some amount of sugar. The level of sugar intake varies among consumers. On the average 59.10% of the population consume maximum of 2-cubes of sugar per meal, 28.00% of the respondents consumes between 3-4 cubes per meal. The high sugar consumers constituted about 3.60% (5-cubes or more).

Lactose intolerance is the inability to digest significant amounts of lactose in one's diet, the major sugar found in milk. Lactose intolerance is caused by a shortage of the enzyme lactase, which is produced by the cells that line the small intestine. Among the most common symptoms are mild to severe, include nausea, cramps, bloating, gas, and diarrhea (U.S. Department of Health, 2006). According to the report by U.S. Department of Health (2006), not all consumers deficient with lactase show the symptoms of intolerance when they consume milk products.

The study found that nearly 75.80% of the respondents consume milk and milk products without any symptoms of intolerance whilst 6.00% were lactose intolerant. An average of 18.20% was unable to determine their tolerance level. It was also evident that nearly 42.20% consume between 3-4 table spoons of milk per meal, 28.40% consume two table spoons, 15.10% of the respondents consume between 5-6 table spoons full per meal and 8.20% were considered as high consumers of milk consuming about 7-table spoon and above. Some respondents in an attempt to manage their body mass index (BMI) refrain from consuming cocoa products with the notion of becoming obese. The study outcome observed that about 78.20% of the sampled population fell between 51-75kg body weight, 15.10% ranged between 76 -90kg, 20-50kg body weight accounted for about 3.80% and 2.90% representing 91kg or more.

4.2.7 Consumer physiology

Roland *et al.* (2000) observed that temporary changes in consumer's physiological state such as fatigue, hunger, illness, stress and other emotions is likely to have significant influence on the reliability and precision of sensory assessment report.

Table 4.7: Physiological Attributes

Current State	Frequency	Percentage %
Hungry	148	32.20
Tired or Fatigue	67	14.90
Depressed	14	3.10
Not well	17	3.80
Very weak	12	2.70
Satisfied	185	41.10
Others	7	1.60
Food Availability		
Yes	355	78.90
Not at all	23	5.10
Sometimes	68	15.10
Not enough	4	0.90

They are of the view that any physiological state that makes individual uncomfortable has the potential of limiting the precision and reliability of sensory assessors performance.

The study observed that about 41.10% (Table 4.7) of the respondents were physiological satisfied, 32.90% hungry, 14.90% tired and 3.10% depressed and 3.80% not well, 2.70% were not really well and 1.60% could not described their physiological state. Table 4.7 shows that 78.90% of the respondents did not have problem with food availability for their families.

About 5.10% complaint of access to food, 15.10% mostly students' complaint of lack of adequate food accessibility making it sometimes difficult to afford some cocoa products.

4.2.1 Statistics of sensory evaluation

Five cocoa products samples were coded and presented to assessors to determine their level of preferences by ranking them from 1-10. Test samples were assigned the following special codes as indicated in Table 4.8 below:

Table 4.8: Cocoa products samples

Product	Kingsbite Chocolate	Dark Chocolate	Royale Natural Cocoa Powder	Alltime Drinking Chocolate	Aspire Chocolate
Code	245	306	407	283	516

The preference level increases as an assessor navigates from least to highest. Ranking method was adopted since respondents were not supposed to differentiate or pick the odd one out. Two groups of sensory assessors were used. Group one consisted of untrained panel of 450 respondents drawn from different demographic backgrounds. This group was chosen to represent the objective perception of the general consuming public. The tests were done under un-controlled environment since the consumer does not need controlled environment when consuming the product. Group two consisted of trained panellist at Cocoa Processing Company Limited. The company's sensory evaluation room with all the

conditions necessary for sensory evaluation was employed. The results of the trained panel were used to compare the level of reliability of the customer survey conducted.

4.2.2 Appearance

Consumers place much emphasis on product appearance before decisions are made. The five products were presented to the assessors for assessment by ranking them according to their levels of preferences. The summary of the survey results is presented in Tables 4.9 and 4.10 respectively.

Table 4.9: Sensory evaluation by untrained sensory panelists

Products	245(Kingsbite)		306 (Dark choc)		407(Royale)		283(Alltime)		516(Aspire Choc.)	
	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%
Appearance	24.50	80	22.40	80	16.90	70	25.30	80	18.20	90
Aroma	30.20	80	23.10	70	19.60	80	19.80	80	19.80	70
Mouth feel	25.30	90	18.20	80	16.00	70	22.40	80	21.30	80
Taste	24.40	80	19.10	70	11.80	80	23.10	80	18.00	90
Aftertaste	21.60	80	19.10	80	17.10	70	26.40	80	21.60	80

Table 4.10: Sensory evaluation by trained sensory panalists

Products	245(Kingsbite)		306 (Dark choc.)		407(Royale)		283(Alltime)		516(Aspire Choc.)	
	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%
Appearance	36.70	80	43.30	70	20.00	60	30.00	70	30.00	60
Aroma	33.30	80	40.00	70	20.00	50	26.70	80	26.70	80
Mouth feel	33.30	80	33.30	70	26.70	60	60.00	80	30.00	80
Taste	36.70	90	36.70	60	40.00	70	46.70	80	26.70	70
Aftertaste	33.30	90	43.30	70	26.70	70	50.00	80	30.00	70

The results by the untrained panelists show that 24.50% of the respondents preferred the visual appearance of product 245 at 80%, 22.40% rated product 306 at 80% preference. Product 407 was ranked at 70% preference by 16.90% of the assessors whilst 25.30% preferred product 283 at 80%. Product 516 recorded 90% acceptance by 18.20% of the respondents. The trained sensory assessors consisted of 30 panelists. Each panelist was presented with the five products for assessment. On appearance, 36.70% of the respondents

scored product 245 at 80% preference, product 306 was adjudged 70% preference by 43.30% of the respondents whilst 20% of the respondent rated product 407 at 60% as indicated in Table 4.10. Panelists rated products 283 and 516 at 70% and 60% likeliness respectively by 30% of the respondents. The variations in assessment by both panels are illustrated in Figure 4.1.

