

**AKENTEN APPIAH-MINKA UNIVERSITY OF SKILLS TRAINING AND  
ENTREPRENEURIAL DEVELOPMENT**

**DEPARTMENT OF HOSPITALITY AND TOURISM EDUCATION**

**AN EXAMINATION OF CHEFS' STRATEGIES IN FOOD PORTIONING  
AND ITS EFFECTS ON CUSTOMER RETENTION**

**BY**

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**MARCH, 2023**

## **DECLARATION**

### **Candidates Declaration**

I hereby declare that this dissertation is my original work and it has not been submitted in this form or any other form to this or any other institution for examination purposes. Any quotation made has been referenced accordingly.

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### **Supervisor's Declaration**

I hereby declare that the preparation and presentation of this work were supervised under the guidelines for supervision of Dissertation as laid down by the Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development.

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## **DEDICATION**

I joyfully dedicate this work to Almighty God, the love of my life, Rev. Emmanuel Anderson Aidoo, my lovely daughter, Nyamekye Anderson Aidoo and my sons, Paa Kwasi Anderson Aidoo and Kobby Anderson Aidoo as well as my mum Madam Anna Adelaide Quansah.

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## **ABSTRACT**

As the world is becoming more conscious about lifestyle, food, nutrition, exercising and overall healthy living is the new global trend, necessity has brought food portioning in terms of size and nutrition and has made it a part of the new global trend. Therefore, food portioning strategies plays a pivotal role in this trend and how that affects customer retention was a question that was left unanswered. Hence, the study sought to examine the strategies adopted by chefs in food portioning and its effect on customer retention using selected restaurants as case study. The researcher adopted a descriptive and case study design synced with quantitative techniques and purposively sampled chefs and kitchen staff of the selected restaurants and used convenience sampling method to sample one hundred (100) customers of the selected restaurants to whom questionnaires were administered. Out of the sample size, forty-two chefs and kitchen staff as well as eighty-one (81) customers filled and returned the questionnaires and their responses was collated, presented in tables and charts and discussed with the support of existing literature to provide to draw conclusions on the study objectives. The findings revealed that chef's adopted strategies such as using small dinnerware, nutrition label, texture and contrasting colors and the right plate as food portioning strategies for food portioning. With a commendable customer retention level at the selected restaurants, it was discovered that, chefs' strategies used in food portioning had a significant effect on customer retention. It was recommended that, food portioning strategies can be used by management a yardstick to retain customers since 86.5% of variability in customer retention was as a result of food portioning strategies with an overall correlation of .948 between the two variables.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the study**

As the world is becoming more conscious about lifestyle, food, nutrition, exercising and overall healthy living is the new global trend, necessity has brought food portioning in terms of size and nutrition and has made it a part of the new global trend (Filimonau, 2019). According to Ledikwe, Ello-Martin, Ledikwe and Rolls (2005), the upsurge in obesity rates over the last thirty years has been paralleled by an increase in frequency of food portion sizes and eating out. The number of meals typically consumed away from home has increased from 3.7 meals per week in 1981 to 5 meals per week in 2000. According to the National Restaurant Association, regularity of eating out has been linked with higher energy and fat intakes and with a higher BMI (Kant & Graubard, 2004). Along with frequency of eating out, there is a notable trend toward the availability and consumption of larger portion sizes. Studies using nationally representative dietary intake data reported that between 1977 and 1998, portion sizes of foods and beverages increased significantly both outside and inside the home (Kant & Graubard, 2004). Several laboratory-based studies have found that larger food portions can lead to excess energy intakes. Although it is clear that portion size influences energy intake, more information is needed to understand how food providers determine the amount of food served to customers (Nielsen & Popkin, 2003).

It is significant to note therefore that, chefs play an imperative role in preparing and serving healthy food. While there are reported surveys that shows that chefs acknowledge the significance of nutrition in menu planning, many chefs are preparing meals that varies from the U.S. Dietary Guidelines. Bull and Wise (2000) found that, when chefs were asked how they could make recipes healthier, the majority indicated

that to make the food healthier, they would reduce fat content. However, not much is known about the views of chefs on other ingredient modifications or the role they play in determining portion sizes.

In today's global and excessive competition which has been made possible due to creativity, innovation and advancement in technology, excellence is the fundamental requirement for any organisation who wish to survive in this fierce competition and feedback plays a vital role in this pursuit (Kotler & Armstrong, 2006). Many organizations today face great difficulty in attracting new customers, therefore, they put in place marketing strategies by appointing managers in the marketing department specifically for customer relationship management who give the needed attention to existing customers in the bid of retaining them (Ahmad and Buttle, 2002). The concept of customer retention and its inception is as old as customer feedback. Thus, retaining customers is very important as it is their feedback. Feedback plays a critical role in customer retention (Kotler and Armstrong, 2006). According to Ahmad and Buttle (2002), customer retention aids the growth and sustainability of organisations in the hotel industry. They add that, it is the hotel's duty to ensure that they fulfil all the customer's needs and wants from time to time and seek their feedback as well.

William (2000) argues that creating successful innovative business or a new product or service requires every organisation to listen to customer feedback and the latest trend in line with food and dietary related issues. Customers can help to develop a better product, to provide a better service, to bring purpose to the product or valuable service offering, to tell how they really feel about a product or service and provide the best advice (Kotler & Armstrong, 2006). This is done by retaining customers and listening to how the product or service can be improved as that makes them happy by being responsive to their needs. This provides great insights for the organisation to create

strong and long-term relationships with customers. William (2000) explains that people do business with who they know, like and trust and this creates lifetime revenue for organisational growth and sustainability. Same is with the strategies that chef's put in place for food portioning as this makes the customers feel that their health and lifestyle goals are a priority to the organization by the kind of food portioning strategies used by the chef and the nutritional value the food and its quantity.

## **1.2 Problem statement**

Kotler (2001) asserts that a business that is doing well can become complacent. He argues that a sign that a business is about to hit the rocks is the absence of customer loyalty from their retention. He adds that customers are not happy all the time due to the insatiable nature of man; however strategies that helps customers to feel part of the organization and its processes is what mostly informs customer retention.

A number of researchers have been done in line with food portioning ranging from the opinion of chefs on food portioning conducted by Condrasky, Ledikwe, Flood and Rolls (2007) however, their research focused more on the determining the who establishes restaurant portion size and factors that influence these decisions while examining chef's opinion regarding portion, size nutrition information and weight management. Their findings revealed that executive chefs were identified as being primarily responsible for establishing portion sizes served in restaurants. Factors reported to have a strong influence on restaurant portion sizes included presentation of foods, food cost, and customer expectations. While 76% of chefs thought that they served "regular" portions, the actual portions of steak and pasta they reported serving were 2 to 4 times larger than serving sizes recommended by the U.S government. Chefs indicated that they believe that the amount of food served influences how much patrons consume and that large

portions are a problem for weight control, but their opinions were mixed regarding whether it is the customer's responsibility to eat an appropriate amount when served a large portion of food (Condrasky et al., 2007).

Rolls (2014) conducted a study on the role of portion control specifically looked at its effect on weight management and the findings revealed that providing individuals with larger portions of foods and beverages leads to substantial increases in energy intake. The effect is sustained over weeks, supporting the possibility that large portions have a role in the development of obesity. The challenge is to find strategies to effectively manage the effects of portion size. One approach involves teaching people to select appropriate portions and to use tools that facilitate portion control. Although tools such as portion-control plates have been shown in several randomized trials to improve weight loss, limited data are available on whether education and tools lead to long-term changes in eating behavior and body weight. Another approach is to use pre-portioned foods (PPFs) to add structure to meals and minimize decisions about the amount of food to eat (Rolls, 2014).

There have been several ways or strategies to food portioning that have been adopted over the years however, Rolls (2014) suggested that, a more effective strategy may be to encourage people to increase the proportion of foods low in energy density in their diets while limiting portions of high-energy-dense foods. If people lower the energy density of their diet, they can eat satisfying portions while managing their body weight.

Building sustainable business is to listen to customers and improve product or service of the organization which informs which customers stay with the organization. In the food industry, customer feedback is as important as business growth and sustainability as these factors influences customer retention. Necessity has therefore created customer retention and has made this phenomenon an elementary part of the global world of

hospitality business that no organisation in the food and hotel industry will survive without it. Numerous research (McQuitty et al.,2000; Martey, 2014, 2000; Khan, 2013) illustrate that it is important that organisations in the hotel and food industry retain customers, as well as create loyalty through diverse marketing and customer relationship strategies in order grow and sustain their businesses. Hence a dedicated focus on customer retention has become a necessary prerequisite for the future survival of organizations in the hotel and food industry.

Hotel managers believe that firms can improve their profits by satisfying customers. However, studies (Liu, Hu & Cheng, 2005; Kotler & Armstrong, 2006; Al-Msallam & Alhaddad, 2016) depict that, satisfying customers alone is not enough, since there is no guarantee that, satisfied customers will return to purchase. It is now becoming apparent that retaining a customer is significantly more important than satisfying a customer (William, 2000).

The increasing sophistication of customers' demands coupled with the increasing market competition has posed a new challenge to hotel and restaurant managers, therefore, marketing scholars emphasizes on diverse structures including nutritional basis as a strategically important tool from which customer retention can be secured for competitive advantage, growth and sustainability of organisations (William 2000; Kotler & Armstrong, 2006). There is undoubtedly a growing interest in the subject of relationship marketing especially customer retention (Samaan & Abdullah, 2016). The strong competition characterizing today's business environment has resulted to the building of stronger firm-customer relationships (Ndubisi, 2007) and as reported by Ndubisi, more firms are capitalizing on strong firm-customer relationship through all means possible to gain invaluable information on how best to serve customers and keep them from defecting to competing brands.

From the studies above, it appears that food portioning strategies and customer retention has been understudied distinctively over the years giving this study impetus to explore chefs' strategies in food portioning and its effects on customer retention. Also due to the lack of attention on the mutual reward of both customer retention and food apportioning strategies in research, the question as to whether chefs' strategies in food portioning has an effect on customer retention in the Ghanaian geographical scope still remains unanswered and that is what this study seeks to explore using selected restaurants as the case study.

### **1.3 Objectives of the study**

The main objective of the study is to examine the effect of chefs' strategies in food portioning on customer retention. The objectives of the study will specifically seek to:

1. To examine the strategies adopted by chefs in food portioning regarding the determination of restaurant portion sizes.
2. To identify the factors that influence the portion size of restaurant foods.
3. To determine the effect of chefs' strategies in food portioning on customer retention.

### **1.4 Research questions**

1. What are the strategies adopted by chefs in food portioning regarding the determination of restaurant portion sizes?
2. What are the factors that influence the portion size of restaurant foods?
3. What is the effect of chefs' strategies in food portioning on customer retention?



### **1.5 Scope of the study**

Food portioning and customer retention are very broad phenomenon to study but for the sake of this research, strategies adopted by chefs in food portioning is treated as independent variable and customer retention as the dependent variable and analyses done in that regard which gives the study a conceptual scope. Moreover, the globally recognized growth of the restaurant sector of the hospitality industry which makes it enticing to understudy the variables of this study in a wider geographic scope, however, this study will be limited to the selected restaurants and primary data will be collected from that outfit as this will help the researcher to work within the time stipulated for this study.

### **1.6 Significance of the study**

This study is expected to make several contributions to both research and practice. On the theoretical front, the first contribution of the dissertation is the development of a theoretical construct for the effect of food portioning strategies on customer retention. Previous research studying food portioning strategies have always focused on either health, lifestyle or weight management however this study investigates food portioning strategies adopted by chefs, factors that influences food portioning and how such strategies in food portioning affects customer retention.

Additionally, this study will advance our understanding of the linkage between food portioning strategies and customer retention. The findings of the study will generate resolvable information for the management of restaurants in improving the techniques or strategies of food portioning as well as customer retention. The findings of the study will draw the attention of policy makers on the global trend of healthy lifestyle using food portioning as the basis and it will be a source of information for policy

makers like the Ministry of Food and Agriculture, Food and Drugs Authority and Ghana Hotels Association in rejuvenating the customer retention while using push factors like food portioning. This research would be used by scholars for further studies as it will serve as a source of reference in the study area. Scholars will be able to identify further research areas of the variables to investigate.

### **1.7 Limitation of the study**

Due to the excessive global competition in the industry, every employee on the job were very particular about how the researcher approached the customers. Moreover, not a lot of them wanted to give information on strategies for food portioning as they explained that every chef has their secret ingredient and ways of presenting food and that should not be public knowledge because it is what identifies with their uniqueness in the food industry. Therefore, they were not comfortable giving out that information however a letter addressed to the restaurant manager made it quite easier as they explained to them that it was solely for an academic exercise as we assured them that any information that they will give will be treated with utmost confidentiality.

In addition, approaching customers was also a very difficult task as most of them came to the restaurant for a specific purpose and especially hungry and did not want to get distracted while they were waiting to get served and most of them did not have much time at their disposal after eating as most of them wanted to relax and did not want to be disturbed. However, the researcher resorted to using convenience method; thus, customers who were available and easily accessible were approached and this reduced the effect of this particular limitation.

## **1.8 Organisation of the Study**

This project work will be divided into Five chapters where chapter one will introduces of the study and the problem setting, objectives, scope, significance and limitation of the study chapter two will cover literature review, chapter three is research methodologies, chapter four is the presentation of results from data collection, analysis and discussion and chapter five will be conclusion and recommendations.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 An overview of the kitchen hierarchy**

According to DiSantis et al., (2011), hospitality is a growing industry that employs hundreds of thousands of people each year and is expected to continue expanding. The culinary arts are also flourishing as more people are opting to eat out. Working in restaurants or the foodservice industry requires a lot of hands-on experience, but obtaining a Culinary Arts certificate or degree can expand career choices in the food industry. Either way, working in a kitchen is the goal. In every kitchen there are a number of different job roles that keep a kitchen running smoothly in order to deliver orders in a timely manner. DiSantis et al., (2011) review the potential hierarchy available in a restaurant kitchen and its management structure.

#### **2.2 Executive Chef**

Not every restaurant has an executive chef; that title normally applies only to large chains or restaurants. Generally, an executive chef does very little cooking. Their primary role is managing the kitchen and its staff. This includes overseeing and training personnel, planning menus, managing the culinary budget and sometimes purchasing. To be an executive chef, you need prior experience cooking as well as good management skills to ensure that the kitchen is run efficiently.

##### **2.2.1 Head Chef (Chef de Cuisine)**

The head chef remains at the top of the hierarchy in restaurant kitchens without an executive chef. Like an executive chef, this person controls all aspects of the kitchen. They are responsible for creating menus, controlling kitchen costs, and managing the

kitchen staff. Some head chefs leave the cooking to the sous chef and the rest of the team, while others are more hands-on and prefer to be involved in the day-to-day cooking activities.

### **2.2.2 Deputy Chef (Sous Chef)**

The deputy chef, otherwise known as the sous chef, remains second-in-command in the kitchen. Depending on the restaurant and its management, it is possible to have more than one sous chef. The sous chef's role may overlap with the head chef, however the sous chef generally remains hands-on. The sous chef is in charge of the kitchen and oversees the day-to-day activities.

### **2.2.3 Station Chef (Chef de Partie)**

The station chefs arguably have the critical roles in the kitchen. These chefs' cook the food that is being served to customers. However, there are multiple positions that fall under the station chef title. Each chef is responsible for a different "station," with different chefs for each food category. For example, there is a chef in charge of cooking the fish and one that cooks the meats. There can also be sauce, vegetable, sauté, and pastry chefs. All of these different roles fall under the category of the station chef, also known as the chef de parties.

