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IMPACT OF PRODUCT INFORMATION ON CONSUMERS´ CHOICE FOR DOG FOOD

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Impact Of Product Information On Consumers´ Choice for Dog Food

BY

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Abstract

This paper provides a unique insight into the key role of the impact of product information factors and the their interaction. Through a factorial design the impact of dog food aroma (natural/artificial) in combination with claim (health/taste) on dog food experience was explored in Experiment 1. Another experiment examined the impacts of factors combinations (dog's response /claim) on consumers' choice. Using rating data on dependent variables, a Mixed-effects model was performed. The results show that: 1) Expected liking was found to be significant among 4 products in Experiment 2; and 2) Claims are suggested to moderate the impact of factors aroma and dog reaction videos, in terms of willingness to pay.

Keywords: Consumer study; Sensory; Health Claims; Dog food

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ABBREVIATIONS

NHC, Nutrition and health claims

TC, Taste claims

FP, Food package

EU, European Union

GLM, General linear model

WTP, willingness to pay

DV, Dependent variable

IV, Independent variable

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I. General part

1. Introduction

In this chapter, the research background is stated in section 1.1. Section 1.2 clarifies the selection of the research topic and the added value of this research. Literature reviews of pet owner preferences, including the conceptual design, are described in Section 1.3. In section 1.4, concepts are defined in order to help clarify the purpose of this thesis.

1.1 Research background

The sale of pet food has recorded solid growth in the recent years. Norway ranks at the top of all the European countries when it comes to monthly spending on dog food (Norway ranks as... 2012). According to this survey, people in Norway spend the equivalent of US$639 per dog each year on pet food. Another recent survey (Taylor 2013) indicated nearly one-third of consumers "preferred to shop at pet product retailers that offer the best products available, even if they are more expensive". Norwegians are also suggested to purchase expensive organic and functional dog foods, which sometimes also come in small meal-size packages instead of larger bags (Norway ranks as... 2012).

Pet food is not designed merely for humans. Pet food differs from food for humans in that pet owner will not directly consume these products. For those pet food products that can be experienced only by watching, touching and smelling, factors such as brand, health claims and aroma can influence the consumer in the selection process and their willingness to pay (WTP) (Cuellar 2013.) Moreover, pet food is also a commercial food, which all have a feature in common: they are using packaging and branding to attract the attention of the potential buyers of the products. Text information on the package with either health promoting attributes or taste promoting attributes conveys different information for choosing a particular food, such as indicating natural or healthy ingredients.

1.2 Aims of this thesis

The goal of this thesis is to investigate the potential impact of such factors on the dog owners' preferences. More specifically, this thesis aims to explain how the claims on the packaging, in some giv-

en situations (combine with smell/video), have impact on the dog owners' liking preferences, expected health and taste perception and willingness to buy.

The measurement assessed the consumers' preferences of dog food (whether preference is modulated by presenting of different conditions), and whether any such preferences are correlated by the background information of the consumer (e.g., geographical or dog-cohesion).

1.3 Literature review of pet food choices

The literature review was conducted to develop a deeper understanding into which factors can influence dog food choice. After looking over the scientific literature databases, the research on the pet food sector seems to be limited. A variety of product information, including odors of humans' food products, textual elements of package (D.G. Liem 2012) and video stimuli, has been suggested to affect consumers' perception. Empirical evidence of cross-modal association within dog food-related stimuli is difficult to locate. A few consumer studies reported in the literature have been conducted with different pet foods (Case 2011) and cat foods (Pickering 2009) to find out the important factors affecting consumers´ perception. The authors found sensory and health consideration to be the most important factors affecting dog food choice. A few studies have been conducted with pet food (e.g. Di Donfrancesco et al, 2012). Di Donfrancesco applied human sensory analysis method with dry dog food in the US market. In his study, he suggests that varying sensory properties such as aroma, flavor and texture sensory might have some impact on consumer choice when brand and packaging information are removed. Pet owners interact with pet food when feeding their pet and they like to watch dog when they were eating (Di Donfrancesco et al, 2012). Given this situation, it is therefore considered to be of great academic interest to discover the impact of dog reaction on dog food choice.

1.4 Conceptual model Development

The ways in which people feed farm animals and pets are different. Farm animals are bred in order to produce meat or other products, while pets are raised for their own sake. Thus the buyers of food for farm animals will mainly look for food that enhances the quality of the product to be sold. In contrast, the buyers of pet food might focus more on qualities of the food that would make the animal happy and healthy than the weight gains of the animal. Pet foods are uniquely positioned, as the pet foods are products sold to humans, but which are designed with the pets in mind.

To sum up these findings on pet food purchase behavior, the general trend seems to be that if a per-

son is going to buy a certain pet food, he must first have an actual liking of the food, and high expectation of both health and taste benefits. Second, he must be closely connected to this pet, and then he will be motivated to pay a certain amount of money for this dog food. Respondents may believe that the dog foods are good in general. But since some of them are dog owners themselves, they might not be willing to pay as high a price for it as actual dog owners would. Thus, the reaction a dog makes when being exposed to the food, which itself is not an attribute of the dog food product, can actually change the purchasing behavior. As a result of this, dog owners might be willing to pay a higher price for the foods if they believe that their dogs like to eat, even if such foods might be less healthy than other foods. Other factors such as age and gender are also suggested to contribute to the consumers´ willingness to pay. A conceptual model has been developed theorizing the causal relationships determining pet food purchase behavior. This model is shown in Figure. (Fig.1)

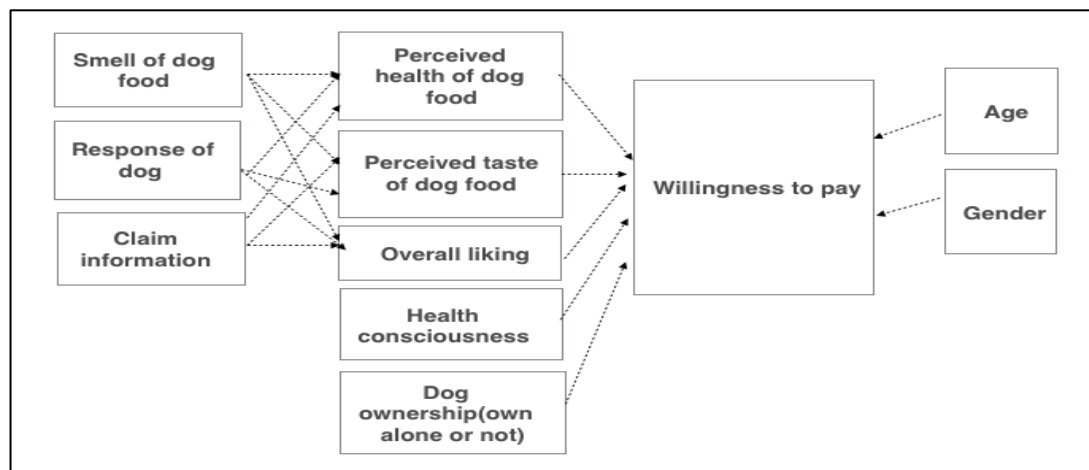*Figure 1*: *A conceptual model adapted from Garmt (Garmt 2004)*

1.5 Definitions of concepts

Below are definitions of various concepts used in this study. These definitions are derived from earlier work in the field.

