Master thesis

Use smaller cooking pans!?

"Does the size of a cooking pan and the shape of food influences the amount people cook for dinner?"

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March 2014

Wageningen University

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Summary

Objective
This study is conducted to investigate if different sizes of cooking pans and shapes of food influence the amount to prepare for dinner. Since extensive research is done towards the stage of serving and consuming food and barely any research towards the moment of preparing a dinner, this study focus on this stage to figure out why consumers prepare a certain amount of food. Nowadays there is a significant amount of food waste in the world, next to this consumers have the tendency to eat more than necessary which can cause overweight and obesity. To investigate the moment of cooking in relation to the underlying issues of food waste and overeating, the following problem statement is investigated:

"Does the size of a cooking pan and the shape of food influence the amount people cook for dinner?"

Method
In a between-groups experiment, 153 participants were randomly assigned to one of the four conditions; they were presented with either a large cooking pan or a small one, and either pasta of distinct shape or amorphous shape. By performing the first steps of cooking pasta diner for friends, data was collected on how these factors influenced the amount of pasta selected. Afterwards, participants filled in a questionnaire about the experiment and their own cooking experiences. Scales (e.g. uncertainty) were assessed on their reliability and a randomization check was performed to check whether participants were equally distributed across the conditions on key variables (i.e. gender, age, experience to cook for three persons).

Results
A series of Analysis of Variances showed that significant differences exist between the small and large cooking pan, and also between distinct and amorphous shapes of food.
Consumers tend to choose a larger portion if the cooking pan is larger, and a smaller portion in case the food is of amorphous shape. Different shapes of food also influence consumers in the amount of uncertainty they experience; as distinct shapes can be easily counted they generate a higher level of certainty. This can be linked with experience with the product. However, the size of the cooking pan has no direct influence on the uncertainty consumers experience. The combination of size of cooking pan with the shape of food gives no significant differences on the chosen amount. However, it does provide a significant difference based on fear of having too much for dinner.

Conclusions and implications
This study suggests that the size of a cooking pan significantly influences the amount consumers decide to prepare for dinner. Subsequently the shape of food, amorphous versus distinct, also influences the consumer significantly in their determination of portion size. . To prevent overcooking, consumers should become more aware of the effects of choosing certain types of cooking pans and how different shapes of food can influence the amount they prepare, serve and consume.

Preface

This master thesis is the product of six months research at the department of Marketing and Consumer Behaviour at the Wageningen University. This reports gives new insights about the stage of preparing a dish, focussed on the size of the cooking pan and different shapes of food. The underlying factors of this master thesis are the huge amounts of food waste in the world and the tendency of consumers to eat more than necessary. This study I did not perform completely on my own, but got help from several people who I would like to thank.

First, I would like to thank my supervisors of the Wageningen University, Erica van Herpen and Ellen van Kleef who helped me through the process the past six months. Their enthusiasm and dedication on this topic inspired me a lot, after every meeting I had a boost of new energy and matter to work on. Thanks for your tips and feedback towards my writing, implementation of the experiment and the evaluation of the founded data. Your support, advice and guidance made this thesis possible.

Next I also want to thank my family and friends for their never-ending support and interest towards my proceedings of this thesis. Whenever I wanted to, I could ask them to share thoughts and knowledge to gain new insights for the project. A special thank you goes to Stef with all his pep talks, lovely words and sayings how proud he is of me which made me realise that I can make a master thesis on my own, even though it is sometimes difficult.

Last but not least I would like to thank all 153 participants. With their time and help they made it possible to collect the data within a week, and made it a successful experiment. Their enthusiasm when they performed the experiment was very nice and inspiring, with interesting topics and results as outcome.

I hope you enjoy reading this report!

Klaartje Philipsen
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1. Background

Food waste is a global problem; on a daily basis food is thrown away. A study of the Food and Agriculture Organization (FAO) indicates that there is a worldwide food waste of 1,3 billion tons per year. Globally, one third of the products that is made for feeding consumers is thrown away (Gustavsson, 2011). The FAO defines food waste as "wholesome edible material intended for human consumption, arising at any point in the food supply chain that is instead discarded, lost, degraded or consumed by pests" (Parfitt et al., p. 3065, 2010). It takes place in every stage of the food supply chain, at the farm during harvesting until the final disposal of food in the trash bin of consumers. Not only food is thrown away without eating it, but also resources necessary to produce the food have been in vain which cause natural and monetary wastage (Parfitt et al., 2010).

Looking to consumers and their households, there are three different types of waste. Waste & Resources Action Programme (WRAP) (2009) makes the distinction of avoidable, possibly avoidable and unavoidable food waste. If you focus on (possibly) avoidable food waste, there is a main reason why households throw away food (Parfitt et al., 2010). People purchase more products than they actually consume, which cause the disposal of food that is over date and not used before the 'best before date'. The case that consumers purchase too much food makes people cook, prepare or serve too much. These leftovers are a result of, for example, not weighing the amount of rice before boiling (Parfitt et al., 2010).

These wastes are caused by consumers' lack of knowledge of amounts of rice or pasta they have to cook (Westerhoven & Steenhuisen, 2010). This can be caused by their current consumption norms, the amount of food people think they have to cook or eat. Consumption norms have changed over the last decades, they have become two to five times greater than their original size (Fisher & Kral, 2008). Large portion sizes are nowadays common in grocery stores, at restaurants and at kitchenware (Wansink, 2010). Since consumption norms are constantly changing, people find it difficult to estimate what a normal and appropriate portion is to cook and serve for the people participating during dinner (Wansink, 2010). Results of a survey among 1,200 households showed that 22 per cent of the respondents rarely or never consider the size of a portion while cooking and 32 per cent find it difficult to judge how much to prepare per person (LoveFoodHateWaste, 2011). Consumers have difficulty in estimating how much to prepare. This can cause overeating, since there is a relation between the portion size and the amount that is consumed (Diliberti, 2004). The effect of identifying large portions as appropriate portions can ensure that people eat more calories than they require on a day (Schwartz & Byrd-Bredbenner, 2006), since consumers generally eat what is served on their plate in front of them (Wansink & Cheney, 2005). So cooking too much during dinner can trigger overeating with the consequence of overweight/obesity or food waste by throwing away the food in the trash bin.

In previous studies (Parfitt et al., 2010; Westerhoven & Steenhuisen, 2010; Koivupuro et al., 2012; Monier, 2011), attention has been paid why food waste exists, in which amounts and what kind of consequences it has for the environment. If you particularly zoom in on food waste in households, the most common reasons of food waste are buying too much at the grocery store, which cause cooking, preparing and serving too much. Motives behind this food waste are mostly caused by lack of knowledge. Research why people prepare too much is done mostly at the serving and consuming stage; little attention is paid towards the moment of preparation (Wansink, 2004, van Kleef et al., 2012; Wada et al., 2007). The topic of shapes and sizes is extensively investigated at the serving and consumption stage. In particular, it has been studied how illusions affect people during eating and which sizes and shapes of bowls and spoons influence the amount they serve themselves (Wansink et al., 2005.) Other factors, like the eating and food environment, also received broad attention at the serving and consumption stage, but less at the moment of cooking. These cues might make consumers serve too much food on their plate, which can cause them to overeat (Wansink et al., 2006). Barely any research is done towards the size of the cooking pan and the effect it might have on the amount people cook. It may be conceived as logical that using a larger cooking pan results in a larger portion cooked, but is it obvious that the size of the cooking pan is the only influencing factor? People can estimate the amount to prepare on the size of the cooking pan, but other factors can also be of influence. Like for example if consumers have to prepare pasta with a shape they normally do not use, do different shapes of food give different amounts when preparing a dish? And does interaction of factors result into different effects?

2. Problem statement and aim

Since extensive research is done on the effect of shapes and dinnerware at the serving and consuming stage and little research on the moment of preparing a dinner, this paper will investigate the moment of cooking in relation to the underlying issues of food waste and overeating. The following problem statement will be investigated:

Does the size of a cooking pan and the shape of food influence the amount people cook for dinner?

The focus in this research will be on the sizes of a cooking pan that people use during cooking and on different shapes of food. Since people typically make an estimation of the needed portions to prepare instead of using measurement devices, such as a scale, they often do not prepare the appropriate amount. Knowledge about the appropriate amount to prepare is not sufficiently present, which can cause consumers using anchors instead. These processes often occur without consumers' awareness. The type of food product is probably also of influence, the same product in different shapes can provide different portions during the moment of preparing a dish. If people have to prepare dinner with products that are difficult to count, they can be more uncertain about how much to cook. If these shapes are combined with different sizes of cooking pans, the

possibility arises that an interaction effect exists. Different shapes of food in a small cooking pan give visually a different view compared to these shapes in a large cooking pan. Cooking too much food causes multiple options what to do with the leftovers: save food for later consumption, overeating or food waste by throwing the leftovers in the trash bin.

3. Research questions

To investigate whether the size of a cooking pan and the shape of food influence the amount of food that is planned to be cooked, the first two research questions are formulated. The last research question is formulated to investigate if an interaction effect exists between the two factors. The following research questions are formulated:

- *To what extent is there an effect of cooking pan size on the amount people prepare for dinner?*
- *To what extent is the unit size of shape of food of influence on the amount people prepare for dinner?*
- *Is there an interaction between the size of the cooking pan and the shape of food on the amount people prepare for dinner?*

This research has relevance, because there already exists a lot of information why people throw away such amounts of food, but it is unknown what is the exact reason why people still prepare too much. Insights derived from this study might be of use in the battle against food waste and eating too much. Organisations that are committed to reduce food waste can use results by providing tools or indicators for consumers how to reduce spoilage, and make clear which factors influence the amount prepared for dinner. Next to these organisations, companies can also make use of the results by changing packaging for serving the optimal portion, which leads to less food waste at households. For the next generation it is important to be clear which consumption norms are normal, and that consumption norms no longer grow in size. If consumption norms, food waste and the world population continue to grow, there is a possibility that in a couple of decades the world cannot deliver enough food to feed the world.

To answer the formulated research questions, a literature review and an experiment is executed. The paper will start with a literature review of what is already been investigated. An overview of relevant information will be shown, and as a result of the literature study a model is created which will be used for further investigation. Thereafter, a chapter will be included with description of the method and the set up and implementation of the experiment. Subsequently, results will be shown and conclusions will be given if different sizes of the cooking pan affect the amount of food cooked during dinner. Finally, limitations and recommendations for further research will be shown.