### **2.2.4 Junior Chef (Commis Chef)**

A junior chef, also called the commis chef, works with station chefs to learn about the kitchen environment. This person has recently completed some schooling or training and is beginning to work in the culinary field. The junior chef's job is to assist the more experienced chefs and to absorb their knowledge and techniques.

### **2.2.5 Kitchen Porter**

The kitchen porter usually does not have the same training and experience as the chefs. This person is in charge of simple but important tasks involved in the basic preparations of the food. This can include anything from cutting vegetables to peeling apples or grating cheese.

### **2.2.6 Purchasing Manager**

The purchasing manager is in charge of buying all of the food for the kitchen. This person keeps track of the food available in the kitchen and the food that needs to be ordered. They identify and interact with vendors with the goal of getting the best quality food for the most competitive price. The purchasing manager interacts daily with multiple vendors and members of the staff. Not only does this position require a personable character but also someone who is organized and can keep track of both the kitchen and a budget.

### **2.2.7 Overview of chefs and their roles**

Every restaurant's reputation lies with the chef of the eatery. Therefore, responsibilities of a chef are quite significant to build or mar a food joint's prestige. The term 'CHEF' is synonymous with delicious cuisine, aromatic flavors and obviously a beautiful dish presentation that not only satisfies our gourmet desires but are also treat to the eyes (Yan et al., 2007). A chef is 90% responsible for the accomplishments that a restaurant achieves. Besides the restaurant's artistic beautification and other customer attractive features, the food it serves is the first element that adds to its recognition. Hence the chef ought to have exquisite culinary skills. He must have the abilities to set a new paradigm within the food joint with his

intelligence. Kotler (2001) once remarked very aptly that a recipe has no soul, it is the cook who must bring soul to the recipe. With his ultimate professionalism, the chef and his team members can assist the eatery to garner worldwide acclaim. In short, a chef and the restaurant both share a valuable and genuine collaboration.

### **2.2.8 Categories of chefs**

According to Pratten (2003), as every occupation has a hierarchy, a restaurant also has different types of chefs and the activities of the chef depend on their specific position. Below are the different categories of chef's standard in most restaurants.

### **2.2.9 Executive Chef or Chef de cuisine**

At the top of the kitchen management structure, is the position of executive chef or Chef de cuisine which is a French term. In most parts of the world, the position is popularly called 'head chef' or 'master chef.' The duties and responsibilities of the head chef are as follows:

- Cooking is not their function; their role primarily is in managing the overall kitchen
- They are responsible for operating multiple restaurant outlets.
- Their role also includes controlling kitchen costs.
- Another essential duty — liaising with suppliers and creating the menus.

It has been established that the position of Executive Chef is notable only at the large establishments where there exist a lot of staffs at the kitchen and with a wide management structure.

### **2.2.10 The Sous-Chef**

The Sous-Chef is the direct assistant of the Chef de Cuisine or the head chef. He reports directly to the executive chef or head chef. Sous-chef is also a French term which mean ‘under chef’ or ‘second chef.’ He works in accordance to the duties assigned him by the head chef. The duties of the sou chef are as follows:

- He is responsible for scheduling the kitchen staff.
- He works in place of the head chef when he is off-duty.
- Additionally, Sous chef also assists the Chef de Partie (line cook) as and when needed.
- Sous chef is responsible for the kitchen’s inventory management.
- He looks after the organization cleanliness.
- He also trains the entire staff.
- A sous-chef’s conducts line checks and oversees the timely rotation of all food products.
- Sous-chef is actively involved in the everyday operation of the kitchen.

Similar to the head chef, Sous chef is also not found in smaller operations but in large establishment where a wide array of kitchen activities is undertaken and a broader kitchen management structure.

### **2.2.11 Chef de Parties**

A chef de partie or “station chef” and sometimes also called “line cook” is in charge of a particular area of production. In large establishments, chef de partie have assistants and cooks, but in most normal level restaurants, the chef de partie is the only worker in that department. These line cooks are again divided into “first cook,” “second cook” and so on. There are several types of chef de partie whose name are



given based on the specific section or department of the kitchen which are butcher chef, fish chef, roast chef, grill chef, fry chef, soup chef, vegetable chef, pantry chef, and pastry chef.

### **2.2.12 Commis**

In larger restaurants, we also come across a commis, who is the basic chef and works under a chef de partie. He mainly learns the station's responsibilities and operation and is in charge of the very little things.

### **2.3 Roles and responsibilities of chefs**

Weaver (200) opines that, generally chefs have the following roles, duties or responsibilities in the kitchen or restaurant as well as the organizational setup where food is required. He suggests that the following are the roles, duties and or responsibilities of a chef.

**Developing New Recipes:** A chef is responsible for developing newer recipes. He experiments for days, months and even for years to present a new dish on your table.

**Planning menus:** It is a tough job for a foodie to choose 2 or 3 dishes from the hundreds of delicious 'names' printed on the menu card. But, believe me! It is tougher to decide what will be those hundred names on the menu card. The chef has the responsibility to analyze the performance of each of the dishes individually and review the dishes as a part of the whole menu.

**Manage Customer Relations:** "A satisfied customer is the best business strategy of all" — Michael LeBoeuf. These words are true for every business on this earth and the restaurant business is no exception. So, nowadays, a chef does not keep himself locked up in the four walls of the kitchen; rather he interacts with customers to have

honest feedback. He also takes care of the complaints, collected from the customers, regarding any food preparation or quality.

**Train the Kitchen Staff:** The chef is supposed to be the most experienced and knowledgeable person in the kitchen. So, one of his main responsibilities is to train the kitchen staff and to ensure that their duties are being carried out to the greatest extent of their potential.

**Inventory Management:** He is the key person to decide when and what (ingredients, equipment, etc.) to order from the suppliers. And in this regard, he also controls the budget and keeps accurate records to produce them before the restaurant administration.

**Quality Control:** A chef ensures that the food they are providing is of the best quality. He inspects the freshness of the ingredients. He also monitors the matters of cleanliness and sanitation in the kitchen. Another area of concern for a chef is to maintain timeliness. He needs to make sure that none of the guests have to wait for long to have his first round of food and beverages.

**Monitoring Safety standards:** The chef needs to strictly follow the kitchen safety standards and monitor that his subordinates are maintaining them too. He also looks after the functionality of the kitchen equipment to avoid any unwanted incident.

**Coordinating with the purchasing department:** The chef is also responsible for acquisition of required goods and services for the overall kitchen management.

**Looks after the hygiene standards:** As hygiene is one of the main criteria for the success of a food joint, is the chef who ensures proper grooming and hygiene standards of all kitchen and its staffs.

Obtains feedback from the guests: A chef is also known to interact with guests to receive their feedback on food quality, service levels, and presentation. He along with his team takes care to modify and develop those areas that require more attention.

A chef is known to have a personal influence on an eatery's culinary world. Although his responsibility is strictly limited to his position in the hierarchy, yet he is equally trained to handle duties of his immediate supervisors or those who are ranked just below him. However, becoming a chef is not an easy path as it requires years of hard labor and developing of passion for food. After all, contributing to a chef's unique perspective and leadership qualities, he undoubtedly holds a significant position in a restaurant for increasing its bottom line.

### **2.3.1 An overview of food portioning size**

According to Rolls (2014), a "portion size" is the actual food that is placed on your plate, reflecting your own choice or the choice of the restaurant or food producer. It should be remembered, however, that in addition we need to know the amount consumed and any subsequent compensatory changes in the rest of the diet that may occur.

There is increasing evidence that the portion sizes of many foods have increased and, in a laboratory, at least this increases the amount eaten (Benton, 2015). The conclusions are, however, limited by the complexity of the phenomenon. There is a need to consider meals freely chosen over a prolonged period when a range of foods of different energy densities are available. A range of factors will influence the size of the portion size chosen: amongst others packaging, labeling, advertising, and the unit size rather than portion size of the food item (Rolls, 2014). The way portion size interacts with the multitude of factors that determine food intake needs to be

established. In particular, the role of portion size on energy intake should be examined as many confounding variables exist and we must be clear that it is portion size that is the major problem. If the approach is to make a practical contribution, then methods of changing portion sizes will need to be developed. This may prove to be a problem in a free market, as it is to be expected that customers will resist the introduction of smaller portion sizes, given that value for money is an important motivator (Steenhous & Poelman, 2017).

There is considerable evidence that the portion and packaging sizes of many foods has increased over the last 30 years (Young and Nestle, 2002; Nielsen and Popkins, 2003; Steenhuis & Poelman, 2017) with the concern that this may be one factor that has contributed to the rise in obesity. In fact, it has become received wisdom that an increase in portion size has played a part in the raised incidence of obesity, yet the topic is not straightforward and the resulting advice has often been too certain; failing to reflect the existing state of knowledge and the complexity of the situation.

When considering the control of energy intake and the possibility of obesity, to date attention has been largely directed to physiological and biological events that occur towards the end of a meal; those that stop food intake. The physiological approach has found post-ingestive mechanisms at a molecular and cellular level that associate the storage of fat with changes in feeding behavior (Morton et al., 2006). Yet, food intake is often controlled more by external rather than internal cues. Such behavior occurs without awareness and the amount consumed is influenced by factors, such as portion size, the visibility of food, and the ease with which it can be obtained. Ferriday and Brunstrom (2011) noted that energy intake to a large extent depends on the size of the meal, something that is determined before we start eating. They make the controversial suggestion that satiation plays a secondary role in the control of food

intake: rather decisions about portion size made prior to eating play a predominant role.

### **2.3.2 Difference between serving size and portion size**

Young and Nestle (2002) opines that, a key part of healthful eating means choosing appropriate amounts of different foods. When it comes to deciding how much to eat, the terms serving size and portion size are often used interchangeably. Serving size is a standardized amount of food. It may be used to quantify recommended amounts, as is the case with the represent quantities that people typically consume on a Nutrition Facts label. Portion size on the other hand is the amount of a food you choose to eat — which may be more or less than a serving. For example, the Nutrition Facts label may indicate  $\frac{1}{2}$  cup cereal for one serving but if you eat  $\frac{3}{4}$  cup, that is your portion size.

### **2.3.3 Estimating portion sizes**

According to Young and Nestle (2002), measuring cups and spoons are great tools for making sure portion is the same as the serving size, however, these tools are not always available when getting ready to eat. Another way to estimate portion size is by comparing it to something else.

- A baseball or an average-sized fist
  - Measures about 1 cup
  - An appropriate portion size for raw or cooked vegetables, whole fruit or 100% fruit juice
- A tennis ball or small, scooped handful
  - Measures about  $\frac{1}{2}$  cup

- Equal to 1-ounce equivalent for grains, such as pasta, rice and oatmeal
- A deck of cards or the palm of the hand
- Measures about 3 ounce-equivalents
- An appropriate portion size for fish, chicken, beef and other meats
- The size of the thumb
- Measures about 1 tablespoon
- An appropriate portion size for peanut butter or other nut spreads such as almond butter
- A postage stamp or the tip of the pointer finger to the first joint
- Measures about 1 teaspoon
- An appropriate portion size for oils or other fats

Measuring food regularly helps an individual to get an idea of what the serving sizes look like. This makes it easier for the individual to pick the appropriate amount as the individual gets more accustomed to it. While serving sizes are a valuable tool, it is important to listen to the body while eating. If there is still the feeling of hunger after eating one serving, that likely means there is the need for more food however if the opposite happens then it means it good.

## **2.4 Factors that influence food portion size**

### **2.4.1 The food unit**

Herman and Polivy (2005) suggested that norms concerning portion size may be influenced by both the amount served but also the number of items. Whereas the response to an amorphous food, such as macaroni cheese, reflects a reaction to the amount present, in other situations intake is influenced by the number of items consumed. For example, when sandwiches were offered, cut to different sizes on four

separate days, significantly more was eaten when the portion size was larger (Rolls, 2014). Such data may, however, reflect either an effect of overall portion size or alternatively the size of each food items if a norm of eating a particular number of items was influential. It is possible that consumption can reflect either the amount of food, or number of items available.

Marchiori et al. (2011) noted that much of the work in this area has considered portion size and there had been relatively little examination of the size of food items. Geier et al. (2006) placed Tootsie Rolls (a US brand of chewy candy) in bowls in a public area of an office. On alternate days these were of a small (3 g) or large size (12 g). Thus, the weight of available snacks was constant but the unit size varied. Similarly, in an apartment building, on some days normal sizes pretzels were on offer in a bowl and on other days the pretzels were similarly presented but they had been cut in two. In both cases, more was taken when the unit size was larger. The consumption of candy was also offered in its original size and when cut in two. Offering the half-size sweets halved the amount consumed. There was a cognitive bias that it was appropriate to consume a particular number of food items, regardless of their size. Similarly, Geier et al. (2006) suggested that there is a “unit bias”; that is there a perceived appropriate number to eat when presented with a food in a particular form. When pretzels were presented half the normal size, even though there was available exactly the same overall amount, and there were no economic consequences associated with eating more, less was consumed.

It is easy to see that such a “unit bias” will encourage a higher consumption when larger unit sizes are presented. Such data suggest that in addition to using smaller portion sizes, smaller unit sizes may help to control consumption. The perception of the appropriate amount to eat will determine the amount served. It is apparent that

portion size should not be exclusively considered as on occasions the unit size, when portion size has remained constant, has been found to be influential.

#### **2.4.2 Expected satiety and satiation**

Brunstrom and Rogers (2009) examined the common assumption that it is the palatability of food that determines the chosen portion size with consequences for weight gain and obesity. They considered the relative role of palatability and “expected satiation” the ability to stave off hunger. When 17 foods commonly eaten for lunch were examined, they found that both the reward offered by the food item, and the portion sizes in kilocalories, were both closely associated with expected satiation. Foods that were not expected to result in prolonged satiation were chosen in larger portion sizes. Importantly, foods expected to produce a lower level of satiation tended to be more energy dense. They concluded that their findings questioned the role of palatability when choosing the size of a meal; in contrast “expected satiation” played an important role.

Many studies in this area have looked at preferred foods with unspecified portion sizes. Alternatively, the same weights of foods have been compared. However, it has been argued that when you wish to consider energy intake, you need to compare foods on a calorie for calorie basis (Brunstrom and Rogers, 2009). Is one calorie of food X more liked, satiating, or selected in higher quantities than food Y? Brunstrom and Rogers (2009) reported that foods that were expected to generate greater satiation were selected in smaller portions. High energy foods were consumed in greater amounts; but not because they were more liked, rather because it was anticipated that they would produce a lower level of satiation.



Thus, a novel and interesting approach is the proposal that portion size is influenced by “expected satiation.” The variable was measured by Brunstrom and Rogers (2009) using psychophysical methods: essentially a standard food of known energy content appears on a screen and the size of a portion of a test food is manipulated until it is estimated to make you feel equally full or alternatively will stave off hunger equally well. Brunstrom and Rogers (2009) found that there was often a mismatch between the expectation of satiety, satiation, and the actual energy provided by a food. Some foods are expected to result in five to six times more satiation per kilocalorie than others. As an example, 200 kcal of pasta and 894 kcal of cashew nuts were expected to result in the same degree of satiation. In particular, foods of a high energy density and those high in fat were expected to offer a low level of satiation. It was found that there was a high correlation between familiarity with a food and the expected satiation, suggesting that the relationship is learnt, although it was not possible to rule out responses based on parameters such as the volume of a food.