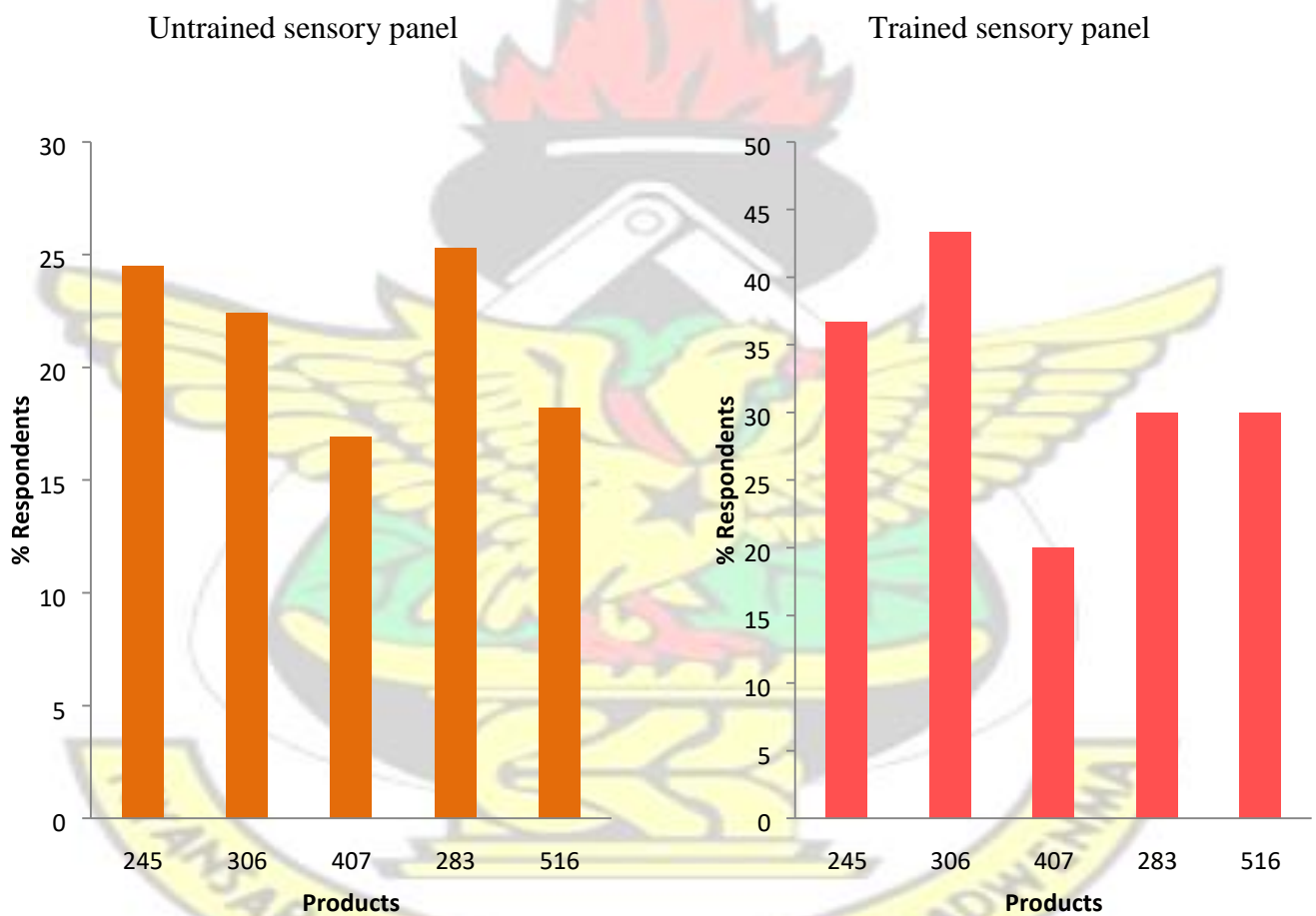


Figure 4.1: A plot showing variation in sensory assessment by trained and untrained panalists (Appearance)

4.2.3 Aroma

According to Roland *et al.* (2000), British Standards Institution defines aroma as ‘the combination of taste and odour may be influenced by sensations of pain, heat, cold and by tactile sensations’. Flavors are said to play a major role in determining acceptability of food. The study revealed that 30.20% of the untrained assessors rated product 245 at 80% acceptable whilst 33.30% of the trained panelist rated the product at 80%. The results of the study shows that there was no significant variation in aroma acceptability of product 306 by both assessors, each rating it at 70% preference by 23.10% and 40% untrained and trained panelists respectively (Tables 4.9 and 4.10). This was not the case with product 407 of which acceptance levels varied from 60% and 80% ratings by trained and untrained respondents respectively at an average of 20% each. Furthermore, the study results indicates that both panelists ranked product 283 at 80% preference level each by 26.70% and 19.80% respectively of trained and untrained assessors. The results confirm high reliability of assessors’ perception. The statistical outputs suggest a slight variation in assessment of product 516 by both assessors. Trained assessors rated the product 516 at 80% by 26.70% as against 70% by 19.80% by untrained panel respectively. Figure 4.2 presents the various assessments by assessors.

Untrained sensory panel

Trained Sensory Panel

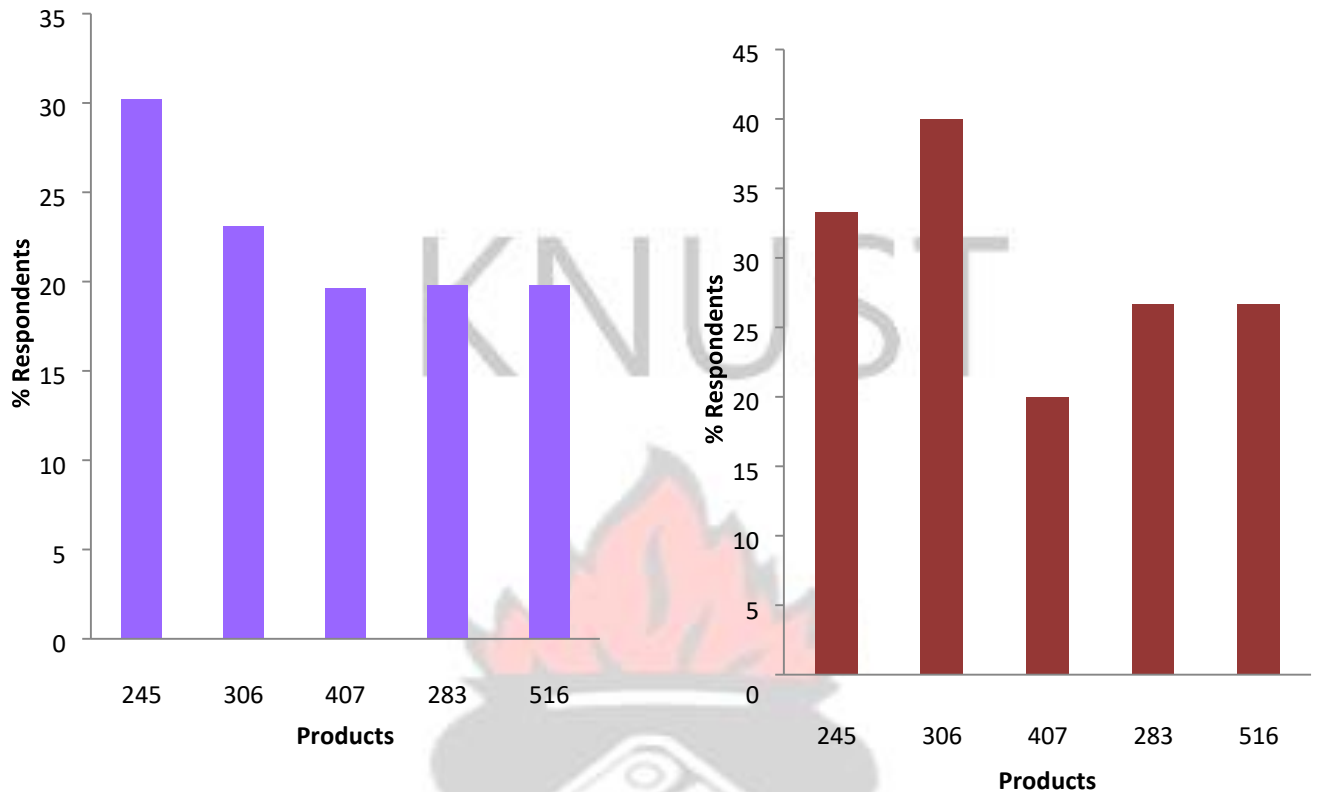


Figure 4. 1: A plot showing variation in sensory assessment by trained and untrained panelists (Aroma).