4. Theoretical background

In this chapter, a literature review will be given of what already is investigated in the scientific literature. This literature will be linked to making decisions in the environment of preparing a dinner, how consumers are influenced during this stage and why they still prepare too much. Finally, a conclusion will be given with a model, which can be used for further investigation in the experiment.

Extensive research (Wansink, 2004, van Kleef et al., 2012; Wada et al., 2007, Parfitt et al., 2010) has been done about the topics of serving, consumption and the disposal of food. Food waste arises when consumers cook, prepare and serve too much food. Monier et al. (2011) argue that consumers do not have the knowledge to use food effectively and do not know how much a normal portion contains. Janssen (2010) adds that consumers cook too much because of lack of time, presence of children during dinner, fear of not having enough food for fellow eaters, not making a grocery shopping list and sensibility of promotion deals in grocery store. Respondents of Janssens' research indicate that leftovers after dinner are the most thrown away food.

Multiple investigations (Parfitt et al., 2010; Westerhoven & Steenhuisen, 2010; Koivupuro et al., 2012; Monier, 2011) show reasons and consequences behind food waste, little research is done why people are biased during the moment of preparing a dinner. In the process of preparing a dinner, several steps need to be taken where consumers can be biased. During the stage of preparing a dinner, people can unconsciously be influenced by the environment or biased by factors like shapes and sizes.

4.1 Influence of the environment

During the moment of decision-making the surrounding environment is an important factor of influence, which unconsciously affects people. Environmental factors are of greater influence than people realize, consumers incorrectly believe that these factors only influence others and not themselves if they have to make food choices (Wansink et al., 2009). This also applies in consumer behaviour when preparing or consuming food. According to Wansink et al. (2006) are even the smallest things in the environment of huge impact to the amount that is consumed. Think for instance in subtle changes in the shape of a plate, the size of a package, or being distracted during the preparation of a dinner. To determine a link between the surrounding environment and the amount to prepare, the process of decision-making will first be explained.

4.2 Dual systems perspective on consumer decision-making

If consumers have to make decisions, they can do this in two ways: by conscious thinking about the topic or by relying on reflexes. This latter method of decision-making can be done using heuristics. Heuristics can be defined as "intuitive, rapid, and automatic systems" (Furnham & Boo, 2011), which "reduce the complex tasks of assessing probabilities and predicting values to simpler

judgmental operations" (Tversky & Kahneman, 1974). Some heuristics are taken consciously, more often it is unconscious decision-making. Most of the time, people do not reason in a logical manner if they have to define, identify and process the problems they encounter. This is because it would be impractical to reason every choice they have to make during life (Bazerman, 2008). Due to a shortage in time and information to consciously think about every topic, heuristics are often used to make decisions (Hoyer, 1984). Next to conscious thinking or relying on reflexes, the way people process situations can be formulated in two systems according to Kahneman (2003), into System 1 and System 2. The processes of system 1 are "typically fast, automatic, effortless, associative, implicit (not available to introspection), and often emotionally charged; they are also governed by habit and are therefore difficult to control or modify" (Kahneman, 2003, p. 698). The processes of system 2 are described as "slower, serial, effortful, more likely to be consciously monitored and deliberately controlled; they are also relatively flexible and potentially rule governed" (Kahneman, 2003, p. 698). The environment combined with heuristics let people more often make decisions that are based on System 1. Processing situations in this way can cause consumers making decisions too fast, which ensure that factors like the environment can bias consumers in their decisions. Before making the link between the 'automatic' decision-making and the surrounding environment, the topic of consumption norms will be elaborated.

4.2.1 Decision-making and consumption norms

Looking to the moment of preparation and consumption of food, consumption norms can be linked with 'automatic' decision-making. Consumption norms are about "a quantity (or a range) that is acceptable to consume" (Wansink, 2004, p. 458). People are influenced by factors that are mostly out of conscious awareness, which result into decisions that are taken relative automatic. An example can be provided during the moment of consuming food. Bigger plates to serve food on suggest greater consumption norms; larger plates imply that it is acceptable to serve more on your plate and eat more than if the food would be served and eaten from a smaller plate (van Kleef et al., 2012). These relative automatic decisions can also occur during the preparation of food. Consumers use quantities they normally cook; it is habitual for them to use these quantities. However, consumption norms gradually changed over the last decades, which can unconsciously have caused a larger prepared portion. This is partly due to the portions in the grocery store and at kitchenware, since it is nowadays common that these portions are larger (Wansink, 2010). Since the seventies, packages in larger sizes can be bought ten times more and the sizes of our kitchenware, like bowls, glasses and plates, steadily grown with 36% since the sixties. Even portions at recipes in cooking books are increased (Wansink & van Ittersum, 2007). Through slight changes in consumption norms it is difficult for consumers to notice changes, which make them feel that they did not eat more than previously.

4.2.2 Decision-making and environmental factors

Next to consumption norms can environmental factors be linked with 'automatic' decision-making. If you look at the consumption of food, consumers are (unconsciously) distracted. For example, consumers often do not focus anymore

on their internal cues of satiation, but let the external cues decide when they had enough food for dinner. People think they know when they have enough, however visual cues strongly affect these feelings. Take for instance the external cue that not listen to satiation, the phenomenon of 'clean your plate' which contains that consumers not stop eating until their plate is empty (Birch et al., 1987). Next to this phenomenon there are more environmental factors of influence why people eat more and not stop when they are full. These factors will be discussed using Wansinks' investigation about the topic of consumption volume and intake at consumers (Wansink, 2004). He found a variety of drivers that influence consumers at the moment of consumption, and these drivers are also applicable to the environment of food preparation.

According to Wansink (2004) can consumers be influenced at different environments, at the eating and food environment. First is the eating environment clarified, which contains the independent factors that can be associated with the consumption of food (Wansink, 2004). Social influences, effort and distraction are drivers that can be seen as factors of influence. The existence of other consumers can make a difference in cooking behaviour; people act different if they have to cook for familiar or unfamiliar people, or if they have to cook for an unfamiliar number of people (Wansink, 2004). It can also happen that people put more effort in cooking if it is a 'special' occasion, they pay more attention than when they normally cook which can result in cooking too much to be sure to have enough for dinner. And finally, if consumers are distracted during cooking, for example if a child who is begging for attention, different decisions can be made as when they totally focus on the moment of cooking.

Next to the eating environment are consumers also capable of being influenced at the food environment, which contains influences that can directly be associated to the way food is offered to consumers (Wansink, 2004). Wansinks' factors of salience of food, size of food portions and packages, the shapes of the serving devices and the structure and variety of food can also be applied to the preparation of food. For example the smell or vision of food that can stimulate hunger, which can cause larger portions to be sure to have enough food. Also the size of the package is of influence, since most people want to finish their package if it is almost empty, or that people like to pour larger amounts if the package is larger than normally (Wansink, 1996). The factors of shape of the serving devices and the structure and variety of food are explained more broadly below, to take a closer look on these factors to set hypotheses for further investigation.

4.3 Size of cooking pan

People believe that only others are influenced by environmental factors, they incorrectly believe that they are unaffected (Wansink, 2009). This also applies to the driver defined by Wansink (2004), the shape of dishware. During the preparation of food can this factor have effect on the amount people prepare. Different sizes of kitchenware can people make different decisions. Cooking for only two persons in small cooking equipment can result in having a different portion as cooking in larger cooking equipment.

These differences in portions can be linked with illusions; visual illusions can be a reason why people are unconsciously biased. Illusions can cause different decisions compared to situations when consumers would not be biased. Optical illusions can be defined as "an optical phenomenon that results in a false or deceptive visual impression" (Freedictionary, 2013). These visual illusions can bias consumers in their judgments and performances, without knowing that they are biased. Previous research (Wansink & van Ittersum, 2007; Wansink et al., 2005; Wansink, 2006) defined different types of visual illusions during the consumption stage. Like for example illusions which make food look relatively larger or smaller if they are served on certain types of serving device. Next to this illusion, two different types of illusions exist during the consumption stage and some may even also be applicable to the preparation of food. However, this investigation will only focus on the difference in preparation using a small cooking pan compared to a large cooking pan, since this is the first investigation in the direction of sizes of cooking pans and the preparation of food.

4.3.1 Vertical-horizontal illusion

The vertical-horizontal illusion is the first illusion that can bias consumers in their decision-making. This illusion reveals that people overestimate volume if the length of a vertical line relative to a horizontal line that has the same length. If people have the possibility to choose between a tall, narrow glass and a short, wide one, they will make the decision to take the tall, narrow glass. This is because they believe that a tall, narrow glass contains more liquid (Wansink, 2005). Years of experience of a bartender leads to a reduction of pouring too much in short, wide glasses, but the bias of pouring too much was not fully eliminated (Wansink & van Ittersum, 2003). Looking to the preparation of food, this illusion can create a bias at consumers due to the differences in sizes in kitchenware. Like for example, tall, narrow cooking pans can provide another view of poured quantity compared to cooking pans that are short and wide.

Figure 1. Vertical-horizontal illusion

4.3.2 Delboeuf illusion

Another illusion is the Delboeuf illusion. This illusion is about the relative size relationship between the two concentric circles. When consumers estimate the inner circle larger than its physical size, assimilation takes place, which can cause overestimation of portion size. If the inner circle is displayed away from the inducing circle, contrast takes place which cause underestimation of portion size (Van Ittersum & Wansink, 2007). Looking to the moment of serving, if people serve the same amount of food on a small and large plate, food on the large plate looks less, which can cause overeating since people generally eat what they served themselves (Wansink, 2005). If you look to preparing the food, this illusion can probably also be applied, since a portion looks different in a larger pan compared to a pan with a smaller size.

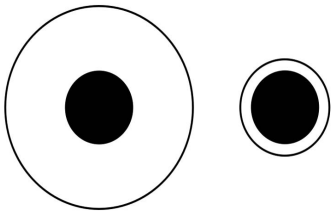

Figure 2. Delboeuf illusion

4.3.3 Size-contrast illusion

The last illusion is the size-contrast illusion, which can be clarified by the Ebbinghaus figure. Figure 3 shows that if a circle is enclosed by small circles it is perceived as larger than if the circle would be surrounded by large circles (Wansink, 2006). If people can serve their own ice cream in a bowl, the people who receive a larger bowl are inclined to serve more than people who receive a smaller bowl. Since people eat most of what they served on their bowl or on their plate, the larger bowls or plates can lead to eating a larger portion, without people being aware of it (Wansink, 2006). This illusion can probably also be applied on kitchenware, if a consumer only has small cooking pans and one large, the portion could give a biased view in the large cooking pan.