Label - Any tag, brand, mark, pictorial or other descriptive matter, written, printed, stenciled, marked, embossed, impressed on, or attached to a package or container of feed. (R. 767/2009, Art. 3.2)

Claim - Any labeling or presentation which draws particular attention to the presence or the absence of a substance in the feed, to a specific nutritional characteristic or process or to a specific function related to any of these. (R. 767/2009, Art. 13)

HNC - Health and Nutrition claims are claiming that it will prevent, treat or cure a disease or claiming that it has particular nutritional purpose, but is not included in the list of PARNUTS in accordance with Article 10 of regulation (R. 767/2009, Art. 13, Art. 14)

Purchase - In the present study, it means the action of acquiring a product against a monetary compensation.

Purchase decision - The choice that a consumer makes in relation to a purchase. It includes product, package, store, method of purchase etc.

Factors - In this study, the factors refer to the variables that may have an impact on dog food choice, which were given to experimental units under control.

Buying Behavior/Purchase behavior - In this paper, these terms mean the decision processes for buying behavior and acts of people involved in buying these products.

Purchaser - People involved in acquiring a product against a monetary compensation.

Consumers - This term means specially that the person who is not eating the pet food, but buying the pet food.

Dog cohesion - This term here has been defined as "the emotional bonding that person and her/his dog".

Stimulus - Throughout this paper, the term "stimulus" refers to a product aspect that stimulates a single factor.

Dry dog food - Dog food products that are in Norwegian stores can be grouped into different types; dry foods, wet foods (canned), semi moist and snacks. While other types have their advantages and usage, dry foods is best sold and constitute the highest output of all pet food produce (Tran, 2008). Pet food with moisture content of 10 % or less is called dry pet food (Case et al, 2011). Dry pet food is suitable for coating as low moisture content (Tran, 2008).

Repeated measures – These measures come from the same subject, as is common in psychological experiments, so that these measures are repeated.

Interaction effect - In statistics, the term interaction effect means two or more factors have more (or less) of an effect than when they are considered individually.

Within-Subject Factor - Same participants are included in all levels of this factor.   E.g. IV = Time, Levels = Time 1, Time 2, Time 3, etc.

Willingness to pay - In the present study, it means the amount of money a consumer wants to pay for   the   product.

2. Research variables selection

As defined by Mathis (Mathis et al. 2003), intrinsic characteristics are the ones bundled in the product and can be said to be the essence of the product. Extrinsic characteristics are those influencing a consumer´s view of the food, but is not bundled in the product itself. In the case of dog food, the sensory properties are a key intrinsic characteristic for acceptance of dry dog food. It is therefore important especially for the repurchase of a product (Koppel, 2014).

In the first experiment, packaging and claims are selected as research independent variables of dog food given with aroma, which was chosen as intrinsic characteristics of dog food. In the second experiment, two different claims, as well as dog reaction were chosen as research independent variables.

2.1 Packaging and health claims

According to Kuvykaite (Kuvykaite 2009), the food package is an important means of enabling communication between manufacturers, distributors and consumers. Thus, academic interest in packaging has become more pronounced over the past decade. Scholars measured how packaging information communicated between manufacturers and consumers and how this product information had impact on purchase decision (Wells 2007, Garber, Burke, & Jones 2000, Folkes 2004). Besides this, ethical consumers have shown different preferences towards packaging. In the past decade, labeling at the front of the package has been used to inform consumers about product origin and the ingredient of the product, especially content that is related to positive health outcomes.

Nutrition and health claims (NHC) and taste claims (TC) are believed to be important for promotion of food according to the study of Rik (eg. Rik & Michel, 2004) However, some studies note that health-related information would positively affect the actual taste experiences when it is given

alongside the presentation of the food product (Verbekea 2009). Other studies indicate that such health-related information may increase the expect health perception of the product (Dean et al., 2007, Lyly et al,, 2007, van Kleef et al., 2005 and van Trijp and van der Lans, 2007). But the impact of such kind of information on customers willingness to actually start using the product or and how it affects their purchase intentions is not clear. Deliza and MacFie (Deliza 1996) claim that external product cues generate sensory expectation and influence the expectated sensory perception of human food.

The information given by the food package, particularly when connected with commercial communications, was proven to have a major impact on consumer behavior (Grunert, 2002; Steenkamp & Baumgartner, 1998). However, the effect of nutrition and health claims on expected product liking is likely to depend on the carrier product (Barreiro-Hurlé, Gracia, & De-Magistris, 2010; Grunert & Wills, 2007).

The commercial pet food label differs from a label directed towards human food in that the information is not directed to the final consumer, the animal, but to the purchaser or veterinarian who decides whether to purchase pet food. Given this situation, it is therefore considered to be of great academic interest to discover the relationship between health-related claims on pet food packaging and the consumers' perception.

2.2 Nutrition and Health claims Regulations for pet food

The regulations governing pet food labeling in Europe are similar to that for human food in many respects, but deviate significantly in some important ways. The EU Animal Products Regulations (767/2009) applies primarily to the 25 member states of the EU and Switzerland, but does not cover Norway. FEDIAF, which comprises the national pet food industry associations in the EU, has published a labeling and marketing guideline. The purpose of the guideline is to improve labeling, usage of claims, in particular the provisions on the presentation of labeling.

According to the EU Animal Products Regulations (767/2009), the claims made on feed materials should be:

(i)   objective and verifiable;

(ii)   well understood by the user of the feed;

(iii)   where purchasers are doubt about the claims, or at the request of the competent authority, reference of such claims should be provided to the Commission.

Health claims for dog food are usually brief. Examples include the terms "optimal growth", "contain calcium for strong, healthy bones and teeth" or "contain vitamin E". Hence, according to Article (767/2009), "Claims referring to treatment, curing or prevention of a disease are considered to be medicinal claims and would cause a product to be medicinal by presentation". Besides, a nutritional adequacy statement on the information panel must substantiate nutrition claims on the principal display panel. Claims which contains neither medicinal nor nutritional content, and which are concerned with general well being, are not considered as Nutrition and Health claims (NHC). Taste claims and general claims on quality are likewise not considered NHC.