These measures are good predictors of both the energy of the meal put on the plate but also palatability. Brunstrom and Rogers (2009) considered the role played by “expected satiety” when deciding about portion size. With various snack foods, the portion size was found to be predicted by both the liking for the item and expected satiety. However, there were individual differences, with those with a higher BMI, and those who were restrained eaters, responding more to expected satiety. Importantly, although expected satiation and expected satiety are influenced by physical characteristics, for example, the volume, they are also learned. Brunstrom et al. (2010) explored changes in expected satiation as food became more familiar. For example, as subjects became more familiar with sushi, the expected satiation increased. They interpreted such findings as evidence of “satiating drift” that is foods

are not believed to be very satiating until we learn otherwise. It was suggested that this may reflect an evolutionary advantageous response; time is not spent eating unfamiliar foods that were probably not too nutritious.

Such findings show that predispositions and knowledge about food, prior to its consumption, are important in our choice of portion size and this reflects learning and adaptation. As there is a commonly accepted norm that we should clear our plates, it is important that we further consider the psychological factors that determine the portion size that is chosen. Pre-meal planning has been reported to be the most powerful predictor of the amount consumed (Wilkinson et al., 2012). These findings also illustrate that we should be cautious in assuming that portion size as such is the parameter to which we should direct our attention. Often the foods offered in larger portion sizes have a higher energy density, such that we need to establish whether we gain additional understanding from considering portion size rather simply examining energy density.

## **2.5 Energy compensation**

Although there is considerable evidence from laboratory studies that increasing the portion size increases the consumption of many foods, it would be unwise to uncritically generalize from such data to everyday living. The laboratory lacks most of the relevant contextual information that normally influence what and when we eat. Even if a similar response existed in real world situations, we need to know whether it is a response that continues over time or whether adaptation occurs via changes in the other aspects of the diet. Essentially, having consumed a larger meal, does energy intake decline in subsequent meals? This is an important question as the answer determines the attention that should be directed to portion size. If having eaten more

for one meal, you eat less during the next meal, then the importance of the portion size is greatly reduced. A transitory effect is of little practical significance.

Rolls (2014) for two days gave adults main meals under controlled conditions and provided snacks for between meal periods. On three different occasions the same menu was provided with 100, 150, or 200% of baseline amounts being provided. Increasing the portion sizes by 50% resulted in 16% more energy being consumed and when the size was 100% greater the intake of energy increased by 26%. All aspects of the meals, including the intake of snacks, increased when more was available.

There are various reasons to be cautious when interpreting this study. The meals were all eaten at scheduled times in private cubicles in a laboratory, such that the effect of portion size was maximized and other factors diminished. There was no choice of when or if you ate, or the nature of the meal. It is an obvious comment that energy compensation is most likely when you decide if and when you want to eat, and is more likely to occur when a choice of foods differing in energy density is provided. Rather than increasing the size of every component of a meal, an interesting question is what response would there be to a larger portion of a single component of a meal, both within a meal and subsequently. Finally, a study for two days may not be sufficient to allow counter regulatory mechanisms to express themselves (Wilkinson et al, 2012).

A later study by the same group, however, looked at the impact of larger portion sizes for 11 days and again reported that the increased energy intake was not compensated by a lower intake at a later time (Rolls, 2014). Again, all food and drink was provided for two 11-day periods, when 100% or 150% of the portions of all items were provided, resulting in an increased daily intake of 423 kcal. In this instance participants were supplied with all meals, although only on nine days was the main

meal consumed in the laboratory. Larger portion sizes resulted in an increased intake of most foods, including snacks. Although the authors claimed that the continued response to larger portions did not support the view that biological systems eventually adjust energy intake, the comments directed to the initial two-day study equally apply. The provision of meals of the same energy density with the instruction to consume three meals a day limits the opportunity for physiological mechanisms, should they exist, to exert an influence.

More generally, Levitsky (2005) considered the bodily response of normal weight adults to overfeeding. For 13 days, each subject consumed 35% more energy than at baseline with a resulting increase in weight of 2.3 kg. When they returned to their normal diet, although energy intake was similar to baseline values, subjects lost 1.3 kg of body weight. It appears that the amount eaten is not the only determinant of body weight and indicates a need to monitor more than energy intake when considering any response to changes in portion size. The general observation that although from time to time there are large variations in energy intake, adult body weight remains remarkably constant, suggests that weight must be regulated by biological mechanisms. Such observations illustrate the need to study the response to changes in portion size over an extended period and require more than a simple calculation of the energy consumed.

In fact, there are many reasons to question the generality and interpretation of longer term studies of portion size examined under laboratory conditions. For example, the time of day a meal is consumed may be important. There are reports that eating a larger, not smaller, breakfast is associated with a lower total daily energy intake. Based on 7-day dietary diaries, Rolls (2014) found that the proportion of energy eaten for breakfast was negatively correlated with the total daily energy intake, whereas

eating more in the evening was positively associated with a higher daily intake. Thus, there was the suggestion that when meals were freely chosen an adjustment in energy intake occurred within a day.

The amount eaten also varies with the day of the week, with more being consumed at weekends. Rolls (2014), based on seven-day dietary diaries, concluded that typically there are “periods of eating interspersed with periods of fasting”: in the short-term the size of meals was elastic and appears to be unregulated to the extent that intake can vary within a wide range. However, physiological mechanisms appear to come into play after a delay of at least a day, and usually longer, such that the amount consumed one day reflects the intake two days previously. Such effects are more likely to be observed when the frequency of eating and the choice of food are under the control of the individual, rather than being imposed by the experimenter.

It should be noted, however, that the influence of the size of breakfast is a matter for debate. Schusdziarra et al. (2011), in contrast to the findings of Wilkinson et al. (2012), observed that acute studies have not tended to find that a larger breakfast resulted in a smaller overall intake of energy, rather a larger breakfast was associated with a larger overall intake. In contrast, when the ratio of breakfast to overall energy intake was examined Schusdziarra et al. (2011) and Wilkinson et al. (2011) were in agreement. However, the ratio of energy consumed at breakfast to total intake depended not on the size of the breakfast, but rather on what was eaten subsequently. The amount eaten for lunch and dinner was fairly constant but the amount eaten for breakfast differed with a resulting difference in the ratio. Therefore, it was a smaller breakfast that was associated with a smaller total daily energy output.

A factor that has not been considered is the nature of the meal. There are reasons to suggest that macro-nutrient composition of the increased portion size may be

influential. Holt et al. (1995) examined the ability of a range of foods to induce satiety over a two hour period. The greatest satiety was produced by boiled potatoes and the least by a croissant. The level of protein, fiber and water correlated positively with resulting satiety, whereas the fat content was negatively associated. In the context of portion size, such data would lead to the prediction that the consumption of foods high in fat would tend not to lead to a reduction in energy intake, whereas other macronutrients might reduce subsequent intake. Consistent with the importance of the nature of the meal, Vozzo et al. (2003) compared the impact of preloads of the various macronutrients on spontaneous eating. Protein rather than carbohydrate and fat resulted in greater satiety and lower food intake. It was important that subjects were free to choose when and how much they ate.

Thus, the question arises as to whether the response to an increased portion size depends on the macronutrient composition of the meal. In addition, there is a need for an examination of the long-term impact of changing portion size on energy intake and body weight. Simply these questions have been little considered.

## **2.6 Chef's strategies in food plating and presentation**

The way you present your food is what tempts customers to try a dish. We eat with our senses: what we see, smell, and feel. And in the age of social media influencers and food bloggers, food plating and presentation matters more than ever. A study from Oxford gastrophysicist, Professor Charles Spence, suggests that the food presentation can actually make a dish taste better.

In the study, Spence gave 60 people 3 salads and asked them to rate each one before and after they ate them. The salads each used the same ingredients but presented them in different ways. One salad was put together with no regard given to presentation,

one was neatly arranged, and the third was plated to resemble a painting by artist Wassily Kandinsky. Diners liked the latter which resembled a painting. Diners thought it tasted better (29% tastier to be precise), even though it used the exact same ingredients. Spence's study concluded that consumers were willing to spend as much as three times more on a well-plated dish. Even basic dishes like a salad can benefit from thoughtful presentation it makes the dish seem more appetizing and valuable.

### **2.6.1 Create height on the plate**

Creating heights in plating foods is one the most important strategies in portioning food. It is important that the food is not separated with the view of filling the entire plate. However, food should be built from bottom up by using a little structure and having a ring mold to start with a base. Some of the food is simply packed in the food in the mold and gently lift it up which gives you a base to build on.

### **2.6.2 Cutting the meat horizontally**

Curtis et al. (2017) recommends that "fanning" or shingling out slices of meat show off its quality. He notes that meats should be sliced on a 45-degree bias, and sliced against the grain of the meat for a more tender cut which gives out the perfect medium-rare steak.

### **2.6.3 Play with textures**

Curtis et al (2017) suggests that playing with textures, foams, and sauces to make the dish look more interesting. Playing with contrasting textures on the plate and with Foams are usually really helpful in plating and can be really easily done, playing around with different sauces and textures.

#### **2.6.4 Using contrasting colors**

Tang et al. (2012) also stresses the importance of playing with contrasting colors. She noted that she avoids artificial colors and uses matcha, powdered sugar, or natural colors to catch the eye instead.

Tang suggests that the way food is presented is imperative. The more time spent on how each dish is presented, the more visual interest it can stimulate in customers. Tang et al. (2012) recommends using bold colors creates appealing visuals. The easiest way to add color is to start working with more colorful ingredients. Items like carrots, potatoes, cauliflower, lettuces, beans, and more come in a variety of gorgeous colors noting that, the difference a purple cauliflower puree makes on a plate is striking.

#### **2.7 Match food presentation to your restaurant theme**

Curtis et al (2017) suggest that the style of plating should match the restaurant's atmosphere. Small ethnic restaurants, where it appears grandma is cooking in the kitchen, cannot serve plates that try to emphasize vertical, architectural compositions. The guests expect a simple, welcoming presentation that stresses straightforward flavor cooked with heart and served with an unfussy, rustic quality. At relatively pricey, hip and high-end restaurants, guests want to see a degree of artistry and care taken in constructing the dishes. The way food is plated should directly reflect the restaurant type. They add that, food should have an element of height or visual texture, the balance of color and thoughtful garnishes both carefully placed and intentional in flavor and texture.



### **2.7.1 Choosing the right plates**

Tang et al. (2012) advocates that using the right plate size, color, and style is as important as the taste of the food itself. The color of plate matters as the plate serves as the canvas for the food. She added that, typically, chefs will stay away from blue plates as there is not any naturally blue food and it is thought to be an unappetizing color. If you have something with a lot of vibrant color, it might stand out better on a white plate. This is corroborated by Curtis et al (2017) as they echo the importance of choosing the right vessel to present dish by choosing a dish vessel that makes it easy for guest to eat and helps give an opportunity for chefs to show their personality in the dishes they create.

### **2.7.2 Serving smaller portion sizes**

Smaller portion sizes were named by the National Restaurant Association as one of the top five hottest restaurant concepts for the year 2019. Of course, every chef still wants to serve enough food to satisfy your guests and portion sizes can vary depending on the type of establishment that the chef is operating, but smaller portions are typically easier to style. Sticking to no more than six elements on each dish helps to prevent the dish from looking overcrowded.

### **2.7.3 Using edible garnishes and decorations**

Garnishes and decorations are a great way of styling a dish, but there are some guidelines that should be followed when using them. Whatever garnishing is used whether it is a herb, spice, or a flower, it needs to be edible. Everything on your plate should be placed with the intention of elevating the dishes taste first, and the way it looks second.

#### **2.7.4 Keep it simple**

Tang et al. (2012) emphasizes the value of simplicity. She states that, overcrowding the plate with unnecessary oils or spices or microgreens just takes away from the food that a chef worked so hard to make adding that subtraction is a chef's best ingredient. Rather than piling on a zillion garnishes or swirls of sauce, let the quality of the cooking speak for itself. She explains that, a properly seared steak with some fresh watercress and perfectly roasted baby potatoes will look better than the fanciest of plates with subpar cookery adding that proper cooking will give you a lot of contrast within your ingredients with both texture and color.

#### **2.7.5 Expressing yourself**

There is an art in plating food and that is where chefs can allow themselves to be creative and have a high impact on how guests perceive the dishes they are eating. Barr (2019) notes that chefs should approach food plating and presentation just as an artist would approach their next piece. Presentation should be approached just like art, cooking, and music by taking a moment to relax and look at what the others are doing, learn a bit of the technique and then find your own voice and style.

When consumers dine out, they expect their food to taste great and be visually appealing. That, along with restaurant's interior design, are all instrumental to the quality of their dining experience and informs their buying back. When plating dishes, each element matters equally: color, arrangement, balance, texture, and how easy it is for guests to eat. If each of these fall out of hand, there is a higher tendency that a restaurant is setting themselves up for disaster through poor customer reviews.

## **2.8 The trend of increasing portion sizes**

One thing that may appear to be uncontroversial is that the size of meals has increased over the years. Wansink and Wansink (2010) studied 52 of paintings of the Last Supper and found that over time the size of the meal had increased progressively. The size of the main meals grew by 69% between 1000 and the 1700, whereas the bread grew by 23%. The greatest increases were observed in paintings between 1500 and 1900. There is no religious reason for this change, so it is likely to reflect popular perceptions of the size of meals at different stages of history. However, although an increase in portion size may have been taking place for hundreds of years, more recently there is a concern that the phenomenon has speeded up. However, even the statement that portion sizes have increased needs some qualification.

Nielsen and Popkin (2003) compared surveys of food consumption in the United States, paying attention to those foods that had been responsible for the greatest increase in energy intake; salty snacks, desserts, soft drinks, fruit drinks, French fries, hamburgers, cheeseburgers, pizza, and Mexican food. This list of foods represented 18% of the calories consumed 1977–1978 but 27.7% in 1994–1996. The portion size had increased for all these food items, with the exception of pizza, resulting over this period in an increased caloric intake being associated with each portion of food that was eaten. Piernas and Popkin (2011) looked specifically at changes in portion size in foods eaten by children and adolescents in the USA from 1977 to 2006. When the list of foods considered in the previous analysis was again considered, the age of the child was important. In 2003–2006 these food items accounted for 38% of the energy intake of those between 13 and 18 years but only 28% of those between 2 and 6 years of age. At all ages, a larger portion size of pizza resulted in a greater energy intake at meals at which they were consumed. In those aged between 7 and 18 years, more energy was

consumed at meals that included larger portions of sugar-sweetened drinks, French fries, or salty snacks. The influence of portion sizes was not, however, uniform: for example, the energy from a meal of a pizza was greater in African Americans, Hispanics, and those from low household education homes. An increase in the daily energy intake (179 kcal/day) between 1977 and 2006 was found to largely reflect that more calories were eaten away from home. Over this period, the percentage of calories eaten outside the home increased from 23.4 to 33.9%.

Young and Nestle (2002) similarly considered ready-to-eat foods and found that portion sizes had begun to increase in the 1970s and were still increasing to the extent that most of the portions exceeded the government-recommended serving sizes. For example, a typical muffin in the United States is 333% greater than the USDA recommendation, and a serving of pasta 480 percent larger. They also found that newer editions of cookbooks suggested fewer servings for the same amounts of ingredients.

It was clear in the USA that the consumption of larger portion sizes in part reflected where food was eaten; in particular the trend to eat more often in restaurants. Between 1977 and 1991 there was a 75% increase in the number of restaurants in the United States (US Bureau of the Census, 1984, 1995). In particular, fast food restaurants offer cheap meals in large quantities (Harnack et al., 2000). It is perhaps not surprising that there are reports that the frequency of eating in fast-food restaurants is associated with a greater energy and fat intake, and a higher body mass index (BMI). Based on data from 29,217 children, from 2 to 18 years, Piernas and Popkin (2011) argued that the location in which children eat influences their energy intake. In particular, foods prepared away from home have been largely responsible for the increase in the total intake of calories. They concluded that in the USA changes in

where meals were eaten, and the sources of foods consumed at home, had fueled the increase in the energy intake of children.