4.2.4 Mouthfeel

Mouthfeel encompasses textural and chemical sensations such as astringency, spice heat, cooling, and metallic flavor. Leadtherhead Food Study Association (1993), defined texture or mouthfeel as ‘the attribute of a substance resulting from a combination of physical properties and perceived by the senses of touch including kinaesthesia and mouthfeel, sight and hearing’. The physical properties they considered to be made of size, shape, number, nature and combination of constituent structural elements. The food texture or mouthfeel is considered to be an essential element in the overall acceptance of food. Consumers expect certain texture characteristics in making their food choices. It therefore a quality parameter consumers look for in assessing freshness for their choicest foods (Roland *et al.*, 2000). According to Roland *et al.* (2000), food texture determination is complex and involves a number of processes such

as chewing, salivation and body temperature. It is normally affected by assessors chewing patterns. The texture provides information of whether a given product is solid, liquid, semi-solid, smooth or gritty.

The study revealed that trained and the untrained panelists' (Tables 4.9 and 4.10) rated product 245 texture at 80% and 90% respectively by 33.30% of the trained and 25.30% untrained assessors. There was not much difference with product 306. Results indicate that 70% was scored by 33.30% of the trained panel whilst untrained respondents rated it at 80% by 18.20% of the respondents. Both assessors expressed their mix-giving about the bitterness of product 407. Trained assessors assigned 60% preference level by 26.70% of the respondents. However, 16.00% of the untrained panelist rated product 407 also at 70%. Both respondents expressed concerns about some level of lumps which could be due to preparation errors. Participants were enthused about the smooth nature of product 283 by scoring it at 80% likeliness by both groups. Trained panels stood at 22.40% whilst 60% was recorded by the untrained. Participants after careful assessment assigned 80% preference to product 516 by 26.70% of the trained and 30.00% of the untrained panel. Majority of the assessors expressed their upmost interest in product 283. Respondent's preferences are illustrated in Figure 4.10.

Untrained sensory panel

Trained sensory panel

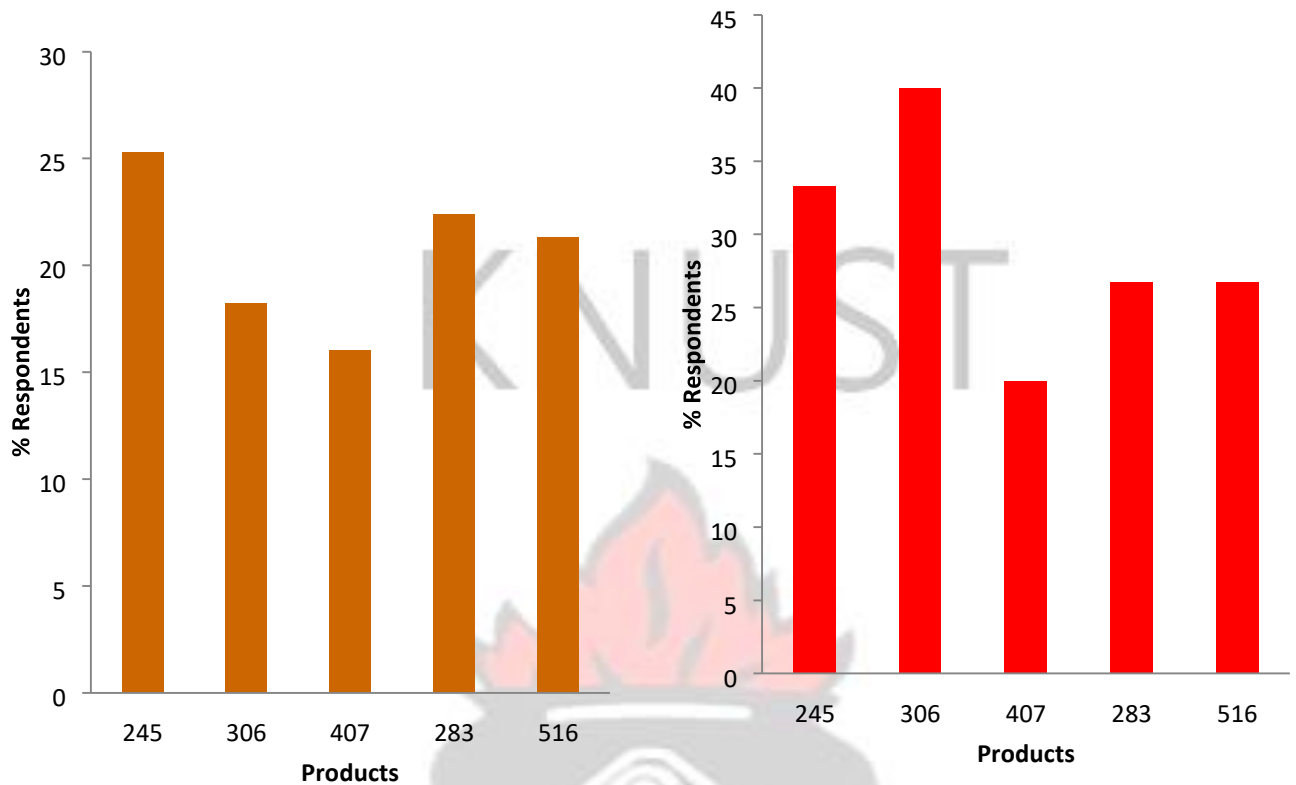


Figure 4.3: A plot showing variation in sensory assessment by trained and untrained panalists (Mouthfeel)

4.2.5 Taste

The tongue is the main taste receptor. Taste is perceived by the taste buds which is primarily located on the surface of the tongue. The papillae give the tongue its rough structure with raised protrusions on the surface its surface. The tongue is made of four types of papillae to aid its core functions. They consist of fungiform papillae, fili form papillae, foliate papillae and circumvallate papillae. Taste buds are located on all the papillae except for the filiform papilla. The tongue contains approximately 10,000 taste buds (Institute of Food Technologists; USA). The taste buds receptors are capable of distinguishing between five main tastes namely: Sweet, Salt, Sour, Bitter and Umami (SSSBU). Respondents were satisfied with the taste of product 245. The results show that 33.30% of trained panel rated the product at 90% preference whilst 80% was assigned by 24.40% of sampled population. Majority of the respondents were satisfied

with the milk and sugar levels. Both assessors scored 70% acceptance level for product 306. The ratio of trained to untrained panelist was 33.30% to 19.10%. Consumers expressed their concerns about the high sugar level. Some recommended the product to the general public as a result of its true natural cocoa content for health purposes.