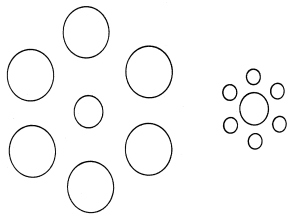

Figure 3. Size-contrast

Different sizes and shapes of kitchenware can influence consumers in their decisions they make during the preparation of a meal. The estimation of the amount of, for example, pasta prepared in a small cooking pan compared with a large cooking pan can be different if people have to estimate the portion by hand and cook pasta without weighting portions before boiling. In a large cooking pan, amounts can look smaller since the pan looks hardly filled which can cause an extra portion in the cooking pan, which finally can cause overeating or food waste.

H1: A large cooking pan makes people prepare more for dinner compared to a small cooking pan.

4.4 Shape of food

According Wansink (2004) is the last driver of influence, which can be applied on the moment of cooking, the structure and variety of food. Structure of food can bias people in their estimation how much to cook. Research of Wada et al. (2007) showed that the way food is cut can lead to overestimation of the portion. Portions of finely cut food are easily been overestimated, compared with the same amount that is not been cut (Wada et al., 2007). Applying this to the moment of preparing a dinner, different shapes of the same product can give different sizes of portions. Looking for example to the products with distinct shapes, like Mie nests where consumers most of the time take a certain amount of nests per person without considering the sizes of the nests. If these nests are made amorphous, the shape is different which makes people judge a portion differently. The difference in shape can bias consumers, since visually the portion looks different. Based to the thought of Wada et al. (2007), a portion of broken Mie nests perceptually looks greater and will be overestimated which cause smaller portions.

H2: Amorphous shapes of food make people prepare less for dinner than the same product in distinct shapes.

4.5 Uncertainty

Next to the environmental factors of size of the cooking pan and the shape of food can other reasons be determined why consumers prepare a certain amount for dinner. One of these reasons can be the factor of uncertainty. According to Westerhoven & Steenhuisen (2010) lack consumers knowledge and find it difficult to estimate how much rice or pasta they have to prepare for dinner (Westerhoven & Steenhuisen, 2010). Different sizes of cooking pans can be a factor of difficulty what the appropriate amount is to prepare, the same with shapes of food products. This difficulty can cause uncertainty at consumers in how much to prepare for dinner, which may result in larger amounts since people do not like to experience fear of having too little for fellow eaters (Janssen, 2010)

H3: The more a consumer feels uncertain, the more they prepare for dinner.

4.5.1 Uncertainty and size of cooking pan

Looking to the moment of preparing a dinner, the size of the cooking pan can be linked with uncertainty. If consumers have to make decisions under uncertainty during the preparation of food, anchoring can be a reason why consumers unconsciously take biased decisions. At these moments consumers can unconsciously adjust judgements by making use of an anchor. If decision makers are biased with the anchoring effect by making judgments, they are disproportionate influenced toward an initially offered value or point (Furnham & Boo, 2011).

In daily life, anchors unconsciously influence people. Looking for instance to the moment of purchasing products in the grocery store. Purchase limits can increase the number of units a buyer purchases, same with promotional sales with larger packages (Wansink, 1996). Larger packages are mostly less expensive per unit, which makes people willing to use more (Wansink, 1996). This can lead to the tendency of overstocking or overcooking, which can finally lead to eating a too large portion or disposal of the goods. Also during the consumption stage are people often unconsciously biased with the anchoring effect. People imitate behaviour of others during dinner, by anchoring the quantity to serve and consume that others take. They first look how much others serve, and than adjust it to their body type (McFerran et al., 2010). Generally, they eat more if others also consume more (McFerran et al., 2010). The anchoring effect of larger packages in grocery stores and the imitating behaviour of quantity to serve can probably also be of influence during the preparation of food. During this stage, consumers have to estimate portion sizes. To come to a portion size they first make use of their existing knowledge about portion sizes, which they subsequently unconsciously combine with anchors. To come to a final portion, adjustment towards a non-relevant reference point can take place by combining an anchor with a visual illusion or another environmental factor. Looking for instance to larger cooking pans, the size can cause doubt at people if it is really enough for dinner, if it is necessary to pour extra in the pan to make sure to have enough.

H4: Estimating how much one needs to cook leads to higher uncertainty in a large cooking pan compared to cooking in a small cooking pan.

4.5.2 Uncertainty and shape of food

Next to the size of the cooking pan can the shape of food also be linked with uncertainty. If these two factors are combined, a contradictory effect can be established compared to the previous hypothesis. The hypothesis of shape showed a positive effect on the amount to prepare, the combination of shape with uncertainty probably provide a different effect. Two different processes can emerge as reason why consumers unconsciously are biased, the process of monitoring and the process of unit bias. Monitoring is the first process and is about keeping up how much food you consume a person, which could reduces deviations between perceived and the actual consumed portion (Wansink et al., 2005). This is necessary, because our stomach is bad in counting how much we already have eaten. If we are not able to see what we already have eaten, it is easy to eat more than is necessary (Wansink, 2007). The other bias is caused by the heuristic of unit bias, which includes that "people seem to think that a unit of some entity (with certain constraints) is the appropriate and optimal amount" (Geier et al., p. 521, 2006).

These processes can also be applied to the stage of preparing a dinner, since consumers have to estimate how much to pour in the cooking pan. If consumers are able to monitor how much they already poured in the cooking pan, they will take a certain amount of pieces per person. If consumers have the possibility to count the product before pouring it in the cooking pan, they will be more certain about the chosen amount. Looking for example to the product of Mie nests, where consumers have the possibility to count the nests. This makes it for consumers easier to take a certain amount, which probably makes them more certain of the chosen amount. On the other hand, if consumers use products that have a shape with the characteristic that it is not countable, they have to estimate how much to take. A fixed amount, like three Mie nests per person, is in that situation not possible and the chosen amounts will every time be different. The estimation of amorphous shapes will probably be more difficult compared to the distinct shapes like Mie nests, which probably also cause more uncertainty.

H5: Using amorphous shapes of food during cooking leads to more uncertainty compared to using distinct shapes of food.

This means that shape of food can cause two contradictory directions. At the third hypothesis causes shape a larger amount with amorphous shapes. However, in the meantime cause amorphous shape more uncertainty, and the more uncertainty consumers experience the more they prepare. It is expected that the visual part is the decisive factor, since people often use visualization of how much a portion contains (Chambers et al., 2000).

4.6 Combined effect of cooking pan and shape of food

An interaction between the two factors, the size of the cooking pan and the shape of the food, is probably also present. As argued before give different sizes of cooking pans probably also different decisions at the moment of preparation, the larger the cooking pan probably the more consumers prepare and the more uncertainty occurs. Next to the sizes of cooking pans is the shape of food also of influence. Looking to the individual factor of the shape of food, two different processes can be distinguished. The first process is based on the perceptual view of amorphous shape. These shapes of food probably cause smaller amounts, since finely cut food perceptually looks larger which cause smaller amounts. However, another process is based on uncertainty. Amorphous shapes probably cause more uncertainty compared to distinct shapes, since finely made food is impossible to count which ensures consumers have to estimate and take a larger amount to be sure to have enough. This estimation at amorphous shapes is more difficult than counting the products, which cause more uncertainty and probably a larger portion.

If the factors of size of cooking pan and the shape of food are combined, there probably will arise an interaction effect which will differ between the amorphous and distinct shapes. At amorphous shapes will the combination with a small or large cooking pan gives larger effects compared to products of distinct shapes. Since consumers can count the product of distinct shapes, consumers probably take a certain amount of food during the moment of preparing a dish. This amount will be more or less the same in a small or large cooking pan, same with the amount of uncertainty that occurs. At amorphous shapes consumers estimate, which can cause differences if different sizes of cooking pans are used. A certain amount of finely cut food looks visually different in a small cooking pan, compared to a large cooking pan.

H6: The size of the cooking pan and the shape of food interact such that the portion size will be significantly influenced for amorphous shapes by the pan size, and will not be significantly influenced for distinct shapes.

4.7 Summary and conceptual model

The focus in this study is on the size of the cooking pan and the shape of food. Previous research showed the surrounding environment as an important factor of influence if consumers have to make decisions. Looking at the preparation of food, consumers often make decisions that are based on heuristics or System 1. These decisions are often automatic, intuitive and fast, which makes them susceptible to the influence of consumption norms and environmental factors. These automatic decisions let consumers make biased decisions. Decisions like this can possibly caused by visual illusions, (unconsciously) chosen anchors and by difficulty in monitoring how much food to prepare.

To investigate if consumers are influenced by the size of a cooking pan and the shape of food, multiple hypotheses and a model are created. To investigate if

visualisation is the decisive factor and to examine if there is a connection between the two factors of size of a cooking pan and the shape of food with the amount of food prepared for dinner, these different hypotheses will be tested. Taking all the discussed literature together, the following hypotheses and model will be examined:

H1: *A large cooking pan makes people prepare more for dinner compared to a small cooking pan.*
H2: *Amorphous shapes of food make people prepare less for dinner than the same product in distinct shapes.*
H3: *The more a consumer feels uncertain, the more they prepare for dinner.*
H4: *Estimating how much one needs to cook leads to higher uncertainty in a large cooking pan compared to cooking in a small cooking pan.*
H5: *Using amorphous shapes of food during cooking leads to more uncertainty compared to using distinct shapes of food.*
H6: *The size of the cooking pan and the shape of food interact such that the portion size will be significantly influenced for amorphous shapes by the pan size, and will not be significantly influenced for distinct shapes.*

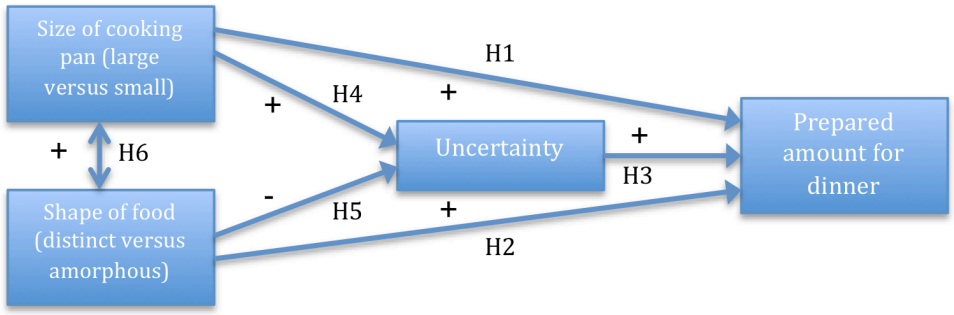

Figure 4. Theoretical model

5. Method

5.1 The experiment

In this chapter, a description of the method is given of which materials and procedures were used during this study. An experiment was conducted to test the hypotheses that were composed in the literature review. The experiment tested if the sizes of cooking pans are of influence on the amount people prepare for dinner. It also examined the shape of food and the effect if people can estimate the amount to cook by counting food products. At the end of the chapter is an analysis plan provided, with a reliability analysis based on the variable uncertainty.