Although a great deal of the evidence comes from the USA, a Dutch survey found a trend toward larger portion sizes and the introduction of multipacks (Steenhuis & Poelman, 2017). However, in France a study of cookery books found that the portions suggested were 25% less than in the United States (Rozin et al., 2003). In fact, French portion sizes were smaller in restaurants, in supermarkets, and in “all you can eat” restaurants.

Although there is a common perception that portion sizes have widely increased, the reality is more complex and precludes a simple conclusion. In the United Kingdom, the Food Standards Agency (Wilkinson et al., 2012) examined the association between food portion sizes, energy intake, and weight gain. They found that there was no simple increase in portion size over time as much depended on the food item. They found that “larger portion size packs are available for many, often premium products, including luxury cookies, American muffins, luxury ice cream bars, sausages, premium crisps, and chocolate confectionery.” But, in addition, smaller pack sizes were “available for many products (e.g., chocolate confectionery, savory snacks, soft drinks, ice cream cones, and bars) but usually as part of multipacks from larger retailers.” The portion sizes of many products, such as biscuits and cakes, had remained fairly constant and there were only a few cases where there had been a general increase in size, for example, individual ready meals. This difficulty in making generalizations about portion size was demonstrated by Smiciklas-Wright et al. (2003) who found that over time about one-third of 107 commonly eaten foods had changed in size, with the majority having increased, although some had decreased in

size. Importantly, there was no food that consistently differed in portion size for every age group and gender, making a generalization impossible.

Thus, although there has been a trend for the portion size of various foods to increase, it is not universally the case. Although, larger packs of some foods are available, there has also been the provision of a wider range of the size of some items, for example, confectionary. In addition the choice of portion size can vary with age and socioeconomic background. However, as these data are mainly from the USA, there is a need to establish the situation in other countries. The worry, however, remains that the supersizing of food portions has changed our perception of the amount it is normal to eat.

### **2.8.1 Response to food portion size**

A tendency to eat more when more food was available was found by Wilkinson et al. (2012). They served people from normal bowls to establish their usual intake and then substituted bowls that refilled from a hidden reservoir. Both those who were lean and those who were obese ate more than usual, although when told about the trick the lean, but not the obese, subsequently decreased their intake. On different days, Rolls (2014) offered four different portion sizes of macaroni cheese and found that the bigger the portion size the more that was eaten: 30% more energy (162 cal) was consumed with the largest (1000 g) rather than smallest portion (500 g). Importantly hunger and satiety were similar after each meal and, in fact, only 45% of the subjects noticed that the portion size differed. In a restaurant, more pasta was eaten when larger portions were offered. Rolls (2014) examined whether it was possible to use portion size to increase the consumption of vegetables when the amounts of meat and grain were kept constant. They found that an increase in the size of the vegetable

portion size resulted in increased consumption. This tendency to eat more when served larger portions has been found regardless of individual characteristics, such as BMI, or a tendency toward dietary restraint or disinhibition (Rolls, 2014).

Similar reactions to snacks have been reported. Wansink and Wansink (2010) gave people in a cinema either a medium or large bucket of popcorn. More was eaten by those given the large bucket. Similarly, an afternoon snack of potato chips (crisps) was offered on different days, consisting of various weights of the snack in the same sized bag. Both men and women ate significantly more when the portion was larger (Rolls, 2014). Importantly, there was no difference in the chosen size of a subsequent meal; that is there was no reduction in energy intake to compensation for the previous high levels of consumption.

Levitsky (2005) gave students a buffet lunch and were told that it was a test of flavor enhancers and that they could eat any amount they liked. Later, they were served either 100%, 125%, or 150% of the amount previously consumed. With the larger servings, more food was eaten. The consumption of all foods on offer, soup, pasta, breadsticks, and ice cream, all increased significantly in proportion to the size of the serving. Surprisingly, the portion size can also increase the consumption of unpalatable items. When given a medium or large size serving of stale 14-day-old popcorn, 33.6% more was eaten from the larger buckets. Thus, an environmental cue had a greater influence than the taste of the food (Wansink and Wansink, 2010), suggesting that the manipulation of portion size could be used to increase the consumption of nonpreferred healthful foods.

This type of laboratory or controlled real-world study has produced a reasonably consistent finding: food consumption increases when the portion size is larger. Such

findings are the basis for the received wisdom that an increase in portion size plays a role in the increased incidence of obesity.

Yet, although consistent with such a view, such data require to be subjected to careful scrutiny. Such studies consider in isolation one aspect of the environment, portion size. The experimental design used has often emphasized the importance of portion size by removing the other information that we use in such situations. As such, the role of portion size may be exaggerated. However, although important in a laboratory paradigm, there is a need to establish the relative importance of such a phenomenon when placed in a wider social context. However, we cannot simply conclude that portion size is a universally important variable without systematic study.

It cannot be assumed that children necessarily respond to portion size in a similar manner to adults, given differences in their eating patterns. Although there are reports of a similar adult-like response to portion size in some children, age may be important. DiSantis et al. (2011) considered children from 3 to 5 years who were given either an age-appropriate sized lunch or one double the size. A 25% increase in the energy intake from the experimental food item resulted, leading to an increased overall energy intake from the meal of 15%. In contrast, in a similar study a larger portion size increased the food intake of 5-year olds but not those aged 3.5 years (Rolls, 2014). In these studies, the ages of the children varied over a small range although DiSantis et al. (2011) compared those from 2 to 9 years. A macaroni meal was offered in an age appropriate size or double that quantity. The child's age did not influence the result; 29% more was eaten when the larger serving was provided. It was suggested that the response to larger portions was consistent across the age range although children younger than two years were not considered.



Although there is evidence that portion size may influence the amount we eat there is also evidence that the portion size influences the way we eat. In children, aged from 2 to 9 years, DiSantis et al. (2011) examined the response to portion size of self-determined, age-appropriate, or double age-appropriate meals: the frequency and size of bites were determined. When given a large portion 29% more was consumed, a reflection of an increased amount per bite rather than an increased number of bites per meal. Although the mechanism behind the tendency to eat more per bite when given a larger portion the mechanism is unclear, it does seem to be a general tendency as it occurred irrespective of the age of the child. These findings were similar to a previous report (DiSantis et al., 2011) that offering a portion, that was twice age-appropriate, increased the amount eaten by 25%, again a reflection of a larger amount consumed per bite. When children were offered age-appropriate sized meals, or double that size, an increased bite size resulted, even with children that did not consume more when a double-sized portion was offered (Fisher and Kral, 2008). They took a fewer number of larger bites per meal. Similarly in adults Lawless et al. (2003) examined the effect of increasing the size of a drinking vessel from 150 to 600 mL on the amount drunk and found that the volume of a sip increased by 15%. There is a consistent finding that larger portion sizes increase the amount taken per bite. Such findings raise the possibility that the use of cutlery that limits the amount of food that forms a single bite, for example, a smaller spoon, may be helpful.

An interesting question is the extent to which any effect of portion size might interact with the nature of the food supplied. Is it only the intake of palatable food that is enhanced or would there be a similar response to less preferred items? Children aged 5–6 years ate a pasta meal of a constant size with side dishes of different sizes on separate occasions. Doubling the portion size of apple sauce that was described as

sweet although it had not been sweetened, increased consumption by 43%. In comparison, increasing the amount offered did not raise the consumption of carrots or broccoli. Although it is unwise to place too much emphasis on a single isolated study, this failure to find an increased intake of vegetables immediately suggested that the portion size effect occurs with some types of food and not others. The question needs to be further addressed. The situation is, however, unlikely to produce simple answers as Spill et al. (2010) found that doubling the portion size increased carrot consumption by 47% when given to 3–5-year-olds at the beginning of a meal.

### **2.8.2 The mechanisms and impact of food portion size**

The mechanisms that underlie the response to portion size have been the subject of limited research, although a greater understanding would allow an informed response to any problem it creates. Although it is not universally true, adults often report that they were aware of an increased portion size, something that was true irrespective of whether the food was eaten as a discrete unit such as a sandwich (Rolls, 2014), as an amorphous food such as macaroni cheese, a drink, or even everything eaten over 2 days (Rolls, 2014). It seems that the offering of a large portion size sanctions an increased intake; it was not that the increased size was not noticed but rather that in some way it permits or encourages an increased intake.

Although adults seem generally aware of differences in portion size a similar awareness is often not apparent in children (Fisher & Kral, 2008). Eating in the infant is primarily driven by the physiological and psychological cues associated with hunger and satiety. In contrast the adult is affected by environmental cues including the social context, time of day, and the palatability of the available food. As a child

develops, it learns cultural conventions and develops the eating style of an adult that by 3–4 years of age is influenced by a range of environmental (DiSantis et al., 2011).

### **2.8.3 Visual Cues**

The importance of sight is well illustrated by the finding that you eat more if the serving dish is on the table rather than left on the stove. When the serving dish was not on the table, women ate 20% and men 29% fewer calories (Payne, 2010). Schusdziarra et al. (2011) served lunch in total darkness where half the subjects unknowingly received larger portions with the consequence that they ate 36% more food. However, this increased consumption did not influence reported satiety. Those who ate larger portion sizes in the light served themselves less dessert than those who ate regular portions, something not true for those who had eaten in the dark. It appeared that satiety was more related to visual rather than internal cues.

Eating in the dark rather than light resulted in a decreased ability to estimate the amount that had been consumed. The ability of a larger portion size to increase consumption was greater in the dark. Thus, it seemed that visual cues play an important role in stopping eating. Similarly, Wansink and Wansink (2010) concluded that “people use their eyes to count calories and not their stomachs” as they consumed more soup when, unknown to those who were eating, more soup was added to the bowl. At least in the short-term, visual cues provide stronger cues to stop eating than physiological mechanisms.

If portion size is influential then visual information is essential in our estimation of this phenomenon: but is it the actual portion size that is important in increasing intake rather than our perception of the portion size. In fact Vozzo et al. (2003) concluded that the eye can fool the stomach, perhaps not a surprising conclusion as the

estimation of volume and the associated weight are complex calculations. Does the estimation of portion size depend on the way the brain processes visual information and in particular how it responds to the manner in which food is served? As it is usual to eat most of the food that you have yourself placed on the plate, any contextual cues that increase the portion size leads to a greater calorie intake.

For many years, psychologists have studied the size–weight illusion, also known as the Charpentier illusion after the French physician who first studied it. Essentially, a larger object is judged to be lighter than a smaller object when they are of the same weight. Clearly, if a similar phenomenon occurs with food then it could have implications for our reaction to a larger portion size.

The vertical–horizontal illusion reflects the tendency to concentrate on the vertical and to downplay the horizontal dimension. It has been found that the vertical height is used predominantly to estimate volume. Wansink and Wansink (2010) found that adolescents poured 88% more drink into short/wide rather than into tall/narrow glasses of the same volume. Similarly, experienced bartenders, when asked to pour 1.5 ounces of a spirit, poured 26% more into a short/wide rather than tall/narrow glass. This phenomenon was systematically examined by Wilkinson et al. (2012) based on a series of seven studies they concluded that a taller container was perceived as having a larger volume and increased consumption. With a taller glass, a smaller volume was perceived to have been drunk and the satisfaction with the drink was less. They proposed a “perceived size-consumption illusion” in that before consumption the volume was seen as being greater but after consumption it was seen as being less. The taller glass is perceived as larger than it really is, however, when a drink is taken the evidence contradicts this initial expectation resulting in more being drunk

Wilkinson et al. (2012). In fact, this lowered perceived consumption resulted in increased consumption.

Those wishing to sell drink should use tall bottles and glasses as they are perceived as having a greater volume and more is drunk. Those wishing to control caloric intake should measure a serving (measure not pour) into a wider and shorter container. These factors are of importance as much of the literature has considered the response to serving a larger volume. In practice on many occasions it is the perception of the volume that drives choice.

The shape of an object also influences size estimation. In general, triangles are seen as larger than a circle or square of the same area; elongated objects are seen as larger; squares where the diagonal predominates are seen as larger than circles; increases in size tend to be underestimated (Wilkinson et al., 2012). Necessarily, food products come packaged and the question arises as to whether the perception of portion size depends on the shape of the package. A study considered a student cafeteria where the same amount of cream cheese was offered in either a round or square container and found that the square container was perceived as larger. When on different days one of two shapes of container were available, it was found that 44% of customers bought two tubs when only the round were available, compared with 21% who bought two when the square variety was offered (Kridler et al., 2001).

The effect of the way a pizza is presented on the amount purchased has been examined. Giving a discount for a larger pizza risks underestimating the extent to which the size is greater than usual. When asked the price subjects were prepared to pay for a pizza of different sizes, it was found that they expected a greater discount when they were given the diameter rather than when they were shown actual pizzas. In fact, providing the area of the pizza resulted in the greatest suggested price, an

approach not taken by those selling pizza. Two small pizzas were viewed as being of a larger size than a single pizza of the same area. A square pizza when viewed with a point at the bottom was viewed as having a larger size than a circle of the same area (Krider et al., 2001). An added complication is that round pizzas are sold in square boxes—to which do we respond?

Given that it is received wisdom that one factor that has driven the increased incidence of obesity is the increase in portion size, the evidence that the nature of the packaging and the shape of the food influence the perception of size are clearly important. What is less clear, as it has been little studied, is the extent to which differences in perceived size influence consumption. It has been reported that multiple items may be purchased if an item is perceived to be smaller than it is (Krider et al., 2001). Yet, if the experience of eating does not match the initial impression of the size of the food item, then more may be consumed. The generality of such findings needs to be established.

#### **2.8.4 Labeling**

There is growing evidence that the nature of labels impacts on the response to food. Although many experimental studies have examined the response to portions that have been provided by the experimenter, in real life foods often come with names that have implications for their consumption: for example, they may be labeled as a “Luxury rich chocolate pudding” or “Low-fat French Fries.” What effect does the labeling or the image created by advertising have for the selection of portion size and the amount consumed? Are some individuals more influenced by the nature of the labeling; for example, those who are obese. Alternatively, can labeling decrease the portion size chosen, for example, by clearly demonstrating the portion size?

Labeling and advertising claims are important as when one piece of nutritional information is given then various inferences are drawn, often inaccurately. For example, a low-fat claim tends to lead to the assumption that it is lower calorie (Wansink and Wansink, 2010). A low-cholesterol food is assumed to be low in fat. Schuldt and Schwarz (2010) reported that labeling a biscuit as “organic” leads to the implicit assumption that it was lower in calories and that they could be eaten in larger quantities. Whereas 3.68 organic biscuits were perceived as an appropriate serving it was only 2.76 with the conventional biscuit, albeit they were nutritionally identical. Raghunathan et al. (2006) found that when you label a food as “healthy” there is a lower expectation that it is going to taste good. They suggested that the attraction of unhealthy food is its unhealthy nature, as this equates with a better taste. As there is no simple relationship between the health implications of a food and its taste, this relationship owes more to expectation than rational analysis.

There is considerable evidence that when faced with an advertisement the information given is generalized to an extent that may be invalid. Wansink and Wansink (2010) offered novel types of M&Ms (colorful button-shaped chocolate candies) with one of two labels: “New ‘Low-fat’ M&Ms” or alternatively “New colors of regular M&Ms.” When the amount taken from a large container was weighed 28.4% more was taken when it was falsely believed that it was a low-fat version. This difference in labeling resulted in the consumption of 244 kcal as opposed to 190 kcal. The difference was greater when the low-fat variety was offered to those who were obese: the intake was 47% greater when reading the low-fat message compared with a 16% increase if you were not obese. There was also a significantly greater underestimate of the calories actually consumed when it was thought to be low fat.