Evidence from the statistical outputs suggests that, 11.80% of general consuming public ranked the taste of product 407 at 80% preference. The trained panel however judged the product taste at 60% by 26.70%. Most of the assessors fell within the age bracket of 15-50 years, did not like the bitter or the sour taste of the product. Assessors who fell within above 50 years expressed high interest in products 407 for its natural cocoa flavor. Product 283 also received high rating for its taste. Both groups of assessors indicated 80% preference at a frequency of 23.10 general and 50% trained. Respondents expressed high interest in the exceptional delicious nature, milk content, after taste, aroma and appearance. Few respondents expressed their dismay about the high sugar content, milk suspension and sediments after dissolution. The distribution of preference levels by both groups is represented by Figure 4.4. The general public showed maximum high satisfaction with product 516 rating it at 90% acceptance by 18% of the respondents. Similar score of 80% was assigned by 30% of the trained assessors. Most respondents described the product has have all the essential characteristics of a pure chocolate with its mild sweetness. Some also expressed concerns about it being gritty, whitish appearance, hard and less sugar content.

Untrained sensory panel

Trained sensory panel

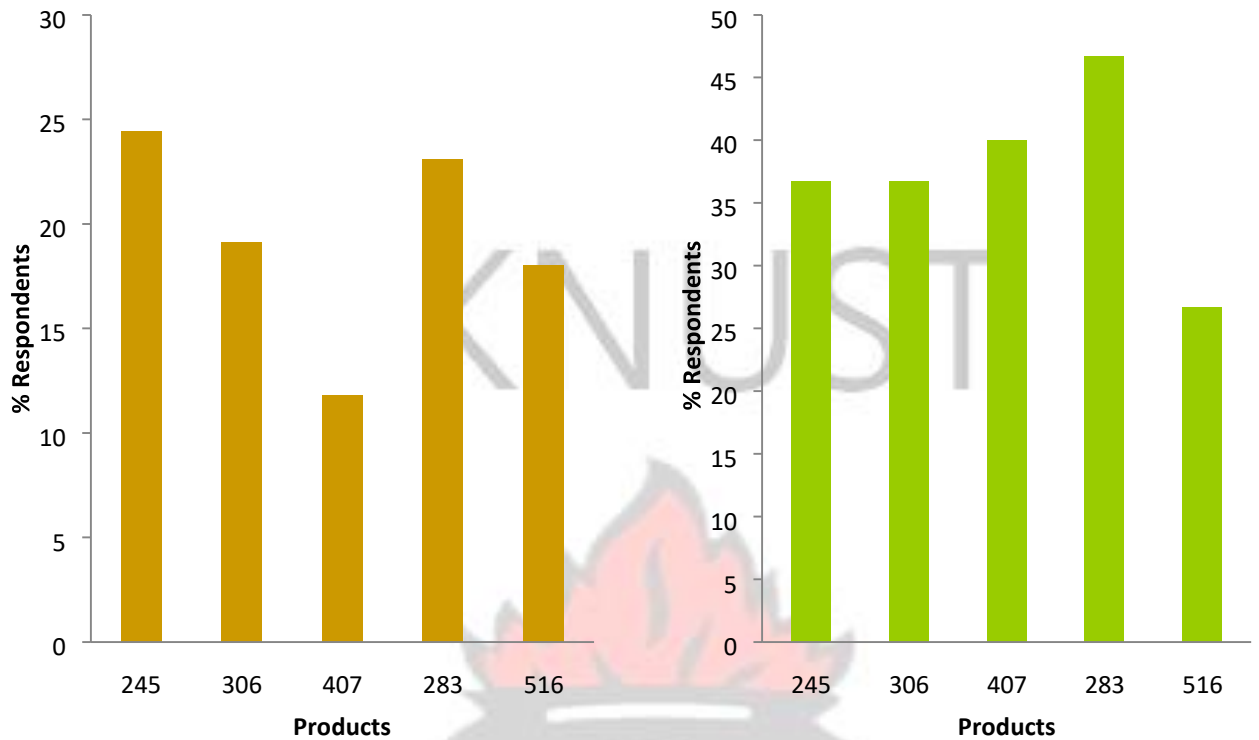


Figure 4.4: A plot showing variation in sensory assessment by trained and untrained panellists (Taste).

4.2.6: Aftertaste

One of the key functions of the tongue taste buds receptors is its ability to determine sweetness or bitterness of a food few seconds or minutes after assessment or tasting. The groups rated product 245 at a ratio of 90% for trained by 33.30% to 80% by 21.60% of the sampled general public. Both assessors preferred the product aftertaste. They expressed their interest for the aftertaste and recommended for the consuming public. The respondents had various views about product 306 aftertaste. Some claimed to be sweet, slightly bitter; others saw it too sour and too bitter. Higher scores were assigned by the untrained panelist at 80% preference by 19.10% meanwhile on the average 33.30% of the trained panel ranked aftertaste at 70% preference. The product is mostly preferred by the aged and some few lactose intolerant consumers. Respondents' assessment of product 407 was about the same at 70% by both panelists. On the whole, 17.10% untrained and 26.70% trained respectively rated the product at

the 70% each. Respondents expressed strong displeasure about its bitterness aftertaste, meanwhile, most aged and sugar free consumers showed interest in the product. The study results revealed that nearly both assessors preference product at 80%. Majority of the assessors preferred its sensory attributes. Nearly 60% of the trained panelist and 26.40% of the general public preferred product 283 at 80% as illustrated in Figure 4.5.