The participants were randomly assigned to groups that experienced either a large cooking pan or a small one, and either products of distinct shapes or amorphous shapes. The experiment made use of two factors, which are "size of cooking pan" and "shape of food". Size of cooking pan refers to a factor wherein the participants used a large or small cooking pan. Shape of food refers to different shapes of food wherein the participant used distinct or amorphous shapes of food. The participants in the conditions with distinct shapes made use of Mie nests; participants in the conditions with amorphous shapes made use of disassembled Mie nests.

The design of between-groups is used, because the experiment wants to find out if differences and/or interactions exist between more than two groups, e.g. the effect between groups who used a large cooking pan compared to a small cooking pan and between groups who used amorphous shapes of food compared to distinct shapes.

The experiment was conducted in November 2013 in the basement of the Leeuwenborch building of the Wageningen University.

5.2 Participants

153 Dutch male and female students participated in the experiment. Only Dutch students participated, people with other nationalities were excluded since this investigation does not focus on differences in culture. The participants were randomly assigned to one of the four conditions; the "large cooking pan – distinct shapes of food" condition (N=38), or the "small cooking pan – distinct shapes of food" condition (N=38), or the "large cooking pan –amorphous shapes of food" condition (N=39) or the "small cooking pan – amorphous shapes of food" condition (N=38).

5.3 Choice of materials

The stimulus that is used in the experiment is pasta. Pasta is chosen, because it is a dish that is easy to prepare, and common food for students. Also, pasta is after rice the most thrown away food (Ventour, 2008). During the experiment, participants were asked to prepare the pasta by putting the chosen quantity of pasta in a cooking pan, like they would do in their own kitchen. Two different

variants were used for the experiment; one variant had the structure like Mie nests, the other variant contained disassembled Mie nests. Previous discussed literature found that people find it difficult to estimate how much to cook (Westerhoven & Steenhuisen, 2010), and consumers seem to believe that a unit of some entity is the ideal and appropriate amount to take and consume (Geier et al., 2006). The Mie nests and the disassembled variant are chosen, because it is almost the same product. The only difference is structure, which makes the products applicable for comparison. Mie nests are a product with the characteristic that it is of distinct shape; people mostly take a certain amount of nests per person. The amorphous variant is difficult to count, which makes people weight or estimate how much to prepare for dinner. Since it is the same product, the recommended amount to prepare for both variants is the same.

To decide which sizes of cooking pans are used, the Mean of a portion Mie is used. According to dietary guidelines of the Dutch National Food Consumption Survey is the consumption of pasta for males 250 gram a portion and 200 gram a portion for females (Fransen et al., 2011). During the experiment, participants had to prepare Mie for three persons. The assignment was to prepare Mie for three persons, consisting of two male eaters and one female eater, to avoid differences in interpretation. Cooking for three males can give differences in amounts compared to three females, since males generally eat more during dinner. The portion that needs to be prepared according the Mean consumption consists of 700 gram cooked pasta, which is 280 gram raw pasta. This portion is based on the fact that pasta becomes two and half times as heavy after boiling (Van Dooren et al., 1995). This raw portion of 280 gram had to fit in the small cooking pan; some extra space needed to be available that participants have the possibility to take a larger portion. Physical inability needed to be excluded in the small cooking pan. The large cooking pan needed to be as large, that there is just a bottom of pasta in the cooking pan when the portion of 280 gram is poured into the cooking pan. There is chosen to make use of a cooking pan with a diameter of 20 cm and a volume of 2,5 litre for the small cooking pan; the large cooking pan is a soup pan with a diameter of 24 cm and a volume of 6,5 litre.

Previous discussed literature found that the type of package influences consumers (Wansink, 1996). Since participants have to estimate the portion, any estimation based on the package should be excluded. Blanc household storage containers exclude estimation based on packaging with signs of weights, which made participants had to estimate the portion based on their own feeling. There is chosen to make use of a container with capacity of 4,5 litre, enough space for 900 gram of Mie. All the containers contain the same weight of the product of Mie, in order to prevent differences.

5.4 Procedure

The experiment was carried out in the basement of the Leeuwenborch building of the Wageningen University. Every person received a word of welcome and a short introduction before moving to one of the four cubicles, which contained of four tables separated by screens. The participant read first the given assignment, which is added in Appendix 1A, and then carried out the experiment. An amount

of pasta was chosen by the participant to pour into the cooking pan. After choosing the amount of pasta, the participant filled in a short questionnaire to measure his feeling about the chosen portion. After filling in the questionnaire, the participants were thanked for their cooperation by offering them a small gift. When the participants left, the amount of pasta was weighted and recorded on their questionnaire. The following pictures show the differences between the four conditions.

Figure 5. Large cooking pan – Distinct shape

Figure 6. Large cooking pan – Amorphous shape

Figure 7. Small cooking pan – Distinct shape

Figure 8. Small cooking pan – Amorphous shape

5.5 Measures

Appendix 1A contains the assignment that is used in the beginning of the experiment. This assignment is added to measure four out of six hypotheses. To find out if the size of the cooking pan and the shape of food is of influence during the preparation of food, participants had to perform a practical assignment. During this assignment, participants had to prepare pasta in the cooking pan for two males and one female. Afterwards the pasta was weighted and used in combination with the conditions to give answers on the stated hypotheses.

After performance of the practical assignment, the participants had to complete a questionnaire. Appendix 1B contains the questionnaire that is used during the experiment. The questionnaire is established based on a 'Likert scale, which is a rating scale where participants give their opinion in terms of agreement or

disagreement about a series of opinion statements, using a numerical scale to judge each statement (Perloff, 2010). With this method each underlying statement is assessed the same, using the same scale every question. A 7-point scale is chosen; it gives the participant the opportunity to indicate differences in their opinions, without being overwhelmed by too many answer options.

The questionnaire is used to measure different constructs. Uncertainty is one of these constructs, and is measured based on multiple questions since this construct cannot be asked in one question. By asking questions about the chosen quantity it is figured out if participants encounter certainty or uncertainty. Next to uncertainty are three other constructs measured, each based on one question. The other constructs are fear of having too much for three persons, fear of having too little for three persons and prior experience with the product.

Further, the first questions are asked to figure out if the participants are familiar with the product and like the product, to check if the outcomes of the different conditions are similar enough for comparison. Subsequently questions are asked about the cooking equipment they had to work with, the way the participants normally cook at home, some personal characteristics about food waste and the fear of heaving too little or too much for dinner to provide some background information. Finally, some general questions are asked about the participants, like cooking experience, their hunger level, their gender and age to have another check if the groups are similar enough for comparison.

5.6 Data analysis

After collecting the data of 153 Dutch participants, a data analysis is performed to convert the collected data into results. All data of the practical assignment and questionnaire are imported into the statistical program SPSS, which is common to use in social sciences. Before deeply analysing the data, a Factor Analysis and Reliability Analysis is performed to discover which combination of questions can be used to measure uncertainty. Also a Randomization check is performed if all the conditions are equal for further comparison. To achieve if hypotheses can be supported the Means and Standard Deviations (SD) are used to define similarities or differences between the four conditions. Next to these calculations, there is made use of Analysis of Variance tests (ANOVA) and regression analysis to compare different conditions and situations. These tests deliver outcomes to find out if relations are significant or not, which means supporting or rejecting the stated hypothesis. Finally, a calculation based on Preacher and Hayes' (2008) method is made to investigate if a Mediation Process exists between the size of the cooking pan/shape of food, uncertainty and the amount to prepare for dinner.

5.7 Reliability analysis

To check if the retrieved results are reliable for further investigation, some questions are formulated in a certain way to assure that the participants do not give contrary answers. To avoid misinterpretations of the results, these questions are first recoded in the program of SPSS into new variables.

To answer three out of six hypotheses, uncertainty is measured. To measure uncertainty, multiple questions are asked since this variable cannot be asked in one question. In this experiment, participants can encounter uncertainty during the moment of pouring the pasta in the cooking pan, if they have to estimate the amount to prepare for three persons. Questions to measure uncertainty are focussed on this moment. Looking to the assignment of the experiment and the moment of possible uncertainty, five different questions were formulated to measure uncertainty. To examine if these five questions together are the ideal combination to measure uncertainty, a Factor Analysis with Oblimin Rotation with Kaiser Normalization is conducted. The outcomes in Appendix 2A show that two components exist, based on Kaiser's criterion that the Eigenvalue needs to be at least 1. Next to Kaiser's criterion, the Scree Plot of Figure 9 shows that there are two components above the inflection point. This means that the five questions measure two different things, and the five questions together cannot measure uncertainty. Looking to the Rotated Component Matrix, the combination the following questions is chosen to measure uncertainty: "I am confident that this is the right amount of Mie for 3 persons", "I feel uncertain about my selected amount of Mie" and "I found it difficult to estimate the amount of Mie I had to cook for 3 persons". The questions "I am afraid I do not have enough Mie for 3 persons" and "I am afraid I have too much Mie for 3 persons" can be used to measure the fear of having too much or too less food for dinner.