2.3 Aroma and dog food choice

Some studies found that autobiographical memories evoked by smells more often reminds the subject of his/her earlier life event than those evoked by visual stimuli (Chu 2000). Peppermint (Metha piperita) is increasingly accepted as a dietary supplement for human. For example, a dietary supplement for digestive disorders (Sparks 1995). It has also been noted for its anti-parasitic medical property, which may be an alternate solution in the treatment of dog's diseases (Safe Herbs & Spices 2014).

The major components of the peppermint essential oils is menthol, which has been demonstrated as having an antioxidant effect (Yang S.A. 2010), plus inducing a sensation of freshness (Labbe 2009) and being a stimulus that excites the trigeminal receptor (Green 2005). Moreover, Labbe suggested a perceptual association between peppermint aroma and freshness (Labbe 2009). Peppermint and related products were found in a huge array of catalogues of commercial pet care products like oral care gel and functional pet food. In the present study, peppermint was chosen to stimulate health related aroma. On the other hand, since beef aroma is widely accepted to be used both in food and feed products, it was chosen to present a meaty aroma, in contrast with health related aroma.

2.4 The reaction of dogs

The results from previous studies (e.g. Woods et al. 2011) have showed that an expectation, created by means of the information provided, has an effect on sweet taste perception. However, to the best of our knowledge, relatively little research has been carried out on how being exposed to visual stimuli of dogs reacting to food actually affects dog food buyers´ choice.

In Experiment 2, the reaction of 6 different dogs were recorded on video and later shown to the participants by video player. Here, the purpose of it is to examine whether the reaction of the dog

can alter the consumers expectations of the dog food, especially with regards to health and taste, as well as the estimation of portion size and their willingness-to-pay.

3. Research methods

3.1 Research design

There are three major reasons for adapting within-subjects design for this thesis. First, the primary interest of the research is to study the interaction effect of experimental factors. Second, more data might be collected with fewer subjects to test and experiments can better mimic real-time conditions. Third, studying multiple outcomes for each subject allows each subjects to serve as his/her own control as between-subject variation is excluded from the error.

A typical consumer profiling experiment consists of: 1) a number of products with a set of attributes; 2) subjects of the experiment, who were considered to be assessors, judge the products using a set of variables; 3) DVs. By combining systematically each factor and level according to two 22 design, 4 combinations were created. Samples were profiled in 3 replicates. Therefore 12 products were presented to each assessor. When the factor combinations (products) have been determined, there are essentially two possible ways to present them to the consumers. First, all factors combinations are presented to all consumers. Second, different factors combination are presented to different groups. The latter usually done in a systematic way using for instance an incomplete block design. The former of these alternatives is the simplest both to organize and to analyze by ANOVA technologies. In the current study, the first strategy was used, as the number of products is not too large. This strategy is also suggested to deal with consumer acceptance data (T. Næs et al. 2010, Kuznetsova 2013). These types of factorial designs have been also applied to obtain sensory data in literature (Andrew 2001, Labbe 2011). The overview of factors and the number of levels can be seen from figure 2:
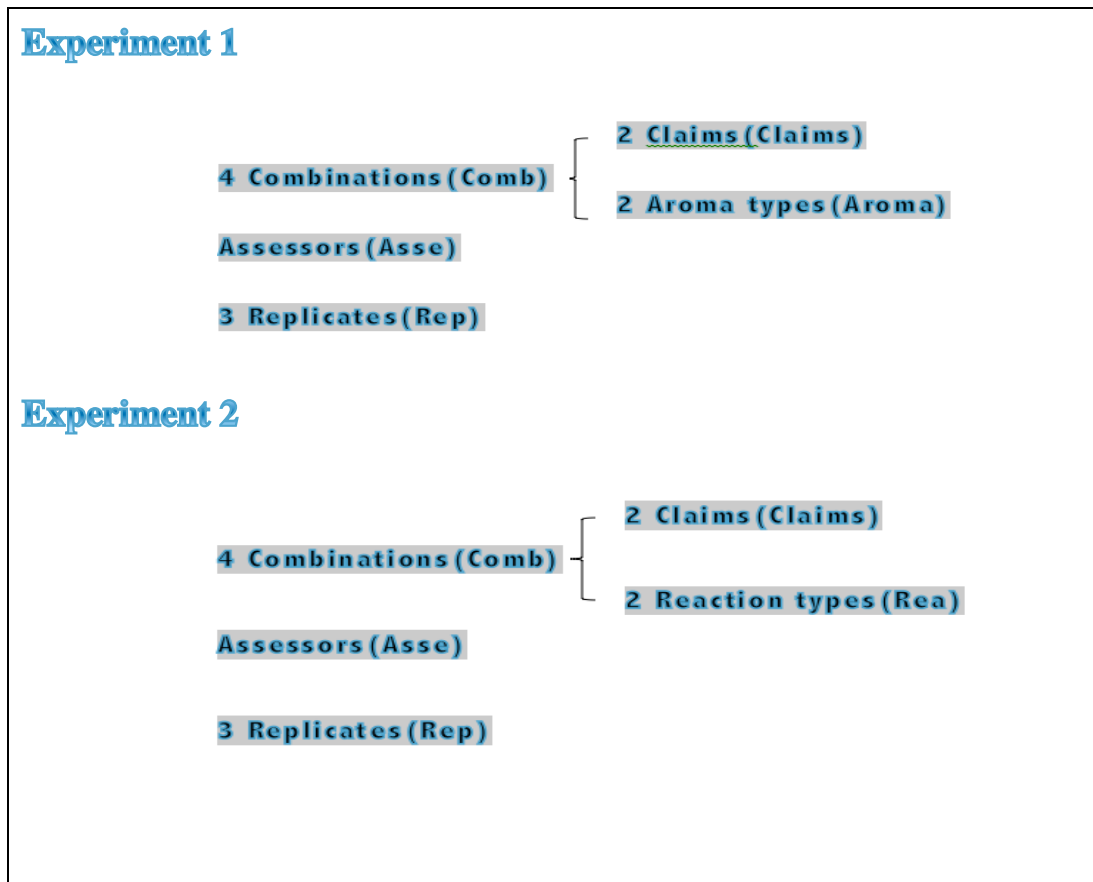
Figure 2: Experimental models and factors

3.2 Statistics modeling and presentation of the hypothesis

This chapter will describe statistics models, dependent variables (DVs) and present a hypothesis for the present study. DVs of Experiment 1 are: expected liking, expected health perception, expected taste perception, portion size, WTP and acceptance. Whilst the five DVs of Experiment 2 are: expected liking, expected health perception, expected taste perception, portion size and WTP.