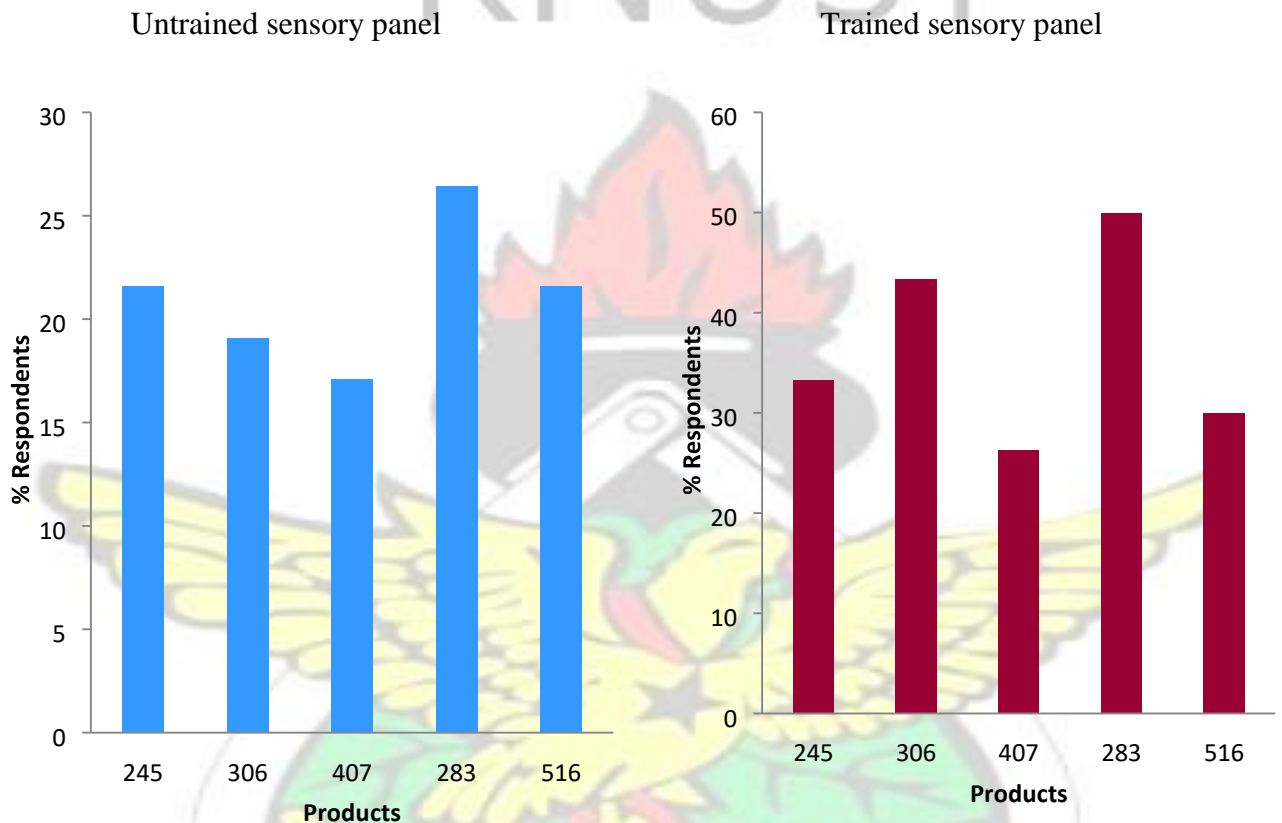


Figure 4.5: A plot showing variation in sensory assessment by trained and untrained panalists (Aftertaste).

With regard to aftertaste, 21.60% of the untrained panelists expressed their likeness at 80% of product 516 whilst 70% was scored by trained panelists representing 30% frequency of the respondents. Varied opinions were expressed on behalf of the product. Over 50% preferred the taste and aftertaste; others preferred an increase in sugar, aroma improvement and fineness.

Table 4.7: Physiological Attributes

Current State	Frequency	Percentage %
Hungry	148	32.20

Tired or Fatigue	67	14.90
Depressed	14	3.10
Not well	17	3.80
Very weak	12	2.70
Satisfied	185	41.10
Others	7	1.60
Food Availability		
Yes	355	78.90
Not at all	23	5.10
Sometimes	68	15.10
Not enough	4	0.90

4.3 Text of significance

4.3.1 Sensory evaluation

Pearson Chi-Square was used to estimate the hypothesis that no significant relationship exist between gender and sensory evaluation. From Table 4.11, apart from product 516, p-values ($p = 0.00 - 0.030$) are all less than significance alpha ($\alpha = 0.05$) indicating that the study rejects the null hypothesis and conclude that there is indeed a significant relationship between gender and product appearance. Since the p-value for product 516 was greater than the significance alpha ($p < 0.221$) the study failed to reject the null hypothesis with the view that there was not enough information to support a relationship between gender and appearance.

Tables 4.12 and 4.13 indicate that p-values for all the products were less than the significance alpha ($\alpha = 0.05$). The study rejects the null hypothesis and concludes that there is a significant association between gender and food product aroma and taste preferences.

Table 4.11 shows that p-values of products 245, 306 and 516 fell below significant alpha and therefore researcher failed to accept the null hypothesis. On the other hand the study failed to reject the null hypothesis of products 407 and 283 since the p-values are greater than 0.05 ($p > 0.116$, $p > 0.065$). The study did not have enough evidence to suggest association between gender and mouthfeel. Furthermore in Table 4.11 apart from product 516, all the p-values fell below the significant alpha indicating a strong relationship between gender and mouthfeel. The study rejects the null hypothesis. This was not the case with product 516 (Table 4.11) with p-value greater than alpha ($\alpha = 0.129$). The study failed to reject the null hypothesis and state that there was not enough evidence to support the relationship between gender and aftertaste.

To estimate the relationship between age and sensory, cross-tabulation using Pearson's' chisquare was done. p-values of all the parameters were less than the significant alpha ($\alpha = 0.05$, $p < 0.001$), therefore the study reject the null hypothesis that significant difference exist between age of a consumer and sensory preferences.

4.3.2 Household Income on Consumption

Study by Britta (2012) shown that demographic change influences consumption patterns of some products such as cocoa consumption. The cross tabulation output revealed a strong degree of association between household income and consumption. Table 4.16 illustrates that the p-values for all the products ($p < 0.001$) were less than alpha significant value ($\alpha = 0.05$). The study rejects the null hypothesis and concludes that strong association exist between household income and consumption.

4.3.3 Seasonal Sales on Consumption

The frequency distribution indicates that cocoa products were highly patronized during festive seasons such as Christmas and National Chocolate Days (Valentine) recording over 50% of the respondents. Table 4.13 show the degree of association between sales patterns during festive seasons. The p-values were all below alpha ($\alpha = 0.05$) recording p-values of ($p = 0.001 - 0.014$) and therefore the study failed to accept the null hypothesis.

4.3.4 Body Weight on Lifestyle

The Chi-square output in Table 4.14 illustrates a strong relationship between respondent's body weight and lifestyle. The p-value ($p = 0.771$) of smokers was greater than chosen significance level ($\alpha = 0.05$), the study therefore failed to reject the null hypothesis and conclude that there was not enough evidence to suggest an association between body weight and smoking. The cross tabulation outputs also confirmed strong association between lifestyle such as drinking alcohol, exercise and exercise type a respondent undertakes result of one's body weight or body mass index (BMI). The p-values of alcoholics, exercise and exercise type ($p < 0.001$) were all below alpha selected ($\alpha = 0.05$). The null hypothesis is rejected and states that there is a relationship between lifestyle and consumption.