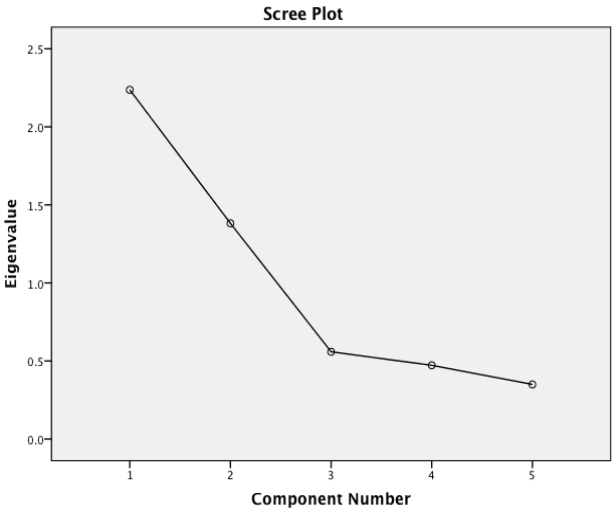

Figure 9. Scree Plot

A Reliability Analysis of the variable uncertainty was executed. A Cronbach α higher than 0,7 is an acceptable value for measuring uncertainty in a reliable way. In this dataset three items are used which gives a Cronbach α of 0,755. The Cronbach α was not improved by deleting one of the items, which makes the combination of the three items together a reliable scale to measure uncertainty.

6. Results

In this chapter, the results of the experiment are presented. First it was checked whether participants were equally distributed across the four conditions on different variables. Next is some background information of the participants presented. Afterwards, all hypotheses were tested, to find out whether they can be supported. Finally it was examined whether the participants experienced fear of having too much or too little for three persons, if prior experience is of influence and if a Mediation process exists between the size of the cooking pan/shape of food, uncertainty and amount to prepare for dinner.

6.1 Randomization check

In this experiment, 153 students participated, which were randomly assigned to one of the four conditions. Three participants were excluded from the database, since they did not meet the criteria for further investigation. During the experiment the weighting moment of one participant went wrong; the weight of the Mie was not recorded before the pasta was placed back in the storage container. Another participant did not behave according the instruction, since there was no Mie in the cooking pan after completion of the questionnaire. An outlier caused the last drop out, since all the Mie of the storage container was put in the cooking pan. Since the weight of 901 gram differs more than three times the Standard Deviation from the Mean (901 > 268.29+(3*100.626)), the participant is taken out of further processing. Excluding these dropouts, 150 valid participants that are aged between 18 and 32 remain, with 34.7% males and 65.3% females.

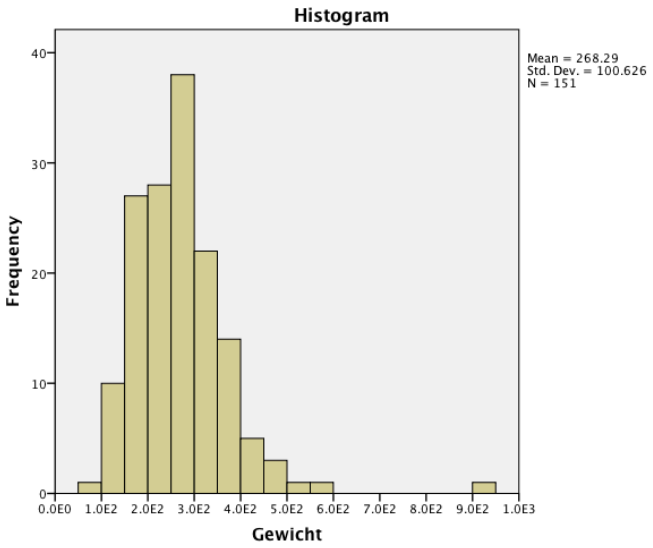

Figure 10. Histogram

To check if all the conditions were equally distributed on the variables of gender, age, experience to cook for three persons, the frequency of making bami and the amount of hunger the participants experienced during the experiment, a chi-square test and Analysis of Variances were conducted. No significant differences are found between the different conditions; also large deviations from the overall Mean are not found.

The chi-square outcomes of the variable of gender show that no indications of differences exist across the four conditions, since χ^2 (3)=.645, p=.892. Outcomes of the Analysis of Variance show also no indications of differences at the variable

age, since $F(3,146)=.814$, $p=.488$. At experience to cook for three persons are also no indications of differences found across the conditions, since $F(3.146)=2.023$, $p=.113$; same with the frequency of making bami, since $F(3.146)=.727$, $p=.538$. Finally, the outcomes of the variable of amount of hunger the participants experienced during the experiment also illustrate no indications of differences across the four conditions, since $F(3.146)=.809$, $p=.491$. As a result, comparison between the groups can be established as valid.

6.2 Background information

Some background information can be provided of the 150 participants that are aged between 18 and 32. Table 1 shows the Means and Standard Deviations.

Table 1. Mean & Standard Deviation background information

	Mean	Standard Deviation	N
How often do you prepare bami for dinner?	-.63	1.63	150
I enjoy having bami as food.	1.39	1.41	150
At home I make use of Mie nests when I cook bami for dinner.	.58	2.13	150
At home I make use of another variant of Mie (no nests) when I cook bami for dinner.	-1.21	1.81	150
At home I make use of storage containers if I have to store pasta.	-1.47	2.21	150
At home I make use of a scale when I have to cook pasta for dinner.	-1.49	2.06	150
When I cook bami at home, I count the number of Mie nests to cook.	.51	2.22	150
At home I pour the pasta directly out of the package in the cooking pan.	1.65	1.77	150
I do not like to throw away food.	1.77	1.52	150
I do not like to have insufficient food when I have people coming over for dinner.	2.31	.84	150
I do not like to overcook.	-.75	1.74	150

The product of Mie is a product that the participants like to eat. Previously was assumed that bami is a dish that is often been eaten by students, since it is easy to prepare. However, the results show that the dish is eaten once in a while. If the participants prepare bami at home, there is a difference in the shape they use. According to a Paired-Samples T-test, there is a significant difference between the two types of Mie, since $t(149)=6.761$; $p<.001$. The participants make use of the original Mie nests more often; different variants are less used. During the preparation of the pasta, most participants use another method than a scale to choose how much pasta to prepare; a scale is barely used. Some participants count the Mie nests at the point that they have to establish how much to cook, but the most used method is to pour the pasta directly from the package in the cooking pan. One of the participants indicated that the assignment was difficult to perform, because he normally estimate the portion according to the package and this time he had to estimates it out of a large storage container into a large cooking pan. If the participants have to store the (raw leftovers of the) pasta, they generally do not make use of storage containers.

In general, participants agree on the statement that they find it inconvenient to throw away food. According to a Paired-Samples T-test there is a significant difference between cooking too much or too less, since $t(149)=18.700$; $p<.001$. According the 150 participants, preparing too much food is not really a problem; they find it more difficult if they do not have enough food. One of the participants provided feedback that cooking too much is not really a problem, if it is stored and eaten on a later moment. Another participant indicated that he always saves

the leftovers for later. It is not a problem for him to prepare too much, it is more an advantage because he likes to eat the leftover next day for breakfast or lunch.

6.3 Hypotheses testing

Multiple Analyses of Variances are conducted to provide answers on the stated hypotheses. The Means and Standard Deviations of the Analysis of Variance based on the weight participants had chosen during the practical assignment are displayed in Table 2; also the Means and Standard Deviations based on uncertainty are displayed in this table. Other outcomes of this Analysis of Variance are incorporated into paragraph 6.4 and 6.5. A regression analysis is conducted to test the third hypothesis, and is elaborated in paragraph 6.5. To test the fear of having too much or too little, two Analysis of Variances are conducted and shown in paragraph 6.6. Subsequently paragraph 6.7 indicates the outcomes of the Analysis of Variance with covariate 'Experience' to tests if prior experience influences the amount of Mie and uncertainty. Finally, in paragraph 6.8 are the outcomes of Preacher and Hayes' Mediation calculations shown.

Table 2. Means & Standard Deviations Weight & Uncertainty

		Grams		Uncertainty	
		Mean	Standard Deviation	Mean	Standard Deviation
Large cooking pan	Distinct shapes	308.32	82.38	.00	1.17
	Amorphous shapes	258.38	94.79	.71	.90
	Total	283.35	91.71	.36	1.10
Small cooking pan	Distinct shapes	261.82	78.47	.43	1.34
	Amorphous shapes	228.79	73.35	.57	1.44
	Total	245.30	77.25	.50	1.38
Total	Distinct shapes	284.76	83.24	.22	1.27
	Amorphous shapes	243.39	85.34	.64	1.20
	Total	264.07	86.54	.43	1.25

6.4 Effects on amount to prepare

The outcomes of the first Analysis of Variance indicate that an effect exists between the size of the cooking pan and the amount participants chose during the practical assignment. Also an effect can be found at the shape of food and the amount participants choose. An interaction effect between the factors cannot be found.

The outcomes of the conducted Analysis of Variance test indicate that the two different sizes of cooking pans give different amounts during the preparation of a dish. The relation between the amounts of Mie in a large or a small cooking pan can be seen as significant, since $F(1.146)=7.967$; $p=.005$. The Analysis of Variance shows that the Mean scores between the two types of cooking pans are quite different. The participants who had to use the large cooking pan made on average use of 283.35 gram of Mie, the participants who used the small cooking pan made on average use of 245.30 gram of Mie. This means that the first hypothesis can be supported:

"A large cooking pan makes people prepare more for dinner compared to a small cooking pan."

The outcomes of the Analysis of Variance show that the difference between the different types of Mie is significant, since $F(1.146)=9.472$; $p=.002$. The Mean scores between the two different types of Mie are quite different. The participant who used the typical Mie nests made on average use of 284.76 grams of Mie, the participants who used the broken Mie nests made on average use of 243.39 grams of Mie. This means that the second hypotheses can also be supported:

"Amorphous shapes of food make people prepare less for dinner than the same product in distinct shapes."

Finally, to figure out if the hypothesis *"the size of the cooking pan and the shape of food interact such that the portion size will be significantly influenced for amorphous shapes by the pan size, and will not be significantly influenced for distinct shapes"* can be supported, an interaction effect needs to exist between the size of the cooking pan and the shape of food. Outcomes of the Analysis of Variance indicate that the relation between the size of the cooking pan and the shape of Mie is not significant, since $F(.146)=.394$, $p=.531$. This means that there is no interaction between the two factors, the hypotheses cannot be supported.