The question of interest in both studies is to see whether there are significant changes in the DVs over different levels of factors and if the interactions of them influence the changes. The interaction of this model is defined by Huyng as the average difference between the effects of first factor for the two levels of the second factor (Huynh 1979). In this thesis the interaction of different levels of factors are taken in to consideration. For answering the question of interest, the most common method to investigate this is to use ANOVA based on the mixed-effects model (Næs et al. 2010) Repeated meausres in GLM package was previously conducted in some researches for dealing mix-effects model(e.g. Næs et al., 2001).

$$Y_{ijr} = \mu + \alpha_i + s_j + \alpha s_{ij} + e_{ijr} \text{ (Model 1)}$$

In this mixed-design model(model 1), Y_{ijr} is modeled for dependent variable , α_i and s_j are two within-subjects independent variables, and e_{ijr} is error term. Data were analyzed with SPSS package version 22.0, using principles based on William (William 2007). In the present paper, repeated measure model in GLM package has been conducted to examine dog food-related attitudes. The mixed model can incorporate the 2^2 full factorial-design by applying repeated measure model. If we consider the product as a unit for comparison, a one-way repeated measure model as be suitable. Consider to measure the interaction effect, two-way or three way mixed model would be suitable.

3.2.1 Hypotheses for Experiment 1

Hypotheses of interest concern effects of dog food smell and claim in Experiment 1:

Hypothesis 1: The dog food aroma influence one's expected liking, acceptance of smell, willingness-to-pay, expected health perception and expected taste perception.

Hypothesis 2: The dog food aroma moderates the impact of package information on one's willingness-to-pay.

Hypothesis 3: The package information influence one's expected liking, acceptance of smell, willingness-to-pay, expected health perception and expected taste perception.

3.2.2 Hypothese for Experiment 2

Based on the theory mentioned above, the influence of the dog reaction may depend mainly on connection attribute between dog owner and her/his dog in context of dog cohesion (strong vs. weak ties).

In this regard, hypotheses of interest concern effects of dog response and claim in Experiment 2 are stated next:

Hypothesis 1: The four different products are significant different regarding one's expected liking.

Hypothesis 2: Dog reaction video has significant impact on one´s expected liking, acceptance of smell, willingness-to-pay, expected health perception and expected taste perception.

Hypothesis 3: Claim moderates dog reaction impact, regarding one's expected liking, acceptance of smell, willingness-to-pay, expected health perception and expected taste perception.

Hypothesis 4: Claim has significant impact on one´s expected liking, acceptance of smell, willingness-to-pay, expected health perception and expected taste perception.

II. Experimental part

4. Experimental overview

This chapter is dedicated to revealing two experiments by providing the reader with a clear view of the experiment. Subchapter 4.1 gives the reader an overview of the materials used in this research, followed by a description of the preparation process and an experimental procedure in subchapter 4.2 and 4.3. Recruitment and consumer panels are introduced in subchapter 4.4, followed by the explanation of how the questionnaires were constructed in subchapter 4.5.

4.1. Experimental materials

1) Uncoated extruded dried animal food with 8% moisture content were obtained from FôrTek, a feed research/product center at Norwegian University of Life Sciences.

2) Oksefond med rødvin (Beef fond. Brand name: Touch of Taste, Continental foods, Sweden)

3) Original JHP rödler olje (Peppermint oil, Arco Interpharma AS, Norway)

4) Color-printed package pictures in A4 size.

4.2   Preparation   Process

4.2.1. Preparation of dog food samples

Dog food samples were obtained from FôrTek, an animal feed research/product center at Norwegian University of Life Sciences. Being suitable for the aims of the current study, this

uncoated dog food had 8% moisture content. Low moisture content increases the aroma absorption, according to the feed manufacturing technology.

The simulated dog foods were then stored separately in preserver to avoid volatilization. Samples were presented in plastic cups, containing approximately 100 grams of dog food, encoded with three-digit numbers(Fig. 3).

Figure 3: Example for dog food samples. Left: dog food with peppermint oil; Right: dog food with beef fond

4.2.2 Preparation of claims

Six pairs of high-quality color images were designed by Adobe Photoshop CS 6 13.0.1 and Autodesk SketchBook Pro 6. For each pair of packages, a label "New", a recycle sign, an image of a dog, a photo of the raw ingredients and a bowl of pellet dog food were identically designed. The above-mentioned package elements were all of the same size and proportion to each other on the package image. Also on a identical package background, both of the two claims(health-related claims/taste-related claims) were applied. Such pairings of claims generated 6*2 unique package images in total, further elaboration of which can be found in Appendix A.2. The package designs were printed on white paper, which eliminated differences in tactile perception.

Figure 4: *Example for package image in pairs. Left: package with taste-related claim; Right: package with health-related claim*

4.2.3 Preparation of videos

The videos are designed in pairs to illustrate whether dogs accepting the dog food or not. The same dog and background were presented within the pair (accepting/ not accepting). After videotaping the dogs, these files were saved as *. wav files and were then placed into folders in random order. These video files were played using VLC software during Experiment 2.

Figure 5: *Screenshots of dog videos. Left: negative response; Right: positive response*

4.3 Procedure of Consumer Study

The experiments of the present study were conducted during the period of 2nd – 29th April 2014, in the Sensory Research Lab at Norwegian University of Life Sciences. To eliminate learning effects, a two-weeks interval was imposed for participants attending both Experiment 1 and Experiment 2.

As temperature, sounds and lighting of the surroundings might influence the participants and thus increase the random errors of the experiment, the sensory room used for this experiment was without any disturbing factors such as traffic noise. The evaluations were performed with fluorescent lights. Prior to the actual experiment, all the participants received the experiment guide beforehand and were instructed to disregard the price information in Step A, as price might be a driver behind a decision to purchase a given product (Senauer, 2001).