4.3.5 Relationship between Gender, Religion, Education and Occupation on Consumption

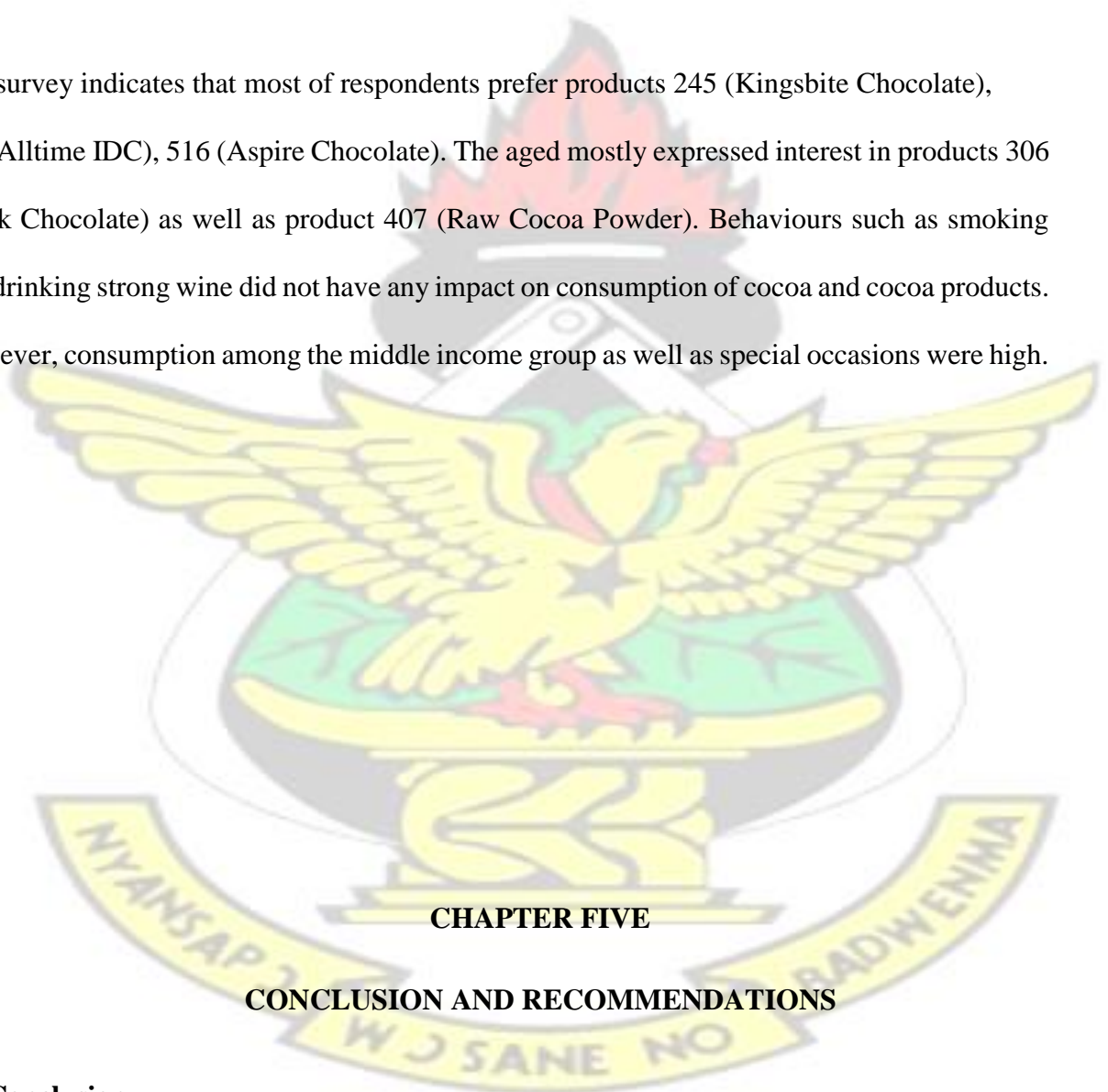
One of the key hypotheses of the study is to test the relationship between consumption and demography. Results from Pearson's' Chi-square Cross-Tabulation (Tables 4.15) shows a strong relationship demography and consumption. The results indicates that p-values of gender, religion, education and occupation ($p < 0.05$) all lies below standard alpha ($\alpha = 0.05$) indicating

relationship with consumption. Therefore the study rejects the null hypothesis and concludes that the observed values differ significantly from expected. The statistical outputs from the cross-tabulation show direct relationship between demography and consumption of cocoa products.

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4.3.6 General observation

The survey indicates that most of respondents prefer products 245 (Kingsbite Chocolate), 283(Alltime IDC), 516 (Aspire Chocolate). The aged mostly expressed interest in products 306 (Dark Chocolate) as well as product 407 (Raw Cocoa Powder). Behaviours such as smoking and drinking strong wine did not have any impact on consumption of cocoa and cocoa products. However, consumption among the middle income group as well as special occasions were high.



CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The survey found that consumers of cocoa products rely mostly on the sensory characteristics of the product. Respondents preferred creamier products, glossy in appearance and less

bitterness after taste. Most participants especially the youth preferred products 245 and 283 as compare to those with more cocoa solids, less sugar and milk. Products such as 407 and 306 were mostly preferred by the aged. In all cases female respondents expressed high interest in products 245 and 283 as result of its milky and appropriate sugar content. In general, mouth feel for all the products were satisfactory as well as aroma and appearance. Nevertheless, quite a number of the respondents mainly the youth were also expressed their dislike in products 407 and 306 probably due to its bitterness and less milk.

According to Hout and DiPrete (2006) societies were stratified by systematically ranking the people according to the social status which was normally associated with unequal distribution of limited resources (social inequalities) and access to opportunities. The study found that consumer demography and sensory attributes greatly influences the consumption pattern of cocoa products since the p-values in most cases were less than the significant α ($\alpha = 0.05$) and therefore showed a strong dependence on consumption. In some few occasions the study could not establish the degree of association. Most respondents expressed their preferences for specific product type based on their demographic sensory attributes. It was also evident that majority of consumers do not have any knowledge of the nutritional benefits of consuming cocoa products. The results of the trained panellist did not vary much from the untrained respondents.

5.2 Summary of stratification and classification of Respondents

To better understand and meet consumers' needs and expectations and after careful study of the survey reports, the respondents were classified into strata in accordance with their demographic and sensory characteristics for effective and efficient delivery. The following stratifications were recommended:

- i. Majority of the respondents mainly females and the youth preferred Kingsbite Milk

Chocolate (245) and Alltime Drinking Chocolate (283).

- ii. Respondents preferred products in the order of large size bar chocolate (100g), medium (50g) and less of the small size (20g). Respondents were silent on drinking powders grammages.
- iii. Respondents such as the aged, diabetics and individuals with high blood pressure expressed much interest in products 407 (Raw Cocoa Powder), 306 (Dark Chocolate) and 516 (Aspire) probably due to the high antioxidant properties and other health benefits.
- iv. The middle age category (41-50 years) preferred a mixture of products 407(Raw Cocoa Powder) and 283 (Alltime Drinking Chocolate) whilst maintaining the cocoa solids content.
- v. Athletes, Footballers, Joggers and other sports men and women preferred a mixture of Alltime and Royale Natural Cocoa Powder drink in a cold form.
- vi. Seasonal sales trend was high during Christmas followed by National Chocolate days (Valentine days), Easter and other special occasions.

5.3 Recommendations for further Study

Future research could focus on:

- i. The impact of gender on sensory evaluation of cocoa products
- ii. The impact of food allergy on consumption of cocoa products
- iii. The myths behind the consumption cocoa and cocoa products among the various consumer groups.