6.5 Effects on uncertainty

To discover if significant differences exist, if different sizes of cooking pans and different shapes of Mie are of influence on the amount of uncertainty consumers experience, an Analysis of Variance is conducted.

The difference between the two sizes of cooking pans has no significance difference, since $F(1.146)=.513$, $p=.475$. The outcomes in the experience of uncertainty between a small cooking pan and a large cooking pan are quite close to each other. Uncertainty scored in the large cooking pan a Mean of 0.36 (SD=1.10) on a scale of -3 to 3, participants experienced in the small cooking pan a little bit more uncertainty with a Mean of 0.50 (SD=1.38). This means that the hypothesis of *"estimating how much one needs to cook leads to higher uncertainty in a large cooking pan compared to cooking in a small cooking pan"* cannot be supported.

The size of the cooking pan does not influence the amount of uncertainty people experience if a small or large cooking pan is used. The results on the relation between uncertainty and the shape of Mie provide different results. Uncertainty scored higher at the participants who had to use the broken Mie nests during the practical assignment, this difference can be stated as significant since $F(1.146)=4.485$, $p=.036$. Uncertainty scored a Mean of 0.22 (SD=1.27) when participants used a distinct shape of Mie, the participants who used amorphous shapes gave uncertainty a score of 0.64 (SD=0.64). According to calculations of the Analysis of Variance based on the variables uncertainty and shape of food, hypothesis 4 can be supported:

"Using amorphous shapes of food during cooking leads to more uncertainty compared to using distinct shapes of food."

To figure out if an interaction effect exists between uncertainty, the size of the cooking pan and the shape of food, outcomes of the prior Analysis of Variance can be used. Outcomes indicate that the relation between uncertainty and the size of the cooking pan/shape of food is not significant, since $F(1.146)=2.016$, $p=.158$. This means that there is no interaction between the factors.

Finally, the last hypothesis to explore is the hypothesis that focuses on the topic of uncertainty in combination with the amount of pasta the participants chosen during the practical assignment. To discover if the hypothesis *"the more a consumer feel uncertain, the more they prepare for dinner."* can be supported, a regression analysis is conducted to provide more clarity about the distribution of weight and the topic of uncertainty. Outcomes indicate that a relation exist between uncertainty and weight. However, this negative relation with $\beta=-.138$ is with a $F(1.1498)=2.874$, $p=.092$, not significant, which means that the hypothesis cannot be supported.

6.6 Effects of fear on chosen amount

Next to uncertainty is the fear of having too much Mie or too little Mie for three persons another factor that can be investigated, which also can be applied to the size of the cooking pan and the shape of food. Two different Analysis of Variances are conducted with fear of having too much and fear of having too little as dependent variable. Fear of having too much is first further elaborated, later on is the fear of having too little explained.

6.6.1 Fear of having too much

Looking to the outcomes of the Analysis of Variance, which is based on the fear of having too much for three persons, same outcomes can be given of the size of the cooking pan and the shape of food. The fear of having too much for three persons is not of influence on the shape of food, since $F(1.146)=.001$, $p=.978$; at the size of cooking pan is also no significant difference found since $F(1.146)=.997$, $p=.320$.

Interaction effects can also be examined. The interaction effect between the size of the cooking pan and the shape of food based on fear of having too much for dinner gives a significant relation, since $F(1.146)=3.950$, $p=.049$. A significant interaction effect exists between the size of the cooking pan and the shape of food, based on the fear of having too much for dinner.

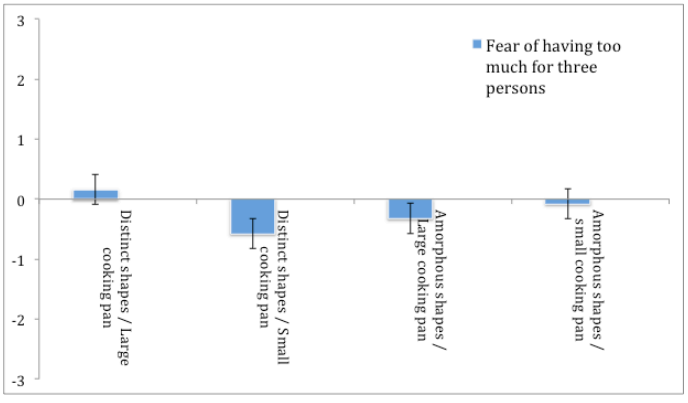

Figure 11. Fear of having too much for three persons

To test which interaction can be indicated as a significant relation, pairwise

comparisons are performed on the variables size of the cooking pan and shape of food. Outcomes indicate that at both sizes of the cooking pan no significant relation exist, since the large cooking pan shows the result of $F(1.146)=1.896$, $p=.171$ and the small cooking pan $F(1.146)=2.057$, $p=.154$. At the amorphous shape is also no significant relation established, since $F(1.146)=.489$, $p=.486$. Distinct shapes indicate another result, with a significant difference between the large and small cooking pan since $F(1.146)=4.459$, $p=.036$. This means there can be indicated that at distinct shape the size of the cooking pan has an effect, at amorphous shapes there is no effect. The Lower and Upper Bound of the Confidence Intervals of the distinct shapes are above zero for the large cooking pan (0,047, 1,435) and below zero for the small cooking pan (-1,435, -0,047). This means that distinct shapes in combination with a large cooking pan provide a larger feeling of fear of having too much for dinner compared to distinct shapes in a small cooking pan.

6.6.2 Fear of having too little

Outcomes show that the fear of having too little for dinner does not influence consumers if they use a certain cooking pan size, since $F(1.146)=.089$, $p=.766$; same outcomes can be presented for shape of food, since $F(1.146)=2.631$, $p=.107$.

Interaction effects can also be examined. An interaction effect of fear of having too little for dinner does not show a significant relation, since $F(1.146)=2.972$, $p=.087$. This means that the size of the cooking pan and the shape of food shows a marginal effect on the amount of fear of having too little if consumers have to prepare Mie for three persons. This will be more elaborated to find out which interaction effect is of influence if consumers experience the fear of having too little for dinner. Outcomes indicate that at both shapes no significant relation exist, since the distinct shapes show a result of $F(1.146)=2.045$, $p=.155$, and the amorphous shapes $F(1.146)=1.016$, $p=.315$. At the small cooking pan is also no significant relation established, since $F(1.146)=.005$, $p=.942$. The large cooking pan shows a different result, with a significant difference between the two shapes since $F(1.146)=5.524$, $p=.020$. This means there can be indicated that at a large cooking pan the shape has an effect on the fear of having too little for dinner. The Lower and Upper Bound of the Confidence Intervals of the large cooking pan are above zero for the amorphous shapes (1,592, 0,138) and below zero for the distinct shapes (-1,592, -0,138). This means that a large cooking pan in combination with amorphous shapes provide a larger feeling of fear of having too little compared to a large cooking pan with distinct shapes.

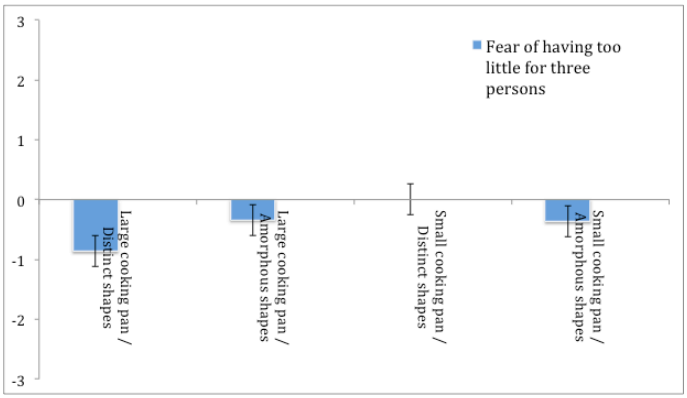

Figure 12. Fear of having too little for dinner

6.7 Controlling for prior experiences

Background information already showed that there is a difference in use of shape of Mie when consumers have to prepare pasta for dinner; the participants make use of the original Mie nests more often. To figure out if experience with the shape of the product is of influence on the amount people choose during the experiment, an extra Analysis of Variance is conducted. There is examined if experience with the product is the factor that clarifies the difference in amount at the two shapes of food. To test this effect, a covariance in the Analysis of Variance is used. Outcomes show that experience is not significant, since $F(1.145)=.588$, $p=.444$; the variable of Mie is still significant, since $F(1.145)=6.145$ $p=.014$. Although there was a difference in experience in shape of Mie, there is no effect of experience on the amount of Mie consumers choose to prepare.

Next to the amount to prepare for dinner, the amount of experienced uncertainty can be investigated. Uncertainty can also be calculated focussing on the experience people have with the product. To figure out if experience with the product is of influence on the amount of uncertainty people experience during the moment of choosing an amount of Mie, another Analysis of Variance with covariance is conducted. Outcomes show that experience is significant, since $F(1.145)=6.807$, $p=.010$. Also, outcomes indicate that the effect of Mie on uncertainty is not significant anymore, since $F(1.145)=.780$ $p=.378$. Experience with a certain type of Mie is of influence on the amount of uncertainty people encounter during the moment of preparing a dish. The type of Mie appears to have an effect on the amount of uncertainty consumers experience, but if experience with the product is recorded the effect disappears. This means that uncertainty arises not because it is a different shape of Mie, but because consumers do not know the product.

6.8 Mediation process

To find out if a mediation process exists; if a third variable affects the relation between the shape of Mie/size of cooking pan with the chosen amount of Mie, the Indirect macro for SPSS of Preacher and Hayes (Preacher & Hayes, 2008) is used. According Preacher and Hayes (2008) is mediation "the process by which some variables exert influences on others through intervening or *mediator* variables" (Preacher & Hayes, 2008, p.879). The chosen macro calculates if a mediator (M) influences the relation between the independent variable (X) and the dependent variable (Y), like displayed in Figure 13. Preacher and Hayes (2008) advise the bootstrap method to assess if mediation occurs among variables.

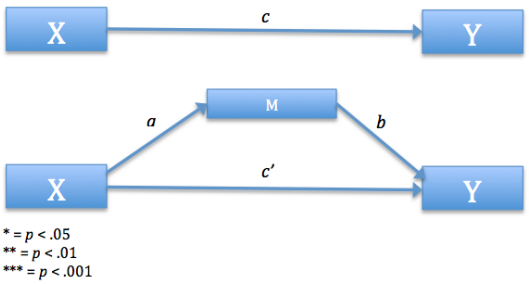

Figure 13. Mediation process

The relation of size of the cooking pan and the amount to prepare is displayed in Figure 14. Outcomes show that the indirect effect (path *c'*) is partially explained by uncertainty people experience. This means if consumers have to prepare Mie, an amount of uncertainty explains partly the chosen amount.