Paper questionnaires using in the current study were all self-administered. They were informed that the experiment would take no more then 30 minutes to complete and were encouraged to finish all the questionnaires. The final section of both experiment contained an online survey about health consciousness. Upon agreement with respondents, their email addresses were obtained. The link of the health consciousness questionnaire, which was unique for each respondent, was sent to the participants after they finished the main experiments. In subchapter 5.3.1 and 5.3.2, different experiment procedures were presented.
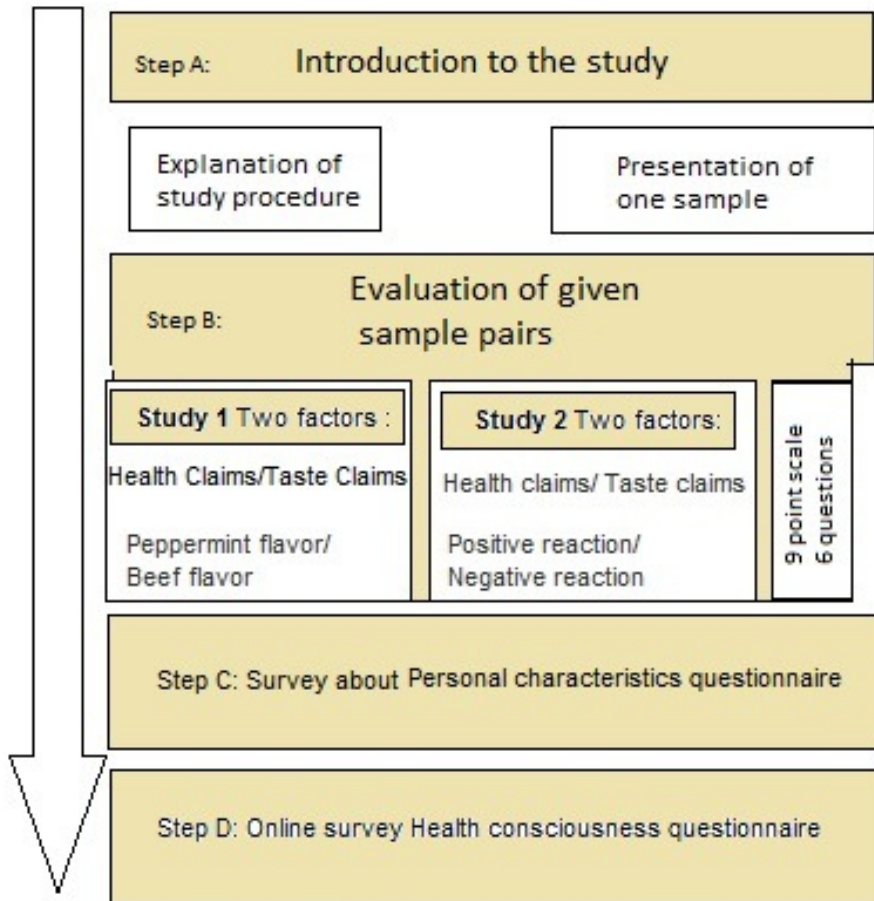
Figure 6: Procedure of Consumer Study

4.3.1 Experiment 1 of Consumer Study

Each participant was tested individually. As shown in Step B (Fig. 6), each participant was given a four-digit number, which is identified for both measurement, personal characteristics and health consciousness questionnaires. A plastic cup with dog food and a package picture were presented simultaneously before participant gave the assessments. The participants were asked to indicate which of the 9-point-scale matched the descriptions or questions. To avoid learning effect, short breaks were held between tests. Participants were allowed to observe and smell the dog food sample but not allowed to eat.

A prepared test was introduced to the participant to familiarize the testing procedure before giving samples in Step B. General information of the participant was obtained in Step C. Afterall, participants were reminded to check their emails for answering a follow-up health consciousness questionnaire. The health consciousness questionnaire was conducted separately from the main experiment in Step D to avoid participant fatigue (Fig. 6).

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Except for one participant from Experiment 2, all other participants completed their health consciousness questionnaires within two weeks.

4.3.2 Experiment 2 of Consumer Study

Participants were seated facing the laptop monitor while video clips were presented on a laptop monitor using VLC software. A video clip and a package picture were presented simultaneously. The experimenter initiated the task with the following instructions: *Now we are going to do a test. Look at the screen (experimenter points to the laptop screen). Later you will see some videos of dog. Try to answer the questionnaire when you have received package image and watched the video. Can you click the "play" button of the video player when you are given another package image?*

As can be seen from the Figure 6, participants assessed the trail in similar way of Experiment 1. In Experiment 2, instead of giving dog food samples, videos were displayed in front of the participants. The trail order was randomized. To avoid learning effect, participants were given a one-minute short breaks between trails. Paper questionnaires were self-administered during Step C (Fig. 6). To maximize response rate, participants were reminded to follow up an online health consciousness questionnaire. Health consciousness of participant was recorded by completing of questionnaire concerning their health consciousness in Step D.

4.4 Recruitment and established criteria of consumer panels

Participants (n=50) were recruited from the Akershus country area and were screened by the following established criteria: 1) having at least one dog in household; 2) taking personal responsibility for commercial dried dog food purchases for at least three months; 3) living in Akershus, Norway for more than 5 years; 4) being older than 17 years and 5) not having any type of nose or eyes disease. Individuals were recruited via the offline recruitment method (e.g. random walk or street contact procedures). They were allowed to take part in one or both two experiments. Supervisors approved the experiment protocol prior to the experiments.

4.5 Questionnaire construction2

4.5.1 Evaluation Questionnaire

When developing a questionnaire, items or questions are generated that require the respondent to respond to a series of questions or statements. Likert-type questionnaires are the most commonly used questionnaire measurement within research design to measure levels of agreement/disagreement (Bowling 1997). A Likert-type scale assumes that the strength/intensity of ex-

perience is linear, i.e. on a continuum from strongly agree, and makes the assumption that attitudes can be measured. Regarding the advantage of more response categories and potential risk of using shorter scale, which is found by Park(Park. J.Y. 2007), the measures were assessed on a nine-point category scales. A six items evaluation questionnaire using simplified English was constructed for Experiment 1, while for Experiment 2, the items number were reduced to five.

Dependent variables were measured by assessing the agreement/disagreements with regards to each item.

For Question 1, the lowest extreme 1 indicated "strongly dislike" and the highest extreme 9 indicated "strongly like". Similarly, Question 2, 3 and Question 6, were constructed to know the expected health and taste perceptions and expectations and human acceptance of the respondents. These questions were assessed by statements: "I think this dog food is very healthy.", "I think this dog food is very tasty." and "This smell would be suitable to use in a similar snack food product for humans." To assess the willingness-to-pay variables, Question 4 "What is the maximum price you are ready to pay for 1 kg of such kind of dog food?" was asked. Participants chose the price around 30 krone/kg, which is a typical price for purchase in small bags in Norway. Question 5 assessed the estimated portion size by "If your dog would take a bowl of this dog food, how many grams in the bowl would you expect?" (see Appendix A.4).

4.5.2 Personal Characteristics Questionnaire

Personal characteristics questions were developed to investigate demographic background such as education, gender and age, as well as location of their living area. Gender, age and education are commonly considered to affect decision-making in previous studies (Hatala 2000, Hawkins 1999). Considering the samples were collected from three different residential regions, these residential regions were added to the general information survey.

Nose and eye diseases were assessed with questions screened participant by this established criterion. The study also attempted to classify consumers' associations with dogs based on whether the dog is owned by themselves, their family, or others. The life stage of the participants' dog was also measured. (Appendix A.4).