Subjects were asked about a container of M&Ms or granola with labels that stated that they were either regular or low-fat (Wansink & Wansink, 2010); items chosen as they had a very similar energy density. The task was say what amount it was appropriate to eat during a movie and to estimate the calories in each container. A low-fat label increased the serving size that was reported by the subjects to be appropriate and it made people feel less guilty about eating. The supposed low-fat M&Ms were thought to contain 20% fewer calories and the low-fat granola 25% less; perceptions that increased the serving size by 21% for M&Ms and 18% for granola.

These findings were followed up by considering whether the low-fat designation was increasing the view of what was the appropriate serving size. Granola was offered with either the low-fat or regular label, but also the information that the amount presented offered two or one servings, or alternatively did not mention serving size. These bags of granola were consumed while rating movies. Again those who received the low-fat designated product ate more; 249 kcal when labeled low-fat compared to 165 kcal when described as regular. However, the serving size information only reduced overeating among guilt-prone normal weight consumers, but not among overweight consumers. However, the tendency to eat more when the food was described as low-fat disappeared when serving information was provided to those of normal weight. In contrast, those who were overweight ate more granola when labeled as low fat, irrespective of whether the serving size had been indicated. There was a general tendency for participants to under-estimate their caloric intake to a greater extent when the supposed low-fat alternative was consumed. Wansink and Wansink (2010) surveyed products on the market and concluded that if the granola had been in fact low fat than 35% less fat would have been eaten, but in practice 33% more calories would have been consumed.



Schusdziarra et al. (2011) noted the lack of comparative studies of the way that people in different countries respond to food labeling and that much of the limited literature on the topic was American. They examined the perception of consumers of yoghurt in Germany, Italy, UK, and the United States. The perception of the impact on health, the understanding of the message and its credibility, differed between countries. A health claim, rather than one related to taste, increased the perceived healthiness of the product and to a small extent added to consumer appeal. The literature is very limited but it appears that the nature of claims on the label influence the perception of a product although it may be necessary to consider different countries and subsections of society within a country. The possibility exists that the response to labeling may be culturally determined and hence there may be differential consequences for the choice of portion size.

There has been little examination of the impact of claims on portion size but it would be surprising if there was not a relationship. The report that a description as a “low-fat” product increases portion size supports this expectation (Wansink and Wansink, 2010), although the nature of claims have not been examined systematically. Raghunathan et al. (2006) similarly asked subjects to rate cheese crackers that were described as containing 11 g of good fat and 2 g of bad fat, the opposite proportions or an equal amount of each. The cracker with the greatest amount of bad fat was predicted to be the tastiest. In a second study Mango Lassi, an Indian drink, was assessed and was found to be more enjoyable when it had been portrayed as unhealthy. These findings question the impact of low-fat options. If low-fat is perceived as inducing a poorer taste, then when given the choice the high-fat alternative may be chosen. Similarly, how “healthy smaller portions” are perceived

needs to be examined. It cannot be assumed that smaller portions will necessarily be viewed positively and lead to less consumption.

The provision of calorie information in restaurants is a recent approach to giving the population the information they need to control energy intake. Roberto and Khandpur (2014) studied the choice of food at a dinner were the menu had or did not have information about calories, or had in addition information about the daily caloric intake needed by an average adult: 14% fewer calories were eaten when they were mentioned. Having information about calories and the number required resulted in a lower intake than the other conditions. It was also discovered that calorie labeling influenced the food chosen by dieters but not those who were not dieting.

What does seem clear is that advertising and labeling will bring both a precise and explicit message and in addition an implicit message, that is a range of assumptions that often will not correspond with reality. We need to understand the implications of such messages, both real and imagined, for the portion size on offer.

## **2.9 Size of Packaging**

The serving sizes of some items are prescribed by the packaging, for example, a can of soft drink. However, in other situations, for example, when bulk purchases are made, or a portion is taken from a serving dish, the amount chosen reflects a personal decision. One response to a widespread concern about large portion sizes, and their possible role in obesity, has been for industry to offer products in a variety of different sized packages. Presumably, such an approach assumes that the offering of food items in smaller quantities allows the consumer to exercise better self-restraint. However, the response to different sizes of packaging is not necessarily straightforward. In

addition to how products are chosen, we need to appreciate how we respond to larger packages.

There are reports that the size of a container can influence the ability to estimate portion size. Young and Nestle (2002) asked for estimates of the amount of food found in various containers. The estimates of solids tended to be better than liquids that, in turn, were better estimated than amorphous items. Also, it proved easier to estimate quantities from small containers. It may be important that a large proportion of the studies of portion size have been carried out using amorphous foods such as macaroni cheese, often in large quantities. The extent to which the portion size effect reflects the type of food item considered, and its packaging, needs to be further examined. Rolls (2014) did, however, find that a 10-minute training session greatly improved the ability to estimate quantities. Vozzo et al. (2003) reported that training to estimate food quantities resulted in better performance immediately after training and one but not four weeks later.

Smiciklas-Wright et al. (2003) examined the response to snacks provided in either large or small packages and in small or large amounts. Potato chips, cheese crackers, cookies, and candy were taken home and eaten over three days. Providing double the amount increased the energy consumed from snacks by 81%, although the size of the package was not significant. Similarly, as part of a weight reduction program, Wansink and Wansink (2010) considered the influence of offering foods in single-serving portions as opposed to larger volumes from which a serving could be taken. The foods were cereal, peaches, apple sauce and cheese. The energy consumed as these foods was 15% less when eaten as a predetermined portion rather than being taken from a bulk supply. The effect was, however, due to the consumption of cereal and apple sauce and not the consumption of peaches and cheese. However, the

opposite has also been reported. Vozzo et al. (2003) concluded that we more easily regulate consumption when larger package sizes are used. They suggested that large package sizes tend to induce a conflict between indulgence and the need to regulate intake. Thus, it was proposed that large rather than small package sizes can reduce the likelihood of consumption being initiated. Clearly, such inconsistent results demand further study.

There are mechanisms at play unrelated to appetite. A major disincentive to buying smaller packages is that better value is offered when buying in bulk. A store may indicate the number of grams on offer for the amount of money paid. Inevitably, better value is offered by a larger pack. There can be little doubt that a major obstacle to the widespread purchasing of small portions is a desire for a bargain, the wish to obtain a good return for your money. In addition, larger packages may prove to be more difficult to control when extracting a serving.

Are bulk purchases necessarily better value? Wansink and Wansink (2010) looked at the records of purchases in food stores in France and found that both fruit juice and biscuits were repurchased sooner when they had been bought in larger quantities: the average daily consumption was 110% greater for juice and 92% more for biscuits. It is, however, unclear whether this increased consumption reflects bulk buying rather than a pre-existing greater liking for the product? In a second study, these researchers gave individuals either four or 12 packages of various foods and measured their consumption over two weeks. When provided in larger amounts, they were eaten on average 112% faster. This effect was, however, short-term and after the eighth day the rate of consumption was similar, albeit sufficient food still remained. It was suggested that this reduction in the consumption of food, when supplied in larger quantities, reflected both taste-satiation and also that the reduction in the stockpile made it less

visually salient. Recently, stockpiled items have been reported to be visually more salient, in part because they take up more room and hence are more obvious (Wansink and Wansink, 2002).

Wansink and Wansink (2010) examined the influence of the size of packaging by comparing the response to a full bottle of cooking oil and a bottle twice the size that was only half full. Thus, the amount present was the same but the size of the container varied. Twenty-three percent more oil was used when it came from the larger container. A similar study using spaghetti found that 29% more was used when it came from a larger container. He followed up these findings by examining the relative influence of the size of the container and the unit cost of the product, in this case either tap or the more expensive bottled water. With the relatively costless item, tap water, a larger container increased the volume poured by a non-significant 3%, although in comparison it was increased by 15% with the more expensive bottled water. The finding was interpreted as indicating that the response was not to the size of the container as such but rather to the perceived value of the item. The effect of the size of packaging did not occur when it did not have an implication for the perception of unit cost.

The suggestion was that it was the unit cost that was the driving mechanism rather than the size of the container. The importance of unit cost was confirmed in a third study where more cooking oil and cleaner were used when it was said to have been sold at a discount rather than full price. Thus, the size of packing influenced the amount used, irrespective of the amount of the product that was kept constant.

It seems that bulk buying increases consumption of many products as more is removed from a larger container. As many of these data have been driven by a marketing perspective, the interest is in a single food item. The broader question of

the impact of buying in bulk on the overall diet has been ignored. Whether it matters if you eat more of one food item will depend on the impact on the overall diet and whether there is energy compensation resulting from a decrease in the consumption of other food items? Equally, although there may be a short-term response to bulk buying, it is unclear if it persists over time. Alternatively, satiation may occur resulting in consumption returning to baseline values or possibly declining further. It is an obvious suggestion that you can get too much of a good thing.

### **2.9.1 Plate Size**

Wansink and Wansink (2010) pointed out that the consumption of about 70% of calories involves the use of bowls, plates, glasses, or utensils such as spoons. There is clearly a great opportunity for the perception of a portion size to be systematically influenced by the nature of its presentation.

Smiciklas-Wright (2003) noted that in the USA in the 1980s the typical dinner plate was 25 cm whereas in the 2000s it was 30 cm, an increase in area of 44%. A frequent recommendation is that the use of a smaller plate will help to contain energy intake, a suggestion offered in the United States by the National Institute of Health and the Department of Agriculture, Center for Nutrition Policy and Promotion. This presumption that a smaller plate is beneficial has, however, been subject to very little systematic study.

The size contrast illusion refers to apparent differences in the size of identical objects depending on the context in which they are placed. In this context, the size of the plate would be predicted to be influential. A group of nutrition experts served themselves with ice cream after being given a smaller or a larger bowl and either a smaller or larger ice cream scoop. The larger bowl resulted in a 31% increase in serving size and

the larger scoop increased the serving by 14.5%. If cough medicine was given using a larger spoon, the amount poured was 11.6% greater than recommended, yet they underdosed by 8.4% when using a medium-sized spoon (Wansink & Wansink, 2010). However, on different days, Rolls et al (2014) served the same lunch on plates of a different size and found it had no effect on energy intake. Steenhuis and Poelman (2017) similarly compared the influence of a large or small plate on the energy consumed at lunch by those who were of normal weight or who were obese. In neither group did the size of the plate influence the energy consumed. It is unclear whether the nature of lunch, with a range of small items, influenced these findings. It is also unclear whether the same finding would have resulted if a main meal of a few components was considered. The only mildly supportive data come from Vozzo et al. (2003) who monitored the amount of pasta consumed by pairs of females when supplied with either individual or shared serving bowls. Those who shared a served bowl ate less although this effect only occurred when the food was eaten from small plates.

There is some evidence that the size of the serving spoon may be influential. Marchiori et al. (2011) placed a large bowl of M&Ms on the front desk of an apartment building. On some days, a spoon was used to obtain a serving and on other days a quarter-cup scoop was available with a volume four times that of the spoon: more was taken when the scoop was larger.

Although the use of small plates is widely believed to result in a smaller food intake, it is based on very little research and that which exists is mainly negative. A possible message is that this is not an area where individual factors, such as plate size, should be explored in isolation; general statements are unlikely to be valid. We need to know whether any effect of plate size depends on the social situation, the nature of the food

being eaten, and the type of person being studied, whether for example, they are obese or restrained eaters.

In the United States, the average portion size consumed by children under 2 years of age did not change from the 1970s to the 1990s (Fisher & Kral, 2008). Although, in contrast the portion sizes consumed by children older than 2 years, in particular drinks, had increased. An increase has also been reported with the most commonly consumed foods.

Fisher and Kral (2008) examined surveys of children aged 1–2 years of age and related portion size to energy intake and body weight and found that the average portion size was positively related to both. Later they similarly considered children aged 2–5 years and reported that the average portion size was the single best predictor of energy intake.

In the United States, Fisher and Kral (2008) considered a random sample of children from 4 to 24 months of age. There was a negative correlation between the number of times that eating occurred and portion size. There was also a negative relationship between the energy density of the food and portion size. In younger children, less was eaten when the energy density was greater, although this did not occur in toddlers. They concluded that there was energy self-regulation in children of this age.

A relationship between energy intake and portion size has been found although such correlations are liable to different interpretations. Energy intake necessarily reflects factors other than portion size, for example, the frequency of eating and the energy density of the items consumed. Again many of these data reflect surveys of the amount eaten rather than the amount that could be potentially eaten: that is portion size was not recorded.



An exception was the study Levitsky (2005) who recorded the food intake of children 4–6 years of age, for 5–7 days. They found that the best predictor of the amount of a food eaten was the amount that was served, although usually the amount eaten was less than the amount served. However, again causality cannot be assumed as the child might have influenced the serving size by indicating how hungry they were, or they may have accepted or rejected the offer of a second serving.

## **2.10 Overview of customer retention**

Khan (2013) defines retention as a commitment to continue to do business or exchange with a particular company on an ongoing basis. Retention as defined by Ndubisi (2007) is the customers' emotional-cognitive constructs (such as liking, identification, commitment and conviction), as well as their behavioral intention (thus their readiness to recommend, and their repurchase intentions) of a product or service. According to Khan (2013), customer retention is deeply held commitment to rebuy or repurchase a preferred product or service consistently in the future, despite situational influences and marketing efforts having the potential to cause switching behaviour. Khan (2013) defines customer retention as the propensity of the customer to stay with their service provider.

Ndubisi (2007) state that customer retention occurs when customers continue purchasing a product or service over an extended time. For products with short purchase cycles, they define customer retention as occurring when the customer continues to purchase the product or service over a specified time period. For products with, long purchase cycles, they define customer retention as taking place when 'the customer indicates the intention to purchase the product or service at the next purchase occasion'.

Many organization are faced with the challenge to attract new customer. Therefore, they restructure their marketing plan or strategy and appoint managers who give attention to their existing customer (Willaims, 2006). For a hotel's growth and sustainability, customer retention is imperative. Consequently, it is the hotel's fundamental obligation to ensure that they have been able to fulfil the timely demands of customers in a positively unforgettable way. Whenever crises arise, they need to be abreast with the current situation and be able to respond in the bid of resolving such issues as soon as they happen. Hotel managements' aim to retain customers is the results of satisfying customers resolving their plights with regards to the patronage of a service or product as well as the feedback they give upon the usage or enjoyment of a product or service. In fact, retention should be the result of hotel organisations should they put good customer relationship strategy which is highly deliberate about customer feedback whether positive or negative as it will help the organisation improve its service offering and meet customers' expectations by serving customers with the best service or product (Kotler, 2001).

## **2.11 Dimensional effects of customer retention**

### **2.11.1 Intent to Switch**

An important dimension of customer retention is customer's intent to switch. Hotel customers may enjoy switching to different hotels when returning to the same destination (Kotler & Armstrong, 2006). Researchers in hospitality industries have indicated the importance of understanding the underlying causes of customer retention behavior and how it relates to customers' intent to switch Switching behavior of customers has been an important research area in banking and marketing. For example, Khan (2013) studied facets of customer satisfaction as explanatory cues for

the switching behavior of business customers. Khan (2013) examined the role of relationships between individuals and their banks in determining bank switching behavior. The intent of switch may be affected by many factors, such as loyalty and dissatisfaction that occurred as a result of defections (Kotler & Armstrong, 2006).