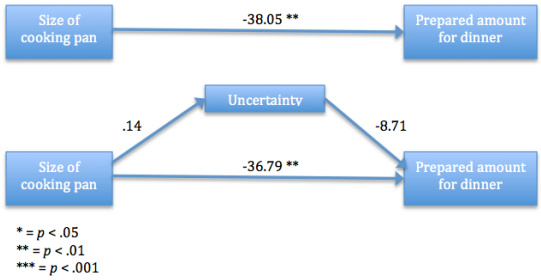

Figure 14. Mediation process size of cooking pan

However, outcomes of the Bootstrap method indicate that a mediation effect of size of the cooking pan on the amount prepared for dinner, via uncertainty, does not exist. The Confidence Intervals of this mediation analysis are situated between -9.0794 and 1.3916. Since 0 lies within the interval it can be established that no suggestion for mediation exists, based on a 95 Level of Confidence at 5000 Bootstrap Resamples.

The shape of food can also be assessed next to the size of the cooking pan. The relation of the shape of food and the amount to prepare is displayed in Figure 15. Looking to the shape of food, the same outcome as the size of the cooking pan can be presented. Outcomes show that at the indirect effect (path *c'*) the prepared amount for dinner can be declared minimal through the amount of uncertainty people experience.

The outcomes of the Bootstrap method of this calculation show that a mediation effect of type of Mie on the amount prepared for dinner via uncertainty also does not exist. Confidence intervals of this mediation analysis are calculated between -12.8522 and .9238. Here 0 is also a part of the interval which means no suggestion for mediation, based on a 95 Level of Confidence at 5000 Bootstrap Resamples.

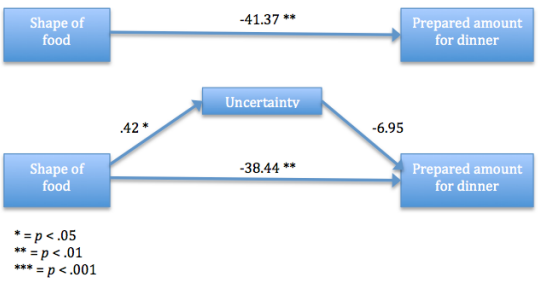

Figure 15. Mediation process shape of food

7. Conclusions and discussion

This study investigated if the size of the cooking pan and the shape of food are of influence on the amount people prepare for dinner. It may be conceived as logical that a large cooking pan influences the amount consumers choose to prepare. However, barely any research is done on the effect during the moment of preparing a dinner. This resulted in the following main research question for this study, "*Does the size of a cooking pan and the shape of food influence the amount people cook for dinner?*" This study shows that the size of the cooking pan is of influence on the amount people prepare for dinner. There are also signals that the shape of food, in this case distinct versus amorphous, is of influence on the amount people choose to prepare for dinner.

As expected, the size of the cooking pan has a substantial effect on consumers when they choose the amount of pasta to prepare using a large cooking pan, compared to a small cooking pan. It seemed that a large cooking pan stimulated to choose a larger amount of pasta to prepare; people choose to pour on average about 15.5% more raw pasta in the large cooking pan. The size of the cooking pan is not of influence on the amount of uncertainty consumers experience if they have to pour pasta in the cooking pan. Next to the size of the cooking pan the shape of food is of influence. At the shape of food two contradictory processes can take place, portions can be estimated based on counting products or based on visual grounds. As expected, the visual part is the decisive factor. Compared to amorphous shapes consumers prepare 17% more pasta if the shape is distinct. Experience with the product is also of influence and can be linked with visualisation. Uncertainty arises not because it is a different shape of Mie, but because consumers do not know the product. If consumers do not know the product portions shall be estimated based on visual ground. Between the size of the cooking pan and the shape of food is no interaction found on the amount to prepare. However, at the fear of having too much for three persons is an interaction found. At distinct shapes the size of the cooking pan has effect on the amount of fear consumers experience. Also a marginal effect is found at fear of having too little for three persons; at a large cooking pan the shape of food has effect on the amount of fear consumers experience.

Based on literature, it can be said that the shape of food can influence the consumer in the determination of the size of the portion. On one side amorphous shapes provide a smaller amount of Mie, on the other side it triggers more uncertainty. This is quite contradictory, since uncertainty often raises the expectation that it causes a larger amount to prepare. If people have to prepare a dish for three persons and they are uncertain if it is the right amount, people tend to reduce their uncertainty by increasing the cooking amount instead of taking the risk of having to little for dinner. Regarding uncertainty, amorphous shapes make consumers experience more uncertainty compared to distinct shapes. This might be caused by the fact that distinct shapes can be counted, which is not possible with amorphous shapes. Counting products can be linked to the process unit size effect, that consumers seem to believe that a unit of some

entity is the ideal and appropriate amount to take and consume (Geier et al., 2006). The amount of uncertainty with distinct shapes can be caused by the number that the consumer had in mind. For instance, if a consumer chooses to cook two nests of Mie for each female eater, uncertainty can arise whether two nests are enough. In comparison with distinct shapes, where uncertainty probably only arises at one moment, amorphous shapes generate multiple moments of uncertainty. First, uncertainty can exist at the moment of determining a certain amount of amorphous shaped pasta per person. Subsequently, if consumers have to pour the determined amount of amorphous shapes into the cooking pan another moment of uncertainty can be experienced. For example if they use their hands as measurement instrument, is their hand the right measurement instrument to provide the amount they had in mind and is the size of the hand the same every time? Finally, uncertainty can also exist at the moment when the pasta is already in the cooking pan. Since counting again is not possible at amorphous shapes, consumers can only use visualisation at the moment of assessing if it is really enough. The multiple moments of uncertainty can be one of the reasons that amorphous shapes are more sensible to uncertainty than distinct shapes. The amount of experience with the product can be another reason why uncertainty is higher at amorphous shapes. Having experience with the shape of the product gives consumers more confidence of the amount needed per person. Distinct shapes are for consumers a more familiar product, amorphous shapes are not familiar which makes consumers estimate portions based on other factors. Visualisation can be one of these factors how consumers estimate portions, which could clarify why the participants choose a smaller portion with amorphous shapes. If the shape of food is amorphous, consumers do not have the possibility to count the product, which ensures people have to estimate the product visually. Amorphous shapes make portions looks larger compared to distinct shapes. This can be linked to research of Wada et. al. (2007), which shows that portions of finely cut food are easily being overestimated compared with the same amount that has not been cut. This means that at distinct and amorphous shapes visualisation is the decisive factor, so consumers rely more on visualization than on their feeling of uncertainty.

A result that also is found in this study is that consumers experience only fear of having too much for dinner if they have to use distinct shapes in combination with a certain type of cooking pan. At distinct shapes the size of the cooking pan has effect on the amount of fear; distinct shapes in combination with a large cooking pan provide a larger feeling of fear of having too much for dinner compared to distinct shapes in a small cooking pan. This could mean that if a large size of cooking pan is used to prepare a dish for three persons, consumers are partly conscious that they choose too much to prepare. At the other conditions this could mean that consumers are not aware that they take a too large amount. Those consumers sincerely think that they do not have enough when they have a look in the cooking pan, while they already have too much. This unawareness in combination with lack of knowledge can ensure that consumers are easily biased, which can quickly create a too large portion which can lead to waste of food or the tendency to overeat.

Comparing the results of this study with the dietary guidelines of the Dutch National Food Consumption Survey, it can be stated that the majority of the participants choose a smaller amount than the guidelines prescribes. According to the dietary guidelines of the Dutch National Food Consumption Survey a portion of pasta for two males and one female contains 280 grams raw pasta (Fransen et al., 2011). Another method of comparison is to compare the outcomes with the food consumption rates that were found by the Dutch National Food Consumption Survey (Fransen et al., 2011). The portion based on these food consumption rates consists of 189,2 grams of raw pasta if prepared for two males and one female. Comparing this portion with the outcomes of this study, it can be indicated that consumers choose a too large amount to prepare. Preparing a dish without a measurement instrument in a small or large cooking pan and with amorphous or distinct shapes of food gives generally a larger portion than normally consumed. This can cause on one side food waste, on the other side it can cause overeating. However, comparison with a clear objective standard cannot really be performed, since there is a lot of variation. It can be stated that completely different interpretations can be given based on comparison with the dietary guidelines or based on comparison with the food consumption rates. The first method sort of rejects that food waste and eating too much exists, the other indicates the opposite where food waste and eating too much is almost common. It needs to be considered if the dietary guidelines recommend the right amounts, since the difference between the consumption rates and the guidelines is quite large. Based on a portion for two males and one female the difference is about 90 grams of raw pasta. Gradually reducing the guidelines together with offering information will probably result into smaller portions to prepare. This can eventually cause a smaller probability to eat a larger amount than essential. Smaller portions can cause less serving and consuming, it can also stimulates the reduction in the waste of food.

This study can be seen as an addition to the current literature. The serving and consuming stage is extensively investigated with topics that possibly also can be applied during the stage before serving and consuming food. Outcomes of this study confirm that the topics of sizes and structures are also of influence during the stage of preparation. Results of this study confirm that different sizes of kitchenware influence decisions consumers make. Research of Wada et al. (2007) and outcomes of this study show that the structure of food is of influence on numerous moments. Outcomes indicate that the size of the effect of shape of food is also suggestible by the size of the cooking pan, which creates a larger prepared dish at a large cooking pan. The found disparities can be of influence on the amount of waste of food and the tendency to overeat. Large cooking equipment, like large cooking pans, can cause a larger prepared dish. A larger prepared portion means the opportunity to serve and consume more. Combining this with certain shapes of food, disparities can even increase. This makes consumers more likely to eat a larger portion than essential since people mostly consume what they serve on their plates (Wansink, 2005). Another option that can occur is that the leftovers are stored for later consumption, or thrown away. However, products like rice and pasta are often thrown away instead of stored (Ventour, 2008).