5.4 Applications

- i. The study will serve as a baseline for developing new and improving existing products to meet changing consumer needs and expectations.
- ii. Food Scientists and Social Scientists will find the study extremely useful in studying consumer behavior using both demographics and sensory characteristics of consumers.
- iii. Food sensory experts, researchers and developers could expand further the sensory evaluation outputs by both panelists to establish the variability.



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KNUST

Appendix

Questionnaire

FOOD CONSUMPTION STRATIFICATION OF COCOA PRODUCTS PREFERENCE

This questionnaire is meant to gather consumers view on the consumption of cocoa products. The findings of the study are for academic purposes only. Respondents' opinions are protected for the purpose of the study.

INSTRUCTIONS

Please give one answer to each question by marking or ticking the circle provided: (○)

1.0 BIO-DATA

GENDER RELATIONS

- M Single
 F Married
 Divorced
 Widow/Widower

RELIGION

- Christian
 Islam
 Traditional
 Buddhist
 Hindus
 Jewish

EDUCATION

- Informal
 Basic
 JHS
 SHS
 Tertiary
 Post-grad.
 Diploma

Occupation

- Student
 Trader
 Civil Servant
 Public Servant
 Business
 Unemployed
 Financial Inst.
 Engineering
 Artisan
 Farmer
 Actor
 Academia
 Others-specify

AGE (yrs)

- 15 - 20
 21 - 30
 31 - 40
 41 - 50
 51 - 60
 61 - 70
 Above 70

GENERAL INFORMATION

2 Please do you eat cocoa products?

- Not at all
 Once a week
 Occasionally
 Most often

3 How much do you usually eat?

- 1 cedis
 1.5 cedis
 2 cedis
 3 cedis

5 cedis and above

4 What time of the day do you eat?

- Early in the morning
- Late morning
- Noon
- Evening

5 Which type(s) of cocoa product do you eat?

- Any
- Chocolate
- Chocolate flavored drinking powder
- Raw Cocoa

- Late evening
- Chocolate coated nuts
- Night before bed
- Others.....

BEHAVIORAL ATTRIBUTES

6 Do you smoke?

- Not at all
- Once a week
- Sometimes

7 Do you drink hard wine/alcohols?

- Not at all
- Once a week
- Sometimes

8 Do you exercise

- Not at all
- Once a week
- Sometimes
- Regularly

9 What type of exercise do you normally do?

- Athletics
- Football
- Spiking
- Jogging

10 Do you like singing?

- Yes
- No
- Occasional

Gulf

Racing

Hockey

Table tennis

11 What time of the day do you exercise?

- Early morning
- Late morning
- Afternoon

12 How long do you exercise?

- 1 – 2hours every morning
- 1 – 3hours every evening
- 1 – 2hours any day

Late evening 1 – 4hours any other weekend At night Specify.....

PHYSIOLOGICAL ATTRIBUTES

13 Please what is your current state nutrition?

- Hungry
- Tied /fatigue
- Depressed
- Not well
- Very weak
- satisfied
- And others

14 Is food readily available and right quantity and

- Yes
- Not at all
- Sometimes
- Not enough

FAMILY SIZE

15 What is your family size?

16 Accommodation

- 1-4
- 5-7
- 8-10
- 11 and above

- Single room
- Chamber and hall
- Chamber and hall self-contain
- Single room self-contain
- Two bed room self-contain
- Three bed room self-contained
- Others.....

- 17 What is the average income level per month
- Below GHC 500
 - No
 - GHC 1000 – GHC 2000
 - GHC 2000 - GHC 3000
 - GHC 3000 and above
- 18 Does the family spend some of its income buying cocoa products
- Yes
 - No
 - Sometimes
 - Every week

FESTIVITIES

- 19 Do you present cocoa products to friends and relations during and relations on Easter holidays? Christmas?
- Yes
 - No
 - Sometimes
- 20 Do you present cocoa products to friends and relations during and relations on Easter holidays? Christmas?
- Yes
 - No
 - Sometimes
- 21 Do you present cocoa products to friends and relations during traditional festivals? valentine or national chocolate day?
- Yes
 - No
 - Sometimes
- 22 Do you present cocoa products to friends and relations on and relations during traditional festivals? valentine or national chocolate day?
- Yes
 - No
 - Sometimes

HEALTH ATTRIBUTES

- 23 Have you been advised by any health professional to consume cocoa products?
- Yes
 - No
 - Non that I know off.
- 24 Have you been advised by any health professional to consume professional not to consume cocoa products?
- Yes
 - No
 - Non that I know off.
- 25 Do you eat sugar?
- Yes
 - No
 - Sometimes.
- 26 Level of sugar intake
- Sugar free
 - 1 - 2 cubes
 - 3 -4 cubes
 - ≥ 5cubes
- 27 Do you drink milk?
- Yes
 - No
 - Sometimes
- 28 Quantity of milk intake
- 1-2 table spoons
 - 3-4 table spoons
 - 5-6 table spoons
 - ≥ 7 table spoons

- 29 Do you react when you drink milk?
- Yes
 - Not at all
 - Sometimes

- 30 Average body weight in kg
- 20 - 50
 - 51 - 75
 - 74 - 90
 - 90 - 100
 - ≥100

- 31
- Yes
 - No
 - Not sure

- 32 Are you allergic to any ingredient in cocoa
- Are you aware of the health benefits of eating/drinking cocoa product?
- Not at all
 - Quite well
 - Very much

Sensory attributes

You have been presented with five samples of cocoa products labeled **245, 306, 407, 283, and 516** respectively. Please indicate your level of preference for each sample by ticking the circle most appropriate.

Rank - each circle represents preference (1-10)

1. Appearance: Preference increases from left to right

245	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
306	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
407	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
283	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
516	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rank - each circle represents a preference (1-10)

2. Aroma: Preference increases from left to right

245	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
306	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
407	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
283	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
516	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rank - each circle represents a preference (1-10)

3. Mouthfeel: Preference increases from left to right

245	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
306	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
407	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
283	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
516	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Rank - each circle represents a preference (1-10)

4. Taste: Preference increases from left to right

245	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
306	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
407	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

283 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
 516 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

Rank - each circle represents a preference (1-10)

5. Aftertaste: Preference increases from left to right

245 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
 306 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
 407 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
 283 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
 516 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

GeneralComment:

.....