### **2.11.2 Loyalty**

Customer loyalty is defined as the likelihood of a customer's return to a hotel. A loyal customer may have emotional attachment to the hotel. Loyal customers are the principal drivers of profits as they continue to stay at a brand's properties. Ahmad and Buttle (2002) reported that guests who fit into the extremely loyalty cluster have high attitudinal attachment to the hotel, so that many are prepared to change the timing of their visit to ensure they are able to stay at their preferred property. They are also not as sensitive on pricing issues and are willing to pay more to stay in their favorite property rather than go elsewhere in favor of cheaper room rate. It has been found that brand loyalty customers also reduced marketing costs associated with attracting new customers. In addition, these customers say positive things about a company to others and frequently pay premium prices (Al-Msallam & Alhaddad, 2016). Ahmad and Buttle (2002) reported that in the luxury hotel segment among leisure travelers, overall satisfaction was significantly higher among repeat guests. This suggests that satisfying leisure travelers can pay off handsomely with higher rates and more repeat guests. Industry executives continue to emphasize "customer loyalty" as a key to sustaining long-term business success.

## **2.12 The role of food portioning in customer retention**

The hospitality industry is experiencing increased globalization, competition, higher customer turnover, growing customer acquisition costs and rising customer expectations, meaning that performance and competitiveness is significantly dependent upon their ability to satisfy and retain customer efficiently and effectively as argued by El-Adly (2019) and their ability to satisfy and retain customers is by listening to their reviews on product whether it being complaints or compliments. In the hospitality industry specifically the food and restaurant sector, the basic products which is food are very similar however how it is presented plays a vital role on what informs customers to return and do a repurchase. When comparing the same quality level, the customer focuses are on soft factor like personal treatment, personalization, one to one marketing and attention by the restaurant professions (Khan, 2013). The hospitality industry specifically the restaurant sector enjoys easy data access as the guests needs to register their name and address during check-in and in some countries especially in hotels that have a restaurant and during payment mostly if it is done via payment avenues excluding cash, guests even need to provide their passport data and more detailed private information. In addition, people are very likely to share their personal preferences with hotel and restaurant staff to make their stay more enjoyable since the servers will know his or her preference with regards to food and other services (Juanamasta et al., 2019).

The hospitality industry specifically the restaurant sector can make use of this database combined with software operations and give the guests or customer a unique experience and get their reviews or feedbacks on the service offered them. The restaurants can establish a close relationship with customers and meet their needs perfectly considering the feedbacks they give and the preference (Juanamasta et al.,

2001). In order to be able to compete on a highly competitive market, a restaurant has to meet every single customer's needs and expectations especially those high class restaurants. To do this, it is important to understand the aspects of business performance that persuade customers to become repeat purchasers and to give feedbacks on the service offered them while specifying their preference on food, how it is served, the components to the details of the garnishing because it costs about five times more to sell to a new customer than to an old customer according to Kotler and Armstrong (2006). To enhance customer retention or repeat purchases also known as revisit and to get the necessary feedback or reviews from customers on service provided them by restaurants on the food they serve, managers should focus on implementing very effective and efficient customer feedback mechanisms that aim to seek, gather and store the right information, validate and share it throughout the organization especially the kitchen staff so that every employee is well informed. Ahmad and Buttle (2002) asserted that to be successful in the market it is not sufficient to attract the new customers but to concentrate on existing customers by implementing effective policies for customers for retained customers to use recommendations or positive word of mouth is the best way to attract new customers.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

This chapter outlines the techniques, strategies and procedures used to collect and examine data for this research in order to make conclusive remarks for this study regarding the objectives of the study. This chapter comprises the research design, population of the study, sample size and sampling technique, sources of data, data collection instrument, ethical considerations and limitations to data collection.

#### **3.2 Research Design**

Kothari (2017) defines research design as the framework of events, procedures, techniques and strategies for collecting, examining and presenting data in the bid to answer research questions as well as achieve research objectives while considering all possible constraints such as time, cost and scope. The researcher adopted the descriptive and case study design synced with quantitative techniques for the study was used by the researcher in this study. Kothari (2017) defines a case study design as a study for medical research or social science that analyses data from a population or a representative subset a particular point in time. This research design was adopted to gather and examine responses in a more suitable, effective and efficient way from the representative subset of the population in the bid of answering research questions of this study.

Kothari (2017) list the advantages of this research design are as ease and flexibility in data collection, low cost and minimal time for data collection and gathering specific information using quantitative methods are some of its advantages. Kothari (2017) argues that the case study research designs comes with such advantages because it has

no time measurement, it depends on the prevailing variances rather than the change that follows an intervention, and select groups based on existing differences rather than haphazard apportionment.

Notwithstanding its suitability for this research, the case study design is disadvantaged on its static results which becomes unreliable with time because its findings are for the context of the study and does not tolerate changes that come with time. Despite its setbacks, the case study design was most suitable and highly effective design for this study with regards to cost and time.

### **3.2.1 Data source**

Kothari (2017) Data source is the location or setting where the data which was used for this research came from. In the context of this study, primary and secondary data were used to achieve the objectives of the study.

### **3.2.2 Primary data**

Saunders et al. (2003) defines primary data as an original data source which is collected first-hand by the researcher for a specific research purpose. Thus, a type of data collected by the researcher for a specific assignment. This happens because such information gathered from the primary data are original has not been collected by anyone or does not exist anywhere that can be accessed. Responses gathered from the questions designed in the questionnaires formed the basis for primary data and helped the researcher to make deductive conclusions as per the research objectives.

### **3.2.3 Secondary data**

According to Saunders et al. (2003), secondary data is the type of data collected or accessed from diverse source of published and unpublished documents whether electronic or physical that are easily accessible by the public and some upon request. Such data or information is not original because it has already been used for a specific purpose or assignment. The sources of secondary data for this study were articles, journals, reports, among others.

### **3.3 Target population**

Kothari (2017) defines a population as a well-defined collection of individuals or objects who possess common, binding and similar characteristics or traits. Thus, the entire group of people or objects to which the researcher wishes to generalise the study findings.

The target population of this research comprised of the employees in the selected restaurants especially the chefs as well as the customers thereof. The researcher selected this population because they were to provide some information for the researcher to answer the research questions and eventually achieve the research objectives.

### **3.4 Sampling size and sampling procedure**

According to Saunders et al. (2003), sample size is the subset of the target population of the study. Thus, the representative of the entire population of the study with whose responses the researcher will generalize the study. Since the research was specific about the strategies used by chefs, chefs of the selected restaurants were purposively sampled, also employees like sou chefs among other workers in the kitchen were also



sampled using convenience sampling. Also, the researcher adopted convenience sampling method to sample one hundred customers to whom research questionnaires were administered. According to Kothari (2017), convenience sampling is non-probability sampling method where the subset of the population chosen is based on the target population's proximity, availability, and accessibility by the researcher. These sampling methods were adopted because they aided the collection of primary data in a time and cost-effective way. The sampling technique was used to sample one hundred (100) customers to whom questionnaires were administered to gather the necessary data or information to conclude on the research having the purpose of the research in cognizance. Purposively sampled chefs and other employees were also given open and close ended questionnaires that requested for information in line with the objectives of the study.

### **3.5 Data collection instruments**

Saunders et al. (2003) argues that collection instrument is a tool used in the collection of data for research from its original source. The researcher designed close ended with 'Yes or No' as well as Likert scale questions which the respondents were required to choose from also the questionnaires that were issued to chefs and employees in the kitchen were open and closed ended questions which aided their expression on the subject matter in that regard.

Prior to the design of the data collection instrument there was a thorough review of literature undertaken by the researcher, after which related literature informed the questions that were designed because the literature was modified in a way that suits the presents studies and collected data that provided original data for the researcher to

conclude on the study. The questions hovered on the collection of demographic data as well as data relative to each objective or research question.

### **3.6 Data analysis and presentation**

Analysing data can be very challenging as argued by Kothari (2017). He explains that examining data collected and adding meaning to such information analysed information could be very daunting and at the same time fascinating to undertake. He adds that every meaning generated from the analysis is comparative and can take different forms. Analysing quantitatively may involve the use of descriptive statistics, classification of data as well as summary of such analysed data to make meaning regarding the purpose of the research.

This research was conducted by collecting data from the field using questionnaires. The data collected was later coded into SPSS for analyses. Data collected which was transformed and summarised to provide solutions to the research questions was presented in frequency tables and charts where descriptive statistics were employed to analyse the strategies in food portioning, factors that influence food portioning and the level of customer retention and regression analyses adopted to determine the effect of food portioning strategies on customer retention. The results were presented in tables and charts further discussed with existing literature to answer research questions and draw conclusions for the study.

### **3.7 Ethical consideration of the study**

The research had keen eyes for ethics and to ensure that the questions in the questionnaires that were administered to respondents were designed in a way not to intimidate any respondent. Secondly, prior to the administration of the questionnaires

the researcher approached respondents to seek their consent and so no one was forced to answer the questionnaires. All who participated did it out of their free will and convenience. Lastly, respondents were assured of the confidentiality of the information they gave in the questionnaires. The researcher played a great role in using the information gathered for academic purpose only and treating the information gathered from the questionnaires with utmost confidentiality.

## CHAPTER FOUR

### RESULTS AND DISCUSSIONS

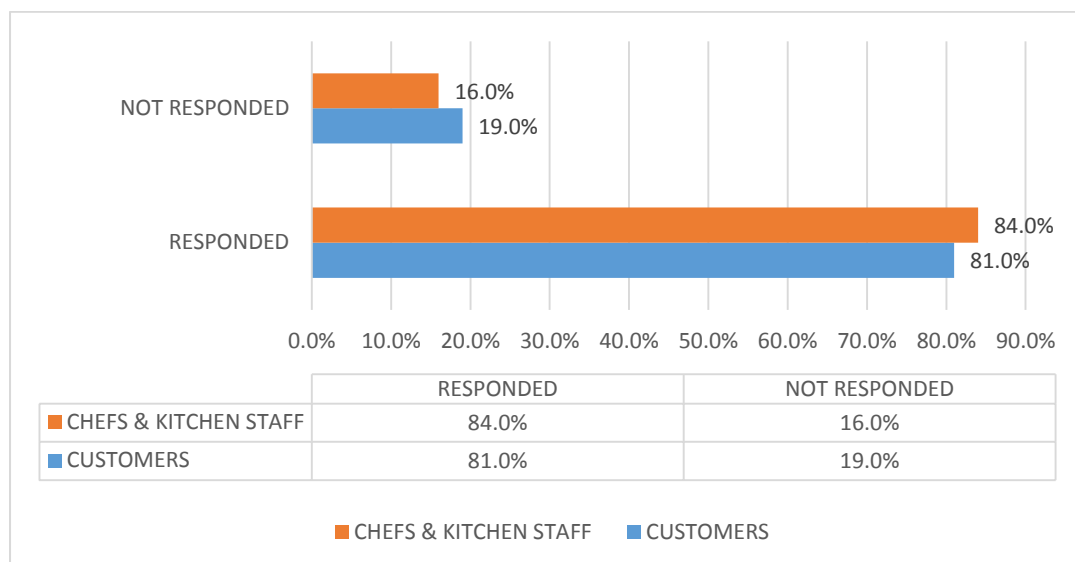
#### 4.0 Introduction

This chapter comprises the presentation and discussion of data collated on the effect of food portioning on customer retention. Data collected from participants of the study encompassed the demographic features of the respondents, chef's food portioning strategies, factors that determine food portion size as well as customer retention.

#### 4.1 Survey responses

Data was gathered from forty-two (42) chefs and kitchen staff as well as eighty-one (81) customers out of the fifty (50) chefs and kitchen staffs and one hundred (100) customers that were sampled for this study. Data collected were presented in tables and charts and discussed with the support of existing literature to draw meaningful conclusions for the study. The survey response is presented in Figure 1 below.

**Figure 4. 1: Number of respondents**



**Source: Fieldwork (2022)**

From Figure 1, 81% and 84% of the total respondents representing customers, and chefs and kitchen staff respectively filled and returned the questionnaires, while 19% and 16% of respondents representing customers and chefs and kitchen staff did not return the questionnaires. This implies that there was a good response rate which was used to generalize conclusions for the study.

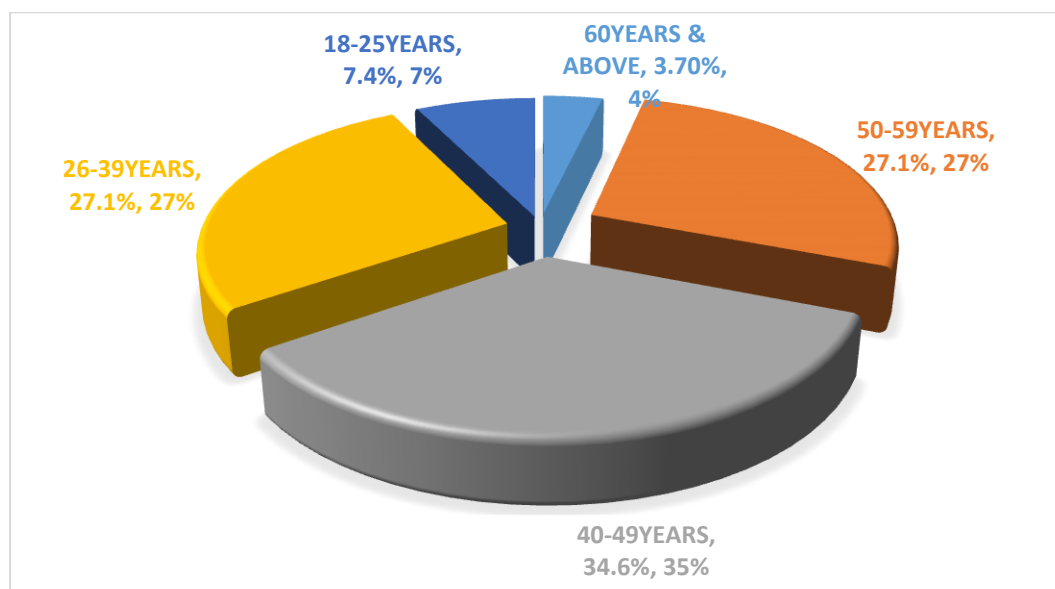
#### **4.2 Demographic characteristics of respondents**

Demographic features of respondents such as age, educational level, how long workers have worked there and the number of visits to the restaurant by customers were collected with the aim of confirming and assuring the validity of responses by ensuring maturity of respondents by age, the number of times they had visited the restaurant to confirm their experience at the restaurant and their educational level to confirm their literacy level.

#### **4.3 Age of respondents**

In assuring the qualification of respondents who filled and returned the questionnaires, responses gathered and presented in Figure 2 revealed that, 7.4% of the respondents were ages 18-26 years old, 27.1% were 26-39 years, 34.6% were between 40-49 years, and 27.1% were between 50-59 years and 3.7% of the respondents were 60 years and above. This shows that the respondents were matured and responsible and could share their independent opinions on the questions designed in the questionnaires.