To decrease the amount of food waste and the tendency to overeat, consumers need to be informed about the effects of choosing certain types of cooking pans and how different shapes of food can influence the amount they prepare, serve and consume. Cooking in a too large cooking pan needs to be discouraged by informing the consumers about the consequences. Also if consumers use a certain shape of food they need to be informed what impact the shape can have on the amount to prepare. Companies in the food industry can also consider the outcomes of this study. Companies can give consumers more detailed information about the amount to prepare, to participate in the reduction of food waste and the tendency of overeating. For example by displaying a guideline of an exact number of nests per male and female on the package of Mie nests. For policy makers this study can be interesting in actions against food waste and obesity, by providing information to consumers which consequences are present during the moment of preparing a dish. The policy makers also need to be stricter towards the food industry, that seducing texts as for example a vague amount of Mie nests to use per person are reduced and replaced by information that is more clear for consumers.

7.1 Limitations and future research

Some remarks about the experiment can be given. Future research is worth carrying out to investigate more about the influence of sizes of cooking pans and the shape of food on the amount people prepare for dinner.

One of the constraints of the experiment is that this experiment is performed without water. Boiling water can give a biased view of how much to pour in the cooking pan. Boiling water can provide that a certain amount of food looks different compared to the amount in a cooking pan without water, water can visualise the product differently. During this study hardly any distraction was present, which gave the participants the possibility to focus on the amount to prepare. Future research should duplicate the experiment including the extra command that participants first have to add water in the cooking pan, let it boil and then pour the pasta in the cooking pan to investigate if water is also of influence on the amount to prepare.

Another limitation of the experiment is the target group used for the experiment. At this experiment the target group was students of the Wageningen University, in the age of 18 till 32. This target group can give other findings than more experienced people, since students are often less experienced with cooking. Outcomes of this study indicate that at students the experience with the product is not of influence on the amount to prepare, only on the amount of fear they experience. However, at consumers that more often use this type of food probably other results can be given. Experience in cooking with a certain type of food can probably give a more fixed amount, therefore the effect of shape and size will be smaller with more experienced consumers. However, Wansink & van Ittersum (2003) established that years of experience reduced the amount to prepare at different shapes, complete elimination was still not present. Future research should investigate if experience is of influence on the type of food, by

for example using products that are often used by consumers compared to products that are never used. Research on different types of food needs to be done to see if the outcomes of this study can be generalised at all types of distinct and amorphous shapes.

Finally, the setting of the experiment can be a restraint. It is difficult to create a natural situation in a research room with only one type of cooking pan and one storage container with pasta. If future experiments can be done in a more realistic setting like at consumers' home, different outcomes can show up. If participants can use their own cooking equipment they are probably less biased since they are more experienced by daily use, on the other side the furnished setting can provide other biases that were not of influence during this study. Future research needs to be done if using own cooking equipment and different shapes of food provide other results, keeping in mind that probably also other influences can be present.

As stated earlier, extensive research is done at the moment of serving and consuming food, but hardly any research is done at the moment of cooking. Before there was barely any proof if different sizes of cooking pans and different shapes of food influence the moment of cooking. This study demonstrates that effects exist when consumers have to prepare dinner. Outcomes of this study show that the size of the cooking pan is of influence on the amount consumers prepare for dinner, also the shape of food gives different amounts to prepare. This first study in the direction of the moment of cooking can be used as starting point for further investigations.

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Appendix 1 Experiment documents

Appendix 1A. Assignment experiment

In this appendix the assignment used for the experiment is shown.

Fijn dat je mee wilt werken aan dit onderzoek over consumenten en koken. Het duurt ongeveer 5 minuten. Ik wil je vragen om eerst de opdracht uit te voeren en vervolgens de vragenlijst in te vullen. Er zijn geen goede of foute antwoorden, graag invullen wat het eerste bij je opkomt. Als deelnemer aan dit onderzoek blijf je geheel anoniem. Het afronden van het onderzoek en ondertekenen van de deelnamelijst wordt beschouwd als toestemming voor deelname in dit onderzoek.

Als je vragen hebt over dit onderzoek kunt je deze stellen aan de onderzoeksleiding in de zaal, of contact opnemen met Erica van Herpen (MCB groep).

Deelnemernummer: …….

Beste deelnemer/deelneemster,

In dit onderzoek ga je pasta koken voor 3 personen voor het avondeten van vanavond. Je had in gedachte om een bami maaltijd te maken met Mie pasta. Alle voorbereidingen zijn al gedaan, alleen de Mie hoeft nog bereid te worden.

Op het plaatje hieronder kun je zien wat er allemaal bij de Mie toegevoegd zal worden. Dit is volgens recept van de verpakking van Honig, gemaakt voor 3 personen. Zoals je kunt zien is het de bedoeling dat er alleen bami gegeten wordt, er zal geen extra bijgerecht bij worden geserveerd. Doe bij deze de pasta in de pan die jij zou koken voor 3 personen. Het gezelschap bestaat inclusief jezelf uit 2 mannen en 1 vrouw.

Als je hier mee klaar bent, graag de bussen waar de pasta in zit sluiten en verder gaan met de vragenlijst die je bij binnenkomst hebt ontvangen.

Recept bami:
- voor 3 personen Mie (2 mannen, 1 vrouw);
- olie of boter;
- 300 gram nasi-/bamivlees;
- 1 nasi-/bamipakket;
- 1 pakje Honig Mix voor Bami Speciaal;
- 1,5 deciliter water.

Ingredienten: Het bereide gerecht, zonder de Mie die jij nog gaat toevoegen:

Appendix 1B. Questionnaire experiment

Vul alsjeblieft de volgende vragen in:

Hoe vaak maak je bami voor het avondeten?

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Ik maak graag bami klaar voor het avondeten.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Het zojuist bereidde gerecht lijkt me een heerlijk gerecht om te eten.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vind bami een lekker gerecht om te eten.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Vragen over zojuist gekozen hoeveelheid Mie:

Geef aan in hoeverre je het eens bent met de volgende stellingen.

Ik ben er zeker van dat dit de juiste hoeveelheid bami is voor 3 personen.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik voel me onzeker over de zojuist gekozen hoeveelheid Mie.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik ben bang dat ik niet genoeg bami heb voor 3 personen.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik ben bang dat ik veel te veel bami heb voor 3 personen.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vond het lastig om in te schatten hoeveel Mie ik moest koken voor 3 personen.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vond het in deze pan gemakkelijk om in te schatten hoeveel Mie ik moest koken.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vond het lastig om in te schatten hoeveel Mie ik moest koken als de Mie in deze variant wordt aangeboden.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vond het lastig om te schatten hoeveel Mie ik moest koken als het in zo'n voorraadbus wordt aangeboden.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Dit lijkt me een geschikte pan om Mie in te koken voor 3 personen.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Vragen over thuisgebruik:
Geef antwoord op de volgende vragen.

Ik maak thuis gebruik van Mie nestjes als ik bami kook voor het avondeten.

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Ik maak thuis gebruik van een andere variant van Mie (geen nestjes) als ik bami kook voor het avondeten.

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Ik maak thuis gebruik van voorraadbussen om pasta op te bergen.

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Ik maak thuis gebruik van een weegschaal als ik pasta moet koken voor het avondeten.

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Als ik thuis bami kook, dan tel ik de hoeveelheid Mie nestjes om te koken.

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Ik doe thuis de pasta direct uit de verpakking in de pan.

Nooit	-3	-2	-1	0	1	2	3	Heel vaak

Vragen over persoonskenmerken:
Geef aan in hoeverre je het eens bent met de volgende stellingen.

Ik vind het erg om eten weg te moeten gooien.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vind het erg om te weinig te hebben voor de personen die komen eten.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Ik vind het erg om teveel te koken.

Helemaal mee oneens	-3	-2	-1	0	1	2	3	Helemaal mee eens

Hoeveel honger heb je op dit moment?

Helemaal geen honger	-3	-2	-1	0	1	2	3	Veel honger

Hoeveel ervaring heb je om voor 3 personen te koken?

Helemaal geen ervaring	-3	-2	-1	0	1	2	3	Veel ervaring

Algemene vragen:

Geslacht:	man / vrouw
Leeftijd:	..... jaar
Voor hoeveel personen kook je normaal avondeten?	..... personen

We waarderen het als je feedback geeft over dit experiment.

Mogen we je vaker voor wetenschappelijke studies per email benaderen om mee te werken aan onderzoeken? Vermeld dan hieronder je mailadres.

Bedankt voor je medewerking! Graag dit formulier inleveren.

Appendix 2. Factor Analysis

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
REV: Ik ben er zeker van dat dit de juiste hoeveelheid bami is voor 3 personen	-.11	1.550	153
REV: Ik ben bang dat ik te veel bami heb voor 3 personen	.21	1.555	153
Ik voel me onzeker over de zojuist gekozen hoeveelheid Mie.	.21	1.567	153
Ik ben bang dat ik niet genoeg bami heb voor 3 personen.	-.40	1.599	153
Ik vond het lastig om in te schatten hoeveel Mie ik moest koken voor 3 personen	1.16	1.430	153

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.237	44.745	44.745	2.237	44.745	44.745	2.171
2	1.382	27.637	72.382	1.382	27.637	72.382	1.513
3	.559	11.178	83.561				
4	.472	9.447	93.007				
5	.350	6.993	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Component Matrix[a]

	Component	
	1	2
Ik voel me onzeker over de zojuist gekozen hoeveelheid Mie.	.786	-.150
REV: Ik ben er zeker van dat dit de juiste hoeveelheid bami is voor 3 personen	.782	-.302
Ik vond het lastig om in te schatten hoeveel Mie ik moest koken voor 3 personen	.776	-.231
REV: Ik ben bang dat ik te veel bami heb voor 3 personen	.154	.898
Ik ben bang dat ik niet genoeg bami heb voor 3 personen.	.617	.639

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Pattern Matrix[a]

	Component	
	1	2
REV: Ik ben er zeker van dat dit de juiste hoeveelheid bami is voor 3 personen	.844	-.073
Ik vond het lastig om in te schatten hoeveel Mie ik moest koken voor 3 personen	.811	-.006
Ik voel me onzeker over de zojuist gekozen hoeveelheid Mie.	.788	.075
REV: Ik ben bang dat ik te veel bami heb voor 3 personen	-.212	.912
Ik ben bang dat ik niet genoeg bami heb voor 3 personen.	.320	.791

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 4 iterations.