4.5.3 Health Consciousness Questionnaire

To measure health related attitudes, all questions adopted come from previous studies (Roininen, K. 2001, Baixauli 2008). Particularly, the survey put emphasis upon the analysis of consumers' motivation and health consciousness during their selection of food products. The same personal code was used in the Evaluation Questionnaire, the Personal Characteristics Questionnaire and the Health Consciousness Questionnaire for each participant. The Question 5 was a reverse-scoring item, by asking that . The participants were asked to indicate their agreements with 14 health statements in an online survey and their answers were written into a .txt document in the server according to the corresponded personal code. The questionnaire was indicated on a scale of 1-9, with 1 representing "not agree at all" and 9 representing "totally agree" (Appendix A.5).

5. Data Analysis

This chapter is divided into four subchapters. First subchapter is a brief description of the procedures used to examine and screen the data for hypothesis testing. Second subchapter details the method problems. Third subchapter aims to clarify the respondents´ profile, followed by the forth subchapter, which presents the Results of Data Analysis.

5.1 Preparation of Collected Data

During the development of questionnaires, each item of questionnaires was assigned a scale of measurement and a code. Coding was primary used to facilitate the data analysis procedure. Furthermore, the data were double-checked for accuracy of data input before the data analysis. For the interested categorical variables, dummy variables, such as gender, were generated to identify the nominal variables. Original datasets store repeated observations on a sample of subjects in "one subject per row" format. Data restructure has been doen to enable they in separate rows before MIXED Procedure. The person who owns dog was coded as "Owner1" whilst the other two categories had only several members, they were summed to form a new group "Owner 2". The scores of reverse-scoring item in health related survey were recoded before analysis of the data.

After that, assumptions of ANOVA were first verified using Levene´s test. P-Value below 0.05 were considered significant for all analyses conducted. Mixed model of SPSS package can be appropriate for analysis. Then the interactions pooled across different factors are presented.

Mauchly's Test of sphericity can then be enforced (Huynh 1979), but because in this thesis, factors' levels are no more than two, so the sphericity test is not necessary.

The analysis involves a test of the interaction between two factors. If no interaction was found, the main effect will be reported. In the situation of interaction found, the plot of interaction was presented.

5.2 Method Problems

In order to reduce method problems two particular method problems must be considered.

5.2.1 Reliability

According to Robson (2002) there are four threats to the reliability of a research. The first one is that the participants or subjects' answers may vary depending on different times when participants have different moods. To eliminate this, the experiments took place on a time, which fits the participant best. The second threat is the subject or participant bias which means that the respondents may give answers that an examiner wants to hear or give the socially desirable response. To avoid this, the experiments were conducted anonymously which means that the participant should not be worried about the other people would recognize them. Phrasing of questions has been taken into careful consideration during questionnaire development to maximize internal validity.

On the other hand, academics experts reviewed the questionnaires beforehand to ensure clarity in the questions. In this way, the above-mentioned threats were controlled. The third and fourth threats are observer bias and observer error.

The author of this paper had made clear rules about the experiment procedure and practiced to give samples to participants before the experiment conducted. . Cross-validation of the dataset was done by splitting the data in two subsets and then test on sample. According to Green and Srinivasan(1978) this validation can be described as reliability testing of the model.

5.2.2 Validity

According to Saunders, validity implies the degree to which a study correctly shows the particular theory that the researcher is trying to measure (Saunders,2007). External and internal validity should be a major concern for researchers. Therefore, all studies attempt to maximize both their internal and external validity. The most common threat to internal validity is selection bias. By randomly assigning participants to both experiment, selection bias are reduced. In order to strengthen internal validity, the population of the present study was limited to Akershus area of Norway.

The result of this thesis can only be used in this situation and specific studies. In other words, it is necessary not to generalize the out come of the end result. The result of present study can not be generalize to all pet owners in Norway because the sample is small to represent all the actual pet food buyers.

5.3 Respondent profile and descriptive statistics

Descriptive statistics, respondent profile and the correlation for all relationships are reported in this subchapter.

5.3.1 Demographics of the participants

Participant demographics are firstly presented in table bellowed (Table 1). All together, 50 participants entered both experiment. One participant had missing data over half of the questionnaires. During data scanning, an outlier was found with one participant in Experiment 1. Another person in Experiment 2 have missing data on health consciousness questionnaire, leaving N = 24 for Experiment 2.

Table 1: Demographics of the participants in the consumer study: gender, age, education level, living area, overweight, age of dog owned

		Experiment 1	Experiment 2
Gender	Total	24	24
	Female	16	15
	Male	8	9
Education level	Primary education	1	0
	Secondary education	6	6
	Bachelor education	12	12
	Master´s or higher education	5	6
Age of respondent	<18	1	2
	19-29	4	2
	30-39	4	4
	40-59	8	9
	>60	7	7
Living area	Ski	4	3
	Ås	12	12

	Drøbak	8	9
Over-weight	Yes	2	1
	No	18	21
	Don't want to tell	3	2
Dog own-ership	Own dog themselves	11	12
	Own by the whole family	8	7
	Dogs of other family members	5	5
Age of dog owned	Puppy	8	13
	Adult	12	3
	Senior	4	8

For Experiment 1, the respondents were mostly female consumers (n=16), compared to male respondents 33.3%. Most of the respondents were from Ås, 50% (n=12). A good percentage of respondents is represented by the category of bachelor education (50%), whereas the percentage of master education or higher is 20.8% (22). The majority of the participants were over 40 years old (62.5%). Descriptive analysis by overweight status of participants showed that 75% (38) of the respondents were reported not to be overweight. 45.8% (n=11) of participants owns dog themselves, followed by 33.3% (8) whose family own dogs. 20.8% of respondents described themselves as their other family members owned dogs. Most of the dogs were adult dogs, while 33.3% of their dogs were puppies and 16.7% of them were senior dogs. For experiment 2, 50% of respondents described themselves as he own dog himself. Most of the respondents were over 40 years old (16). Most of their dogs were puppies (54.17%), while 12.5% of their dogs were adult dogs and 33.3% of them were senior dogs.

5.3.2 Health consciousness correlation

Overall, the Cronbach's alpha was calculated to determine the internal consistency of the statements of health consciousness. All the items were highly correlated; therefore the participants' answers to the statements about health consciousness were averaged.

In order to assess associations between health consciousness and expected health perception, expected liking and WTP, Spearman correlations were calculated between the averaged health consciousness scores of each participant and the above-mentioned outcomes.