**Figure 4.2: Age of respondents**

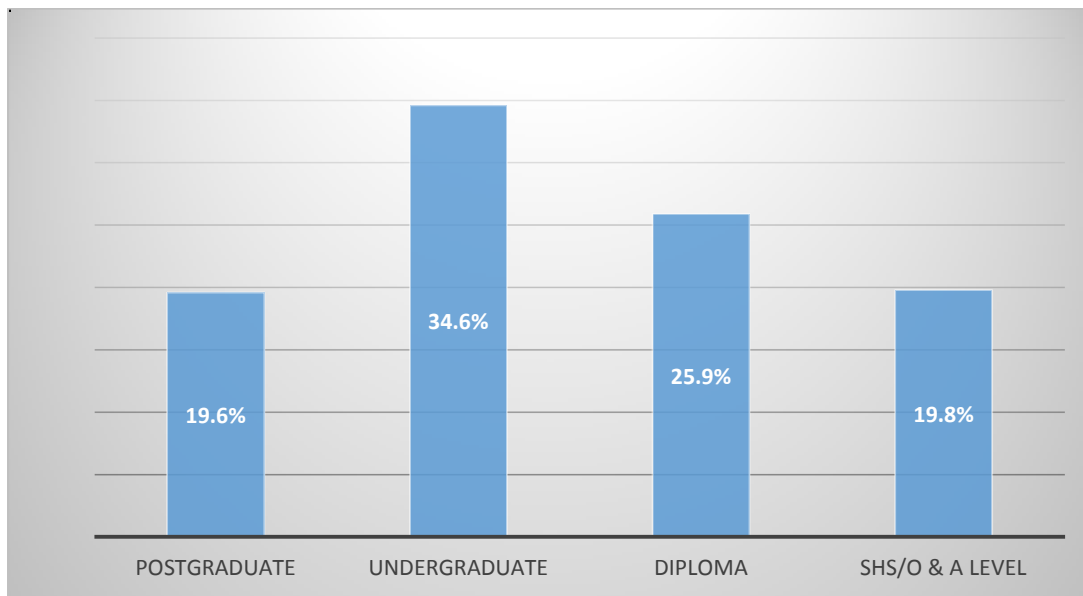


**Source: Fieldwork (2022)**

#### **4.4 Educational level of respondents**

An investigation into the educational level with the aim of confirming the literacy level of respondents revealed that, 19.6% of respondents had a senior high school or 'O'/'A' level education, 25.9% of the respondents had a diploma, 34.6% of the respondents had an undergraduate education and 19.6% of the respondents had postgraduate education. This implies that every respondent who participated in the study had some level of education, an indication that respondents could read, understand and respond to the questions designed in the questionnaires that were administered to them.

**Figure 4.3: Level of education**

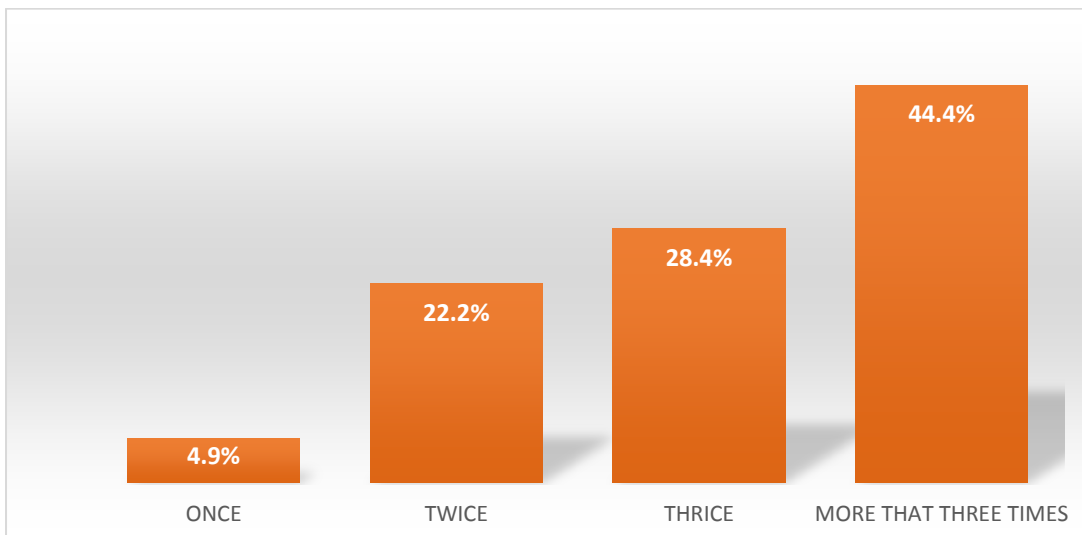


**Source: Fieldwork (2022)**

#### **4.5 Number of visit to the restaurant by the customers**

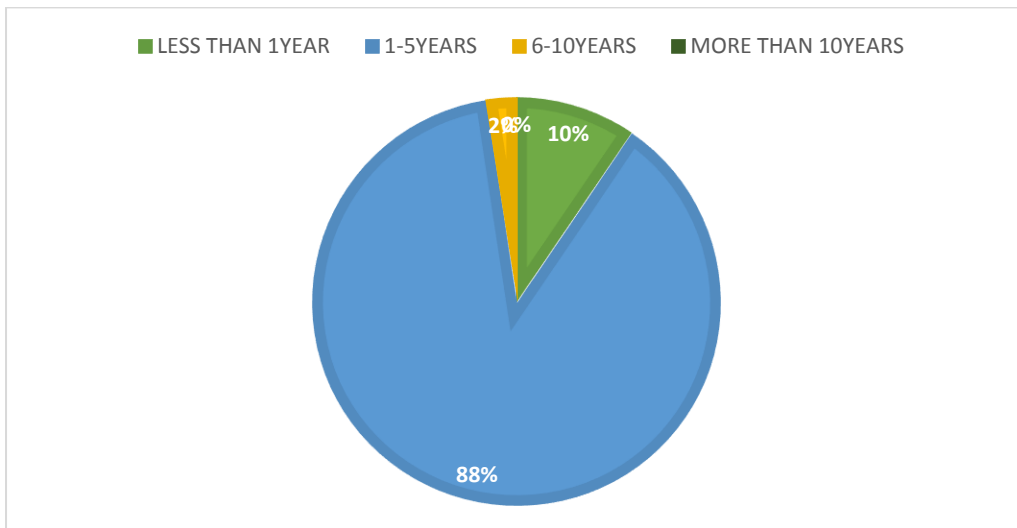
In confirming the respondents' experiences, they had had with the restaurant, responses on the number of times the respondents had visited the restaurant to enjoy their services revealed that 4.9% of the respondents had visited the restaurant once, 22.2% of the respondents had visited the restaurant twice, 28.4% of the respondents had visited the restaurant three times and 44.4% of the respondents had visited the restaurant more than three times. This indicates that, the respondents had had some experience with services offered at the restaurant per their number of visits. Also, this shows that the restaurant had a good rate of customer retention and customer loyalty due to the number of respondents who had revisited the restaurant to enjoy their service. This is presented in Figure 4 below

**Figure 4.4: Number of visit to the restaurant by respondents**



**Source: Fieldwork (2022)**

**Figure 4.5: Duration as an employee in the kitchen**



**Source: Fieldwork (2022)**

An enquiry into the duration of employees revealed that 9.5% of the respondents had worked at the restaurants for less than a year, a vast majority of 88.1% of the respondents had been employees at the restaurant for 1-5 years, with 2.4% of the respondents having worked at selected restaurants for 6-10years while none of the respondents had worked in the kitchen for more than 10 years. This reveals that



majority of the respondents had worked in the firm long enough to have some valuable information on the topic area to share their experience by filling the questionnaires.

#### 4.5.1 Findings on chef's strategies in food portioning

**Table 4.1: Findings on chef's strategies in food portioning**

Presented in percentages (%)	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The use of small dinnerware in serving food and keeping it simple	0.0	0.0	4.8	42.8	52.4
Choosing the right plates and using them as a portion guide.	0.0	0.0	0.0	16.7	83.3
Changing food and nutrition information labelling and product reformulation while using edibles garnishes and decorations.	4.8	9.5	19.0	28.6	38.1
Creating height on the plate rather than filling entire plate	11.9	26.2	7.1	31.0	23.8
Cutting meat horizontally for tender cut and to show off meat quality.	16.7	21.4	9.5	26.2	26.2
Playing with texture and contrasting colours to make the dish look more interesting.	4.8	9.5	9.5	35.7	40.5
Matching food presentation to restaurant's theme.	7.2	11.9	9.5	33.3	38.1
<b>Mean (<math>\sum fx/\sum f</math>)</b>	<b>6.5</b>	<b>11.2</b>	<b>8.5</b>	<b>30.6</b>	<b>43.2</b>

**Source: Fieldwork (2022)**

An enquiry into chef's strategies in food portioning revealed that 42.8% of the respondents agreed that they use small dinnerware in serving food to keep it simple, 52.4% strongly agreed while 4.8% were neutral with none of the respondents

disagreeing. This implies that majority of the respondents agreed that using small dinnerware in serving food and keeping it simple which corroborates with the findings of Robinson and Matheson (2015) who stated that the first strategy for portion control is the dinnerware or the serving bowl which gives the chef a rather limited space to present and garnish the food in the best way possible.

Responses gathered on chef's strategies with regards food portioning revealed that, 16.7% of the respondents agreed that, choosing the right plate and using them as a portion guide is a strategy they use in food portioning, and 83.3% of the respondents strongly agreed. This implies that the choice of a plate and its usefulness as a portion guide is a chef's strategy in food portioning which is in line with the result which supports the argument of Almiron-Roig et al. (2020) that even though there are some challenges that comes with choice of plates, it comes in handy as a portion guide and helps chefs with food portioning.

According to Roberto and Khandpur (2014), food labeling with regards to the nutrition, as well as garnishing is one of the strategies used by chefs for food portioning and in line with this statement is the results from the respondents with 28.6% and 38.1% of the respondents agreed and strongly agreed respectively that changing food and nutrition information labelling and product reformulation while using edible garnishes and decorations and while 19% of the respondents were neutral, 9.5% and 4.8% of the respondents disagreed and strongly disagreed respectively.

Robinson and Matheson (2015) opines that creating height on a plate does not only make food look attractive but helps with food portion control and in line with this assertion is the responses gathered which revealed that, a majority of 32% and 23.8% agreed and strongly agreed respectively that, creating height on the plate rather than

filling the entire plate is one strategy they use in portion control and while 7.1% of the respondents were indifferent, a minority of 26.2% and 11.9% of the respondents disagreed and strongly disagreed respectively. This implies that creating a height on a plate per the majority is a strategy used by chefs for food portioning.

Responses gathered on the chef's strategies in food portioning revealed that, a majority representing 52.4% of the respondents agreed and strongly agreed that cutting meat horizontally for tender cut and to show off meat quality is a strategy used by chefs in food portioning and while 9.5% of the respondents were indifferent, a minority representing 21.4% and 16.7% of the respondents disagreed and strongly disagreed respectively. This implies that tender cut that displays the quality of meat is a strategy for food portioning which is in line with the assertion of Divert et al. (2015) that claims that showing meat quality rather than its bulkiness through tender cut is a way chef's present food to control food portion.

Playing with texture and using colour blends in food presentation to make food look more interesting appeals to the eyes of customers and not only does it inform the quality of food but unconsciously makes them appreciate the need for food portioning (Divert et al., 2015). In line with this assertion is the findings of the study which revealed that, a majority representing 35.7% and 40.5% of the respondents agreed and strongly agreed respectively that, playing with textures and contrasting colours to make food look more interesting is one of the strategies used by chefs in food portioning and while 9.5% of the respondents remained neutral a minority of 9.5% and 4.8% of the respondents disagreed and strongly disagreed respectively. This implies that making food look interesting through a good combination of food texture and colours rather than just make it look bulky is a good strategy adopted by chefs in food portioning.

Theme plays a significant role in food portioning because not only does it inform the portioning strategies used in serving but it aligns reason for eating or food intake at a particular point in time (Ebster & Guist, 2005). In line with their assertion are the responses gathered for the study which showed that, a majority of 33.3% and 38.1% of the respondents agreed and strongly agreed that matching food presentation to the theme of the restaurant is a strategy used by chefs in food portioning and while 9.5% respondents were neutral, a minority of 11.9% and 7.2% disagreed and strongly disagreed respectively. This implies food presentation in line with restaurant's theme is a strategy used in food portioning judging from the majority of respondents.

#### 4.5.2 Findings on the factors that influence food portion size

**Table 4.2: Factors that influence portion size**

<b>Presented in percentages (%)</b>	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
Food unit and an understanding of calorie density	4.8	14.2	9.5	42.9	28.6
Expected satiety and satiation	19.0	28.6	4.8	21.4	26.2
Energy compensation and hunger fullness scale	9.5	19.0	4.8	23.8	42.9
Management policy on restaurant's food portion size	7.1	16.7	11.9	31.0	33.3
Size of the dinnerware (bowl, plate, glass, spoon, etc)	4.8	11.9	7.1	31.0	45.2
<b>Mean (<math>\sum fx/\sum f</math>)</b>	<b>9.0</b>	<b>18.1</b>	<b>7.6</b>	<b>30.0</b>	<b>35.3</b>

**Source: Fieldwork (2022)**

An enquiry into the factors that influence portion size revealed that, a majority representing 42.9% and 28.6% of the respondents agreed and strongly agreed respectively that, food unit and an understanding of calorie density, and while 9.5% of

the respondents were neutral, a minority of 14.2% and 4.8% disagreed and strongly disagreed respectively. This responses gathered corroborates with the assertion of Blake et al. (2015) that, understanding calorie density of each food company that will be served is important in weighing the food unit which informs the portion size.

Expected satiety and actual satiation is the initial reason for ingesting food and what mostly informs the size of food ate by an individual because for most part people would want to fill their belly once there is a hunger trigger (Ello-Martin, Ledikwe & Rolls, 2005). In line with this assertion is the response gathered which revealed that, 21.4% of the respondents agreed that expected satiety and satiation had an influence on portion size with 26.2% strongly agreeing and while 4.8% of the respondents remained neutral, 28.6% and 19% disagreed and strongly disagreed respectively.

Responses gathered on the factors that influence portion size showed that, a majority representing 23.8% and 42.9% of the respondents agreed and strongly agreed respectively that energy compensation and hunger fullness scale influences the portion size and while 4.8% of the respondents were neutral, a minority of 19% and 9.5% of the respondents disagreed and strongly disagreed respectively. This results corroborates the argument of Almiron-Roig et al. (2020) that, energy intake and its compensation plays a major role in food portion size.

One of the major players in the restaurant business with regards to whatever is served rest mostly at the managerial level and even though they may not be seen around the kitchen, management has a hand in the type of meal served and how it should be presented (Robert & Khandpur, 2014). This is in line with the responses gathered which revealed that, a majority of 33.3% and 31% of respondents agreed and strongly agreed respectively that, management policy on restaurant's food portion is a factor that influences portion size and while 11.9% of the respondents were indifferent, a

minority of 16.7% and 7.1% of the respondents disagreed and strongly disagreed respectively.

Responses gathered revealed that, a majority representing 31% and 45.2% of the respondents agreed and strongly agreed respectively that, the size of the dinnerware had some influence on the food portion size and while 7.1% of the respondents were neutral, a minority representing 11.9% and 4.8% of the respondents disagreed and strongly disagreed respectively. This implies that the dinnerware influences portion size which is in line with the assertion of Robinson and Matheson (2015) that the size on dinnerware is a strategy for portion control and the size of the serving plate highly determines the amount of food or food portion size that is served.

#### 4.5.3 Findings on customer retention

**Table 4.3: Customer retention**

Items	Presented in percentages (%)				
	Strongly disagree	Disagree	Not sure	Agree	Strongly Agree
I have not thought about switching to other hotels for the same service	14.8	18.5	9	2.2	4.6
I have visited more than one to enjoy their service	9.9	17.3	0	2.1	40.7
The hotel is committed to delivering quality service	7.4	9.8	11.1	5.9	5.8
The hotel service delivered meets my expectations always and sometimes exceeds my expectation	5.0	1.0	7.4	4.7	9.9
I pride over their corporate image	3.5	3.5	7	7.2	32.1
I am a loyal customer and would want to revisit to enjoy their services.	1.1	4.8	9	9.6	4.6

I enjoy their professionalism and their swiftness to respond to service failure	1.1	1.0	2	3.5	3.2
The value created by the restaurant through food service and presentation is worth paying for.	4	7.3	9	2.1	3.3
I plan on visiting again.	2.3	2.2	0	7.2	3.3
I trust their service quality and I recommend it to other people	7	4.8	2.5	3.3	0.7
<b>Mean (<math>\sum fx/\sum f</math>)</b>	<b>1.2</b>	<b>9.0</b>	<b>6.6</b>	<b>7.8</b>	<b>5.4</b>

**Source: Fieldwork (2022)**

An enquiry into the level of customer retention at the selected restaurants revealed that 22.2% of the total respondents agreed that they had not thought about switching to other restaurants for the same service, 34.6% of the respondents strongly agreed, 9.9% of the respondents were not sure, 18.5% of the respondents disagreed and 14.8% of the respondents strongly disagreed. This implies that majority of the respondents were okay with the services offered them and it had not even crossed their minds to switch to other competitors of the selected restaurants and this corroborates the assertion of Singh and Khan (2012) that customers who are satisfied with the services offered them tends to remain with the organization without the thought of trying the same service from competitors.