LIST OF TABLES

Table 4. 1: Consumer demography

Gender	Frequency	Percentage %	Age	Frequency	Percentage %
Male	314	69.8	15- 20	55	11.6
Female	136	30.2	21- 30	280	62.2
Relations			31- 40	52	11.6
Single	349	77.6	41- 50	39	8.7
Married	93	20.7	51- 60	9	2.0
Divorced	3	0.7	61- 70	18	4.0
Widow/ Widower	5	1.1			
Religion			Occupation	Frequency	Percentage %

Christian	382	84.9	Student	202	44.9
Islam	24	5.3	Farmer	3	0.7
Traditional	3	0.7	Actor	3	0.7
Hindus	40	8.9	Academia	3	0.7
Buddhist	1	0.2	Others	3	0.7
Level of education			Trader	33	7.3
Informal	33	7.3	Civil Servant	20	4.4
JHS	4	0.9	Public Servant	28	6.2
SHS	27	6.0	Business	62	13.8
Diploma	21	4.7	Unemployed	8	1.8
Tertiary	335	74.4			
Post Graduate	30	6.7			

Table 4. 2: Consumption statistics

Eating of cocoa products	Frequency	Percentage %	Time of eating	Frequency	Percentage %
Not at all	5	1.1	Early morning	210	46.7
Once a week	35	7.8	Late morning	57	12.7
Occasionally	169	37.6	Noon	68	15.1
Most often	241	53.6	Evening	63	14.0
Amount eaten			Late evening	10	2.2
1 cedi	51	11.3	Night before bed	13	2.9
1.5 cedis	28	6.2	Any time	29	6.4
2 cedis	82	18.2			
3 cedis	107	23.8	Type of cocoa product eaten	Frequency	Percentage %
5 cedis and above	182	40.4	Any	195	43.3
			chocolate	99	22.0
			Chocolate flavored drinking powder	136	30.2
			Raw Cocoa powder	18	4.0
			Chocolate coated nut	2	0.4

Table 4. 3: Behavioral attributes

Smoking	Frequency	Percentage %	Type of exercise	Frequency	Percentage %
---------	-----------	--------------	------------------	-----------	--------------

Not at all	446	99.1	Athletics	38	8.4
Sometimes	4	0.9	Football	142	31.6
Drinking alcohol			Spiking	14	3.1
Not at all	360	80.0	Jogging	241	53.6
Once a week	18	4.0	Racing	7	1.6
Sometimes	72	16.0	Hockey	3	0.7
Exercising			Table tennis	4	0.9
Not at all	22	4.9	Singing		
Once a week	43	9.6	Yes	256	56.9
Sometimes	265	58.9	No	59	13.1
Regularly	119	26.4	Not often	81	18.0
Time of exercising			Occasional	54	12.0
Early morning	314	69.8	Duration of Exercising		
Late morning	31	6.9	1-2 hrs every morning	274	60.9
Afternoon	28	6.2	1-3 hrs every evening	30	6.7
Late evening	66	14.7	1-2 hrs any day	60	13.3
Night	10	2.2	1-4 hrs any other weekend	32	7.1
			Others	53	11.8

Table 4. 4: Consumer household

Family size	Frequency	Percentage %	Income	Frequency	Percentage %
1-4	208	46.2	Below 500	94	20.9
5-7	198	44.0	500-1000	170	37.8
8-10	32	7.1	1000-2000	77	17.1
11 and above	12	2.7	2000-3000	90	20.0
Accommodation			3000 or more	19	4.2
Single room	77	17.1	Buying Cocoa Products		
Chamber and hall	43	9.6	Yes	222	49.3

Chamber and hall self-contain	31	6.9	No	43	9.6
Single room self-contain	33	7.3	Sometimes	175	38.9
Two bed room self-contain	74	16.4	Weekly	10	2.2
Three bed room self-contain	147	32.7			
Others	45	10.0			

Table 4. 5 Consumption at occasion

Easter Holidays	Frequency	Percentage %	Traditional days	Frequency	Percentage %
Yes	130	28.9	Yes	134	29.8
No	192	42.7	No	201	44.7
Sometimes	128	28.4	Sometimes	107	23.8
Christmas			Valentine's Day		
Yes	240	53.3	Yes	231	51.3
No	111	24.7	No	99	22.0
Sometimes	99	22.0	Sometimes	120	26.7

Table 4. 6: Consumption and health

Advised by Health Professional	Frequency	Percentage %	Milk Intake	Frequency	Percentage %
Yes	34	7.60	yes	341	75.80
No	381	84.70	no	27	6.00
Not that I know off	35	7.80	sometimes	82	18.20
Advised by Health Professional to eat Cocoa Product			Quantity of milk intake		
Yes	134	29.80	1-2 table spoons	128	28.40
No	272	60.40	3-4 table spoons	190	42.20
Not that I know off	44	9.80	5-6 table spoons	68	15.10
Sugar Intake			7 spoons or more	37	8.20
Yes	346	76.90	not applicable	27	6.00
No	34	7.60			
Sometimes	70	15.60	Milk Allergy		
Level of sugar intake			Yes	44	9.80
1-2 cubes	266	59.10	No	328	72.9
3-4 cubes	126	28.00	sometimes	78	17.3
5 cubes or more	16	3.60	Average Body Weight		
Not applicable	42	9.30	20- 50 kg	17	3.8
			51-75kg	352	78.2
Health benefits of eating Cocoa Products			76-90kg	68	15.1

Not at all	58	12.9	90 -100kg	13	2.9
Not well	95	21.1			
Quite well	155	34.4	Any Cocoa ingredient allergy		
Very much	142	31.6	Yes	13	2.90
			No	383	85.10
			Not sure	54	12.00

Table 4.7: Physiological Attributes

Current State	Frequency	Percentage %
Hungry	148	32.20
Tired or Fatigue	67	14.90
Depressed	14	3.10
Not well	17	3.80
Very weak	12	2.70
Satisfied	185	41.10
Others	7	1.60
Food Availability		
Yes	355	78.90
Not at all	23	5.10
Sometimes	68	15.10
Not enough	4	0.90

Table 4.8: Cocoa products samples

Product	Kingsbite Chocolate	Dark Chocolate	Royale Natural Cocoa Powder	Alltime Drinking Chocolate	Aspire Chocolate
Code	245	306	407	283	516

Table 4.9: Sensory evaluation by untrained sensory panalists

Products	245(Kingsbite)		306 (Dark choc)		407(Royale)		283(Alltime)		516(Aspire Choc.)	
	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%
Appearance	24.50	80	22.40	80	16.90	70	25.30	80	18.20	90
Aroma	30.20	80	23.10	70	19.60	80	19.80	80	19.80	70
Mouth feel	25.30	90	18.20	80	16.00	70	22.40	80	21.30	80
Taste	24.40	80	19.10	70	11.80	80	23.10	80	18.00	90
Aftertaste	21.60	80	19.10	80	17.10	70	26.40	80	21.60	80

Table 4.10: Sensory evaluation by trained sensory panalists

Products	245(Kingsbite)		306 (Dark choc.)		407(Royale)		283(Alltime)		516(Aspire Choc.)	
	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%	%(1-10)	%
Appearance	36.70	80	43.30	70	20.00	60	30.00	70	30.00	60
Aroma	33.30	80	40.00	70	20.00	50	26.70	80	26.70	80
Mouth feel	33.30	80	33.30	70	26.70	60	60.00	80	30.00	80
Taste	36.70	90	36.70	60	40.00	70	46.70	80	26.70	70

Aftertaste	33.30	90	43.30	70	26.70	70	50.00	80	30.00	70
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