5.4 Results and Finding

5.4.1 Product comparison: expected liking

Therefore, before we perform statistics analysis, aggregate procedure was necessary done for obtain summary statistics for dependent variables for each product combination. A simple one-way repeated measure analysis was done for both experiments on expected liking. For Experiment 1, we observed that one participant rated extremely high score for peppermint aroma samples, which resulted in normality problem with the dependent variables. According to the five assumptions before repeated measure analysis, there should be no significant outliers in the related groups. Even when we have outliers, we have some options to deal with outliers. For example, the score of extreme this participant was filtered out. To check whether the distributional assumptions of ANOVA were met, normality was tested using shapiro-wilk test over the aggregated data of all observed variables under both Experiments. The result shows that distribution of the dependent variables is not significantly different from normality after the outlier is deleted. Values below 0.05 were considered significant for all analyses conducted. Appendix A.1 shows a part of data after reconstruction. A simple one-way repeated measure was conducted for both experiments on expected liking. For Experiment 2, in order to determine which means are significantly different, we need to instruct SPSS to compare main effects. Result is shown as followed:
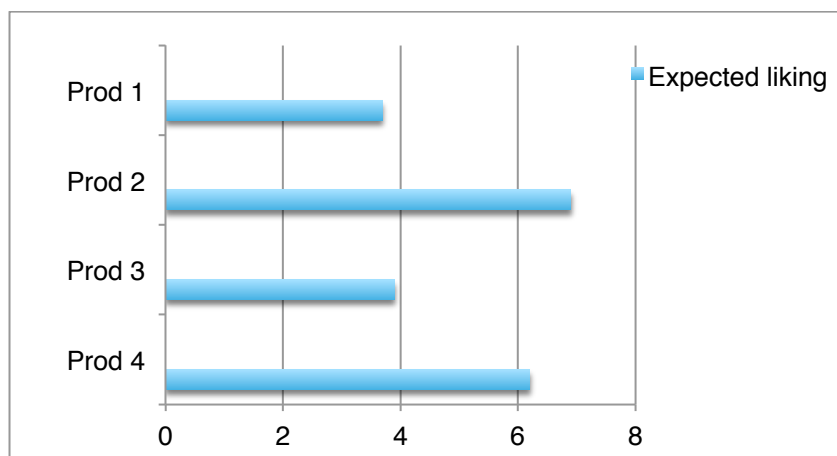

Figure 7 : Expected liking scores for 4 products in experiment 2. Product 1 (health claims and negative video); Product 2 (taste claims and possitive video); product 3(taste claims and negative video); product 4(taste claims and possitive video).

Drivers of expected liking shows that, the most liked sample was the combination of health claims and beef aroma , whilst the least liked one was sample with health claims and peppermint aroma. Since the significant probability is less than 0.5, we also run pairwise comparisons among different products. The result of pair comparison is shown in Table 2.

Pairwise Comparisons						
Measure: Expected_liking						
		Mean Difference (I–J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
(I) prod	(J) prod				Lower Bound	Upper Bound
1	2	2.292[*]	.272	.000	1.728	2.855
	3	-.654[*]	.178	.001	-1.021	-.286
	4	2.513[*]	.338	.000	1.815	3.212
2	1	-2.292[*]	.272	.000	-2.855	-1.728
	3	-2.945[*]	.294	.000	-3.553	-2.337
	4	.222	.286	.446	-.371	.814

Table 2. Result of pairwise comparisons

From this table we can see that the product 1 is significantly different from all the other products. But product combination 2 is not significantly different when comparing with product 4. Mauchly's Test of sphericity can then be enforced to chech the sphericity. Since the p value is 0.031, we cannot assume that the variances between the four sets of scores are equal. F-value were shown as:

Measure: Expected_liking

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Sphericity Assumed	184.496	3	61.499	61.579	.000	.728
Greenhouse-Geisser	184.496	2.274	81.115	61.579	.000	.728
Huynh-Feldt	184.496	2.537	72.712	61.579	.000	.728
Lower-bound	184.496	1.000	184.496	61.579	.000	.728
Sphericity Assumed	68.911	69	.999			
Greenhouse-Geisser	68.911	52.313	1.317			
Huynh-Feldt	68.911	58.359	1.181			
Lower-bound	68.911	23.000	2.996			

Table 3. Tests of Within-Subjects Effects

Simiarly, the result of one-way repeated measure of Experiment 2 shows as followed:

5.4.1 Factors impact on expected liking, taste expectation, health expectation and WTP

Health information is one of the extrinsic factors/cues that has been demonstrated to affect consumer choice. The health claims enhance smell effect on taste expectation of dog food. The claims of health influence consumers' health expectation differently between different groups. Smell effects between different health conscious groups moderates by health claims in terms of Willingness-to-buy. Suggestions to the dog food retailer can be that the health claims should be placed on the package to enhance smell, and further enhance sales. In some other studies, it has been suggested that labels or any information which given with the product will most likely affect consumer´s expectation of the product(Isen, A. M., 2004; Kihlberg, I.,2005).

Effects	Liking	Expected health	Expected taste	WTP	Portion	Smell acceptance

	P-value					
Claims	0.861	0.025	0.048	0.512	0.635	0.051
Aromas	0.060	0.033	<0.001	0.002	0.200	0.007
Claims*Aromas	0.576	0.228	0.042	0.032	0.677	0.709

Table 4. p-value of impact in experiment 1: significant value is marked as red

WTP did not seem to be driven by claims, but aroma seems to have huge effect on WTP. For experiment 2, the significant effects obtained from the repeat measures analysis are summarized in Table 5.

Effects	Liking	Expected health	Expected taste	WTP	Portion
videos	0.059	0.033	0.035	0.019	0.033
claims	0.826	0.866	0.428	0.847	0.667
Claims*videos	0.253	0.148	0.042	0.298	0.128

Table 5. p-value of impact in experiment 2: significant value is marked as red

With respect to dog reaction, positive reaction typically enhance consumers' expected health and attitudes towards this dog food product and willingness-to-buy, while negative reactions have an unfavorable impact on product attitudes. The claims have shown no effect on consumer behavior might due to that consumer pay more attention when video presents. Moreover, according to the findings about the impact of factors on dry dog food, dog reaction and aroma characteristics has been suggested to have possibility to affect consumers choice. Larger differences between the data of the assessors has also be found in the smell. The differences might be due to there are rather large

individual differences between the judges of different smell information than visual information, which is suggested by some previous food studies (Garmt 2004, Nancy 2004)

6. Discussion

6.1 Conclusion and implications

This research contributes to the understanding of how factors can influence dog food choice. Firstly, descriptive analysis showed the some tested dog food samples with different combinations (profiles) were different from each other. Secondly, the impacts of three design factors were analyzed by two-way repeated measure ANOVA.

The impacts of these individual products on expected liking are significant for Experiment 1. It is worth noting that peppermint smell results in lower expected health, and acceptability for human usage than beef smell. One possible reason for this poor acceptance of smell could be that the dog food industry have been using animal origin by-product for a long time. The SD of peppermint acceptance for human usage is larger than the SD of claim information, which agrees with the previous study of(Di Donfrancesco 2012), which is aroma impact on product experiences. Another reason for low acceptance regarding peppermint aroma could be that it may lead the dog owners to associate plant smell with nutritionally unbalanced foods given that dogs are carnivorous.