Responses gathered on customer retention revealed that 32.1% of the respondents agreed that they had visited the restaurant for more than once to enjoy their services, 40.7% of the respondents strongly agreed, and 17.3% of the respondents disagreed and 9.9% of the respondents strongly disagreed. This shows that majority of the respondents had visited the selected restaurants more than once to enjoy their services, a result that supports the argument of Omar, Azin and Sarah (2009) that

visiting a service provider for a second time to enjoy the services they provide means that customer's expectations of the service were met if not exceeded.

From Table 3, it was discovered that 25.9% of the respondents agreed that the selected restaurants are committed to delivering quality service, 35.8% of the respondents strongly agreed, 11.1% of the respondents were not sure, 19.8% of the respondents disagreed, and 7.4% of the respondents strongly disagreed. This indicates that majority of the respondents will vouch for the selected restaurants on their commitment to delivering quality services and this validates the assertion of El-Adly (2019) that, for customers to vouch for an organization's product or service then their expectations of the service before they enjoyed should have been met and that they plan to revisit or repurchase and also stand in to make recommendations to other people or potential customers.

Meeting or exceeding customer expectation is one of the way of predicting customer retention because any customer except they deliberately decide to enjoy the same service from random places will always stick with the service provider who meets or exceeds his or her expectations of the product or service (Omar et al., 2009). In line with this assertion are the responses gathered which shows that, 24.7% of the respondents agreed that the services delivered to them meets their expectations and sometimes exceeds their expectations, 30.9% of the respondents strongly agreed, 7.4% of the respondents were not sure, 21% of the respondents disagreed and 16% of the respondents strongly disagreed.

From Table 3, responses gathered on the level of customer retention level revealed that, 27.2% of the respondents agreed that they pride themselves over the corporate image of the selected restaurants, 32.1% of the respondents strongly agreed, 3.7% of the respondents were not sure while 23.5% of the respondents disagreed and 13.5% of



the respondents strongly disagreed. This implies that majority of the respondents acknowledged that they were proud to be customers of the restaurants and just as Juanamasta et al., (2019) puts it that, it takes a customer who has some attachment to an organization due to the quality of the product or service they offer to pride over the corporate image of the organization.

As part of customer retention is the intention of revisit or repurchase according to Singh and Khan (2012) and the responses gathered revealed that 29.6% of the respondents agreed that, they were loyal customers of the selected restaurants and would like to revisit to enjoy the services of the hotel, 34.6% of the respondents strongly agreed, 9.9% of the respondents were not sure, 14.8% of the respondents disagreed, and 11.1% of the respondents strongly disagreed. This implies that the selected restaurants had an appreciable customer retention level judging from the majority of responses gathered.

Perpetual acknowledgement of customers with regards to knowledge of staff about the services they offer, the level of professionalism and the swiftness the organization is at responding to service failure is one of the predictors of customer retention of an organization (Singh & Khan, 2012). The responses gathered revealed that, 23.5% of the respondents agreed that they enjoy the professionalism and swiftness of the selected restaurants to respond to service failures, 38.2% of the respondents strongly agreed, 6.2% of the respondents were neutral, 21% of the respondents disagreed and 11.1% of the respondents strongly disagreed, an indication that majority of the respondents enjoyed professionalism and swiftness of the selected restaurants in responding to service failures.

Customer's wish is to enjoy a service or buy a product which is worth the value they pay for. This is what determines whether customers' satisfaction because how much

any customer would pay for a product or a service is what informs his or her expectation of the product or service (Maisya et al., 2019) and in support of this statement is the response gathered for the study which revealed that, 32.1% of the respondents agreed that the value created by the selected restaurants through service is worth paying for, 33.3% of the respondents strongly agreed, 9.9% of the respondents were neutral while 17.3% and 7.4% of the respondents disagreed and strongly disagreed respectively.

Responses gathered as part of establishing the customer retention of the selected restaurants revealed that, 27.2% of the respondents agreed that they plan on visiting the restaurants again, 33.3% of the respondents strongly agreed to a revisit intention, 5% of the respondents were not sure, 22.2% of the respondents disagreed, and 12.3% of the respondents strongly disagreed. This implies that majority of respondents had a revisit intention and this validates the argument of El-Adly (2019) that, the confirmation of the revisit intention by customers is one of the factors that determine customer retention.

An investigation into customer retention level of the selected restaurants revealed that, 33.3% of the respondents agreed that they trust the service quality offered by the restaurants and would recommend it to other people, 40.7% of the respondents strongly agreed, 2.5% of the respondents were not sure, 14.8% of the respondents disagreed and 8.7% of the respondents strongly disagreed. This implies that the selected restaurants had an appreciable level of ambassadors, a result which supports the assertion of Juanamasta et al., (2019) that, for a customer to become an ambassador of a firm by making recommendations to other people, then the customer would have enjoyed the product or service for more than once to confirm the service quality in order to make recommendations to others.

#### 4.5.4 Finding on the effect of chef's portioning strategies on customer retention

**Table 4.4: Model Summary of food portioning strategies and customer retention**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.948 <sup>a</sup>	.898	.865	4.3381%

a. Predictors: (Constant), Food Portioning Strategies

**Table 4.5: ANOVA<sup>a</sup> of food portioning strategies and customer retention**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	499.543	1	499.543	26.544	.014 <sup>b</sup>
	Residual	56.457	3	18.819		
	Total	556.000	4			

a. Dependent Variable: Customer Retention

b. Predictors: (Constant), Food Portioning Strategies

**Table 4.6: Coefficients<sup>a</sup> of food portioning strategies and customer retention**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.156	3.314		1.857	.160
	Food Portioning Strategies	.692	.134	.948	5.152	.014

### **a. Dependent Variable: Customer Retention**

The model of chef's portioning strategies and customer retention at the selected restaurants shows that the proportion of total variability in the dependent variable which in this study is customer retention as explained by the independent variable which is chef's food portioning strategies reveals that 86.5% of variability in customer retention is explained by the food portioning strategies used by chefs. The overall correlation between food portioning strategies and customer retention is .948 with the R-squared of .898 as presented in Table 4. Therefore, chefs strategies used in food portioning have significant effect on customer retention of the selected restaurants.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECCOMENDATION**

#### **5.0 Introduction**

This chapter encapsulates the summary of major findings of the study, the conclusions which is aligned to the objectives of the study and make recommendations for policy framework as well as recommendations for further studies.

#### **5.1 Summary and conclusion**

From the findings of the study with regards to strategies adopted by chefs in food portioning in determining food portion size, it was discovered that chef's use small dinnerware in serving food so they can keep it simple, they choose the right plates and use it a portion guide, change food and nutrition labeling and product reformulation while using edible garnishes as decorations. Also, chefs created height on plates rather than filling entire plates, cut meat horizontally to show off quality, play with textures and contrasting colours to make food look interesting and match food presentation to the restaurant's theme which were the strategies the chefs adopted in food portioning. Base on the findings of the study, it can be concluded that the affore-listed strategies on food portioning was adopted by chefs of selected restaurants in food portioning.

From the findings of the study with regards to the factors that influence food portion size, it was discovered that, food unit and an understanding of calorie density, expected satiety and satiation, energy compensation and hunger fullness scale are factors that, influence food portion size. Also, it was discovered that the size of the dinnerware as well as the policy of management on food portion size was very influential in determining food portion size. Based on this findings, it can be concluded that portion size is determined by several factors among the significant

factors being the size of the dinnerware as well as the food unit and an understanding of calorie density.

From the findings on customer retention, it was discovered that customers had not made the intention to switch to other restaurants, customers had visited the selected restaurants several times to enjoy their service, because the restaurants were committed to delivering quality service that met or exceeded the expectations of customers. Also, enjoyed the professionalism and swiftness of the restaurant to respond to service failure and therefore customers enjoyed value for money, had pride in the restaurants' corporate image as they planned on visiting again and trusted the quality of the service provided by the restaurants enough to recommend it to other people.

On the effect of chefs' food portioning strategies on customer retention, it was discovered from the findings of the study that, the percentage of total variability in customer retention as explained by chef's food portioning strategies showed that 86.5% of variability in customer retention is explained by the food portioning strategies used by chefs with the overall correlation between food portioning strategies and customer retention being .948. Based on the findings, it can be concluded that chefs strategies used in food portioning have significant effect on customer retention of the selected restaurants.

## **5.2 Recommendations**

From the results of the study on chefs' strategies in food portioning, it was recommended that the chefs can use the strategies to control portion size which will not only help customers health and weight management but improve nutrition and help the restaurant to efficiently utilize food unit and calorie density of the food they

serve. Additionally, chefs can adopt these strategies and should acquire the dinnerware among other equipment that helps them to fully portion food as that will help the restaurants to stand out and naturally it helps manage the food portion and nutrition of customers in line with health and weight management.

On the factors that influence food portion size, it was recommended that, these factors can be a source of education to other restaurant staff especially waitresses who come in contact with the customers so that they are well informed to get feedbacks and respond to feedbacks on food portion size should the need arise. Also, such factors can be wholesomely attributed to the theme of the restaurant such that anything that is served and how it is served has a reason tailored to the portion size, the ingredients used and the nutritional quality or input of the food in line with the health needs of the customers.

From the results of the study on customer retention, it was recommended that the management and staff of the selected restaurants should maintain if not improve the level of customer retention by diversifying their services and ensuring the perpetual delivery of quality food service, maintaining or improving the meals served, their professionalism and swiftness in response to service failures and offering quality food or restaurant service that meets or exceeds the expectation of the customers as that will improve the image of the restaurants that customers pride themselves with and increase the trust of customers in the quality of service and the nutritional and health benefits of the meal served by the restaurants which will inform their continual recommendations to others.

Lastly, on the effect of chefs' strategies in food portioning on customer retention, it was recommended that, management of the selected restaurants can take advantage of such phenomenon and use strategies in food portioning as one of the ways to retain

customers and rely on the strong correlation between food portioning strategies and customer retention to drive up customer loyalty to the restaurants since it was concluded that chefs' strategies in food portioning is a major predictor of customer retention. Therefore, it is expedient to use food portioning strategies as a tool to increase customer retention.

### **5.3 Suggestion for further research**

This study was limited in geographical scope as due to the limited time available to the researcher. However further research could be done to involve more restaurants from different areas in order to make strong and general conclusions on the topic area. Also, the study is conclusive on its objectives, and the diversity to food portioning can take different routes in research, therefore further studies could be carried out on the following topics in order to strengthen and validate the conclusions made for this study. The suggested topics are as follows:

1. The role of food portion size in weight management in the drive for customer loyalty.
2. The influence of quality food service with regards to portion size on customer retention and loyalty.
3. The role of food portioning strategies in the nutritional needs and recovery of patients in the hospital in the introduction of a new product or service in the hotel industry.



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## APPENDIX

### QUESTIONNAIRE FOR CHEFS AND KITCHEN STAFF

#### AKENTEN APPIAH-MINKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT

##### Introduction

The researcher is a final year student of **Akenten Appiah-Minka University of Skills Training And Entrepreneurial Development**, conducting a study on the topic **“Chefs’ Strategies in Food Portioning and Its Effects on Customer Retention”**. This is part of the requirement for the fulfillment of the award of M. Tech in Catering and Hospitality. Therefore, I humbly request that you spare some of your time and fill in this questionnaire. Please be assured that all information you give will be strictly for academic purposes and will be treated with great confidentiality. Thank you.

##### SECTION A: BIO DATA

1. **Gender**      Male [ ]                      Female [ ]
  
2. **Age** 18-25 [ ]    26-35 [ ]    36-45 [ ]    46-55 [ ]    56-65 [ ]    >60 [ ]
  
3. **Educational level** SHS/O & A Level [ ]      Diploma [ ]    Undergraduate [ ]  
Postgraduate [ ]
  
4. **How long have you worked here and in this position?** >1yr [ ]    1-5yrs [ ]      6-  
10yrs [ ]    <10yrs



## SECTION B: CHEF'S STRATEGIES IN FOOD PORTIONING

Please indicate from the scale the strategies you adopt in food portioning

Food portioning strategies	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The use of small dinnerware in serving food and keeping it simple					
Choosing the right plates and using them as a portion guide.					
Changing food and nutrition information labelling and product reformulation while using edible garnishes and decorations.					
4. Creating height on the plate rather than filling entire plate					
5. Cutting meat horizontally for tender cut and to show off meat quality.					
6. Playing with texture and contrasting colours to make the dish look more interesting					
7. Matching food presentation to restaurant's theme.					

**SECTION D: FACTORS THAT INFLUENCE PORTION SIZE**

Please indicate from the scale the factors that influence portion size in your restaurant

Challenges	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. Food unit and an understanding of calorie density					
2. Expected satiety and satiation					
3. Energy compensation					
4. Management policy on restaurant's food portion size					
5. Hunger fullness scale					
6. Size of the dinnerware (bowl, plate, glass, spoon, etc)					

## QUESTIONNAIRE FOR CUSTOMERS

### AKENTEN APPIAH-MINKA UNIVERSITY OF SKILLS TRAINING AND ENTREPRENEURIAL DEVELOPMENT

#### Introduction

The researcher is a final year student of **Akenten Appiah-Minka University of Skills Training And Entrepreneurial Development**, conducting a study on the topic **“Chefs’ Strategies in Food Portioning and Its Effects on Customer Retention”**. This is part of the requirement for the fulfillment of the award of M.Tech in Catering and Hospitality. Therefore, I humbly request that you spare some of your time and fill in this questionnaire. Please be assured that all information you give will be strictly for academic purposes and will be treated with great confidentiality. Thank you.

#### SECTION A: BIO DATA

**Gender**      Male [ ]                      Female [ ]

**Age**    18-25 [ ]      26-36 [ ]      36-45 [ ]      46-55 [ ]    56-65 [ ]    >60 [ ]

**Educational level**              SHS [ ]    Diploma [ ]    Tertiary [ ]      Postgraduate [ ]

**Number of visits to restaurant**    Once [ ]    Twice [ ]              Thrice [ ]    More than  
three times [ ]

#### SECTION E: CUSTOMER RETENTION

Please indicate from the scale the factors that influence portion size in your restaurant

ITEMS	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
	I have not thought about switching to other restaurants for the same service				
I have visited this restaurant more than one to enjoy their service					

The restaurant is committed to delivering quality and nutritious food service for weight management					
The restaurant service delivered meets my expectations always and sometimes exceeds my expectation					
I pride over their corporate image and theme as well as the nutritious portions served over quantity.					
I am a loyal customer and would want to revisit to enjoy their services.					
I enjoy their professionalism and their swiftness to respond to service failure as well as anything that regards their food service.					
The value created by the restaurant through quality and nutritious food service is worth paying for.					
I plan on visiting again because I believe they have my health needs through food nutrition at the heart of their service delivery					
10. I trust their food portioning and know that it offers good health and helps me manage weight and therefore would recommend it to other people					

**THANK YOU**