Interestingly, the result suggests that the negative reaction of dog interact with the health claims, since the consumer may still be interested in buying the product because of the health-related claims, regardless of the negative reaction of dog. The result also reveal that the consumer consider beef smell to be healthier than peppermint smell. However, the claims also moderates the impact of smell on willingness-to-buy, similar to the claims moderates the impact of negative reaction of dog.

The second study indicated that consumer´s liking was most influenced by the dog reactions, when comparing with health claims. From a marketing perspective, the ability to communicate the health benefits of dog foods is a key aspect for the success of dog foods marketing. The results reveal a positive correlation between health awareness and consumer expected health perception. In addition, the empirical findings suggest that consumers who are guided by the health information are most likely health conscious consumers (Nancy et al 2004).

One of the key findings of this study is that the claims is suggested as one of the significant factor that moderates WTP decision making. Peppermint aroma seems to have a negative relation with

pet owner´s liking. This may be related to that dog owners are generally more accepting "meaty aroma" than healthy aroma, which is consistent with the results from other pet food consumer studies (Di 2012). But the same was not seen from the result of Experiement 2. In general, peppermint aroma can also play an important role in expected dog food liking. Interesting, the presence of health claims seemed to increasing liking by consumers of peppermint aroma. Based on the present study, dry dog food products will be well liked by consumers if the dog has a positive reaction.

6.2 Suggestions for future research

The paper shows the first empirical evidence about the relationship between dog food packaging and its impact on purchasing behavior. Because of the sampling criterion, the finding cannot be easily generalized. Since data collection was limited to Akershus area, our finding may not be applicable to dog owners in different area, with different cultural backgrounds. More research might be done in mapping the impact on purchasing behavior along multiple groups and locations.

Appendices

Appendix A.1 - Restructured Data for Analysis: Four case for each subject.

	personnr	smell	package	like	health
1	3014.00	SH	PH	6.33	5.33
2	3014.00	SH	PT	7.00	6.33
3	3014.00	ST	PH	6.00	6.00
4	3014.00	ST	PT	7.33	6.67
5	3015.00	SH	PH	5.00	5.33
6	3015.00	SH	PT	6.00	6.33
7	3015.00	ST	PH	4.33	4.00
8	3015.00	ST	PT	4.67	6.00
9	3016.00	SH	PH	3.67	4.00
10	3016.00	SH	PT	5.00	5.67
11	3016.00	ST	PH	6.33	5.67
12	3016.00	ST	PT	5.33	5.00
13	3017.00	SH	PH	4.67	4.67
14	3017.00	SH	PT	5.67	6.00
15	3017.00	ST	PH	4.67	5.00
16	3017.00	ST	PT	6.33	5.67

Appendix A.2 - Pairs of claims selected for package design

Pairs of claims selected	
"Your dog will love this taste"	"Your dog will be much healthier"
"Real Taste. Real Excitement"	"For Good Health Of your dog"
"100% great taste for your dog"	"100% precisely balanced nutrition"
"For dogs with an appetite for life"	"Omega-3 fatty acids can improve heart health"
"Superior & Tasty"	"Protein & Healthy"
"So delicious"	"So healthy"

Appendix A.3 - Personal Characteristics Questionnaire

Personal code: _____

This questionnaire deals with the general information of you.

Please complete the questionnaire in its entirety. It should only take a few minutes. To answer, please indicate your selection by circling. Make only one selection per question. Thank you!

1. Please indicate your gender: ☐ Male   ☐ Female

2. Please indicate your education level:

☐ Primary education level or lower.

☐ Secondary education.

☐ Bachelor´s education.

☐ Master's lever or higher education.

☐ Others: _____

3. How old are you?

☐ Younger than 18

☐ Between 19 and 29

☐ Between 30 and 39

☐ Between 40 and 59

☐ Older than 60

4. Where do you live in Norway? You can write down the name of the town or Post code.

Post code(4 digits) ☐☐☐☐

Name of the town _____

5a. Do you have nose conditions or eye diseases? ☐ Yes   ☐ No

5b. If yes, what do you have ? ☐Nose conditions ☐Eye diseases

6. Are you overweight?

☐ Yes

☐ No

☐ I don´t want to answer

7. Do you or your family members have dogs?

☐ My own dogs

☐ Dogs of my whole family

☐ Dogs of my other family members

8. Is your dog a puppy, an adult or senior dog? If you have more than one dog, you can choose to describe the one you spend longest time taking care of.

☐ Puppy

☐ Adult

☐ Senior

Thank you for your time and attention.

Appendix A.4 - Measurement Questionnaire

Measurement Questionnaire for Experiment 1

Personal code: _____

Questions on dog food

Using the scale below, indicate the answers by circling one of the numbers.

1. I like this dog food.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

2. I think this dog food is very healthy.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

3. I think this dog food is very tasty.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

4. What is the maximum price you are ready to pay for 1 kg of such kind of dog food?

I don't want to buy	21kr	24kr	27kr	30kr	33kr	36kr	39kr	42kr
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

5. If your dog would take a bowl of this dog food, how many grams in the bowl would you expect?

<150g	160g	170g	180g	190g	200g	210g	220g	>230g
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

6.This smell would be suitable to use in a similar snack food product for humans.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Measurement Questionnaire for Experiment 2

Personal code: _____

Questions on dog food
Using the scale below, indicate the answers by circling one of the numbers.

1. I like this dog food.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

2. I think this dog food is very healthy.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

3. I think this dog food is very tasty.

Strongly Disagree								Strongly Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

4. What is the maximum price you are ready to pay for 1 kg of such kind of dog food?

I don't want to buy	21kr	24kr	27kr	30kr	33kr	36kr	39kr	42kr
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

5. If your dog would take a bowl of this dog food, how many grams in the bowl would you expect?

<150g	160g	170g	180g	190g	200g	210g	220g	>230g
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Appendix A.5 - Statements on the Health consciousness Questionnaire

1. My diet is healthy
2. I think a good knowledge of how to eat healthily is important
3. I care about the food I eat every day.
4. I think my health is influenced by my food
5. My health is not depends on the foods I consume
6. I consider that the deterioration of my health is very important
7. I am prepared to sacrifice things for my health
8. I am concerned about the quantity of salt that I get in my food
9. I am concerned about the quantity of fat that I get in my food
10. I am concerned about the quantity of fibre that I get in my food
11. I am concerned about the risk of high blood pressure
12. The amount of sugar I get in my food is important
13. The amount of vitamins and minerals that I get in my food is important
14. I am concerned about the amount of cholesterol that I get in my food

Consumers rated these statements on a scale from 1 – not agree at all, to 9 – totally agree.

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