

# Sensory evaluation report essay sample

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Food acceptability is largely determined by the five human senses: sight, taste, smell, hearing and touch. Knowledge of food acceptability is important for many reasons including the health, marketing, sales and development of food products. For these reasons, food sensory evaluation tests have been developed, evaluated and used in all areas of the food industry. Each method of sensory evaluation has advantages and disadvantages which will be discussed. Sensory evaluation tests conducted in this experiment include: Paired Comparison, Hedonic, Triangle and Ranking on a range of food samples. Propersensory evaluation conduction, data collection and analysis will be reviewed as well as the results from the conducted sensory evaluation tests. The assessment will address potential ways for improved analysis and how sensory evaluation tests have proven useful in many studies and the food industry.]

## INTRODUCTION

All five of the human senses help people in the evaluation of food and in determining whether or not they will consume it or enjoy it. Sight usually has its first interaction with food. It allows for people to see the colour, shape, size and any maladies a food may have. Colour can be used by people to determine how ripe their produce is to how concentrated their beverage may be. Smell plays a role in deciding what a person eats and is a far more sensitive chemical receptor than the tongue; it can be grouped into 5 categories: spicy, flowery, fruity, resinous and foul. Odours are detected by the olfactory epithelium and become stronger when volatile molecules become more concentrated. Taste (gustation) is one of the most important factors in determining food selection; it is detected by the tongue when

saliva surrounded food particles touch gustatory cells that send signals to the brain which differentiate tastes. There are 5 basic types of taste: sweet, sour, bitter, salty and savoury/umami, all of which perform an important role in food selection. The umami taste is due to the detection of the carboxylate anion of glutamic acid, a naturally occurring amino acid common in meats, cheese, broth, stock and other protein foods. The tip of the tongue is most responsive to sweetness.

The base (back) of the tongue is most responsive to bitterness and the centre of the tongue appears to be relatively insensitive. Touching food with fingers or the mouth can channel many characteristics of a food to a person including: texture, consistency, temperature, astringency and chemesthesis. Finally, hearing sounds associated with food help to determine certain qualities of foods such as crunchiness, liquidity and temperature. All these senses are important factors in food selection and perceived quality. (Brown 2008) In the food laboratory, the quality of food refers to characteristics in foods that can be subjectively evaluated by human senses. Physical and chemical properties of food are factors that measure food quality; however, measurements of these properties cannot always be quantitative or relevant when it comes to consumer perception and satisfaction. For these reasons, methods of food sensory evaluation have been developed for more subjective ways to measure food qualities. Sensory evaluations include 2 types of subjective testing: analytical and affective tests. Analytical tests are used to detect differences and can involve using descriptive terms to differentiate food qualities. Affective tests evaluate personal preferences of individuals evaluating specific food products (Bethard 2008).

The simplest form of sensory evaluation that can be performed is the evaluation that is done at the bench by the research worker who develops the new products. The research worker usually relies on his or hers own evaluation to determine the differences in the food products. The more formal manner of sensory evaluation is conducted by laboratory and consumer panels in a controlled environment. Sensory evaluation that is performed in the presence of large scale panelists can give clear predication of consumer reactions and demands. Different food products have different composition and ratio ingredients used in them. In order to determine the best composition and ratio that suits the consumer needs, sensory evaluation is done so that the food industry can improve their products to be sold to the consumers. Sensory analysis of food is divided into 3 groups: Effective testing (objective facts about products), Affective testing (subjective facts such as preference) and Percpetion (biochemical and psychological aspects of sensation). The first test conducted was the cola analysis: this was conducted to evaluate perceptions of flavour in association to sweetness and bitterness.

Two samples of cola drink were displayed and analysed by a paired comparison and ranked in order of which was the most bitter. Descriptive analysis sensory evaluations allow panelists to sample food products and describe sensory characteristics using descriptive vocabulary. Classen et al. found that evaluating foods using simple consumer oriented descriptive terms provided for more sensitive and more applicable data for product development and quality assessment as opposed to traditional tests which focused only on defects of a product (Classen 1992). McNeill sought to find

relationship between consumer descriptive analysis and acceptance of peanut butter products (McNeill 2000). This experiment included a panellist evaluating foods using descriptive terms to assess qualities of a bread sample based on colour, flavour and texture. Two separate studies; one conducted by Chan et al. And the other conducted by Philipsen et al. showed similar results when they found colour did not greatly influence perceived beverage taste, acceptance and intensity. Chan et al. concluded, after conducting sensory evaluations on young adults and the elderly, that data did not support the hypothesis that colour greatly influenced perception of taste and acceptability (Chan et al. 1997).

Philipsen et al., who also conducted sensory evaluations on young adults and the elderly, stated that colour concentration did not affect flavour concentration perception in either population (Philipsen 1995). A paired comparison test was conducted to determine which of the given sample has the preferred appearance. In this experiment two samples of tinned grapefruit were analysed in a similar method where a paired comparison tests was used to determine whether the appearance of one sample is preferred over the other. A duo- trio test involves three samples, two of which are the same. It determines which sample differs from the rest. The duo-trio states which sample is different and what is different about it. It is descriptive and is useful in differentiating samples that have different ingredients or are from different production lines. This was used in the 3 bread samples to determine the texture and dryness. Scoring tests use a scale on which a characteristic of given samples must be rated on a scale (Adair 2001). Adair et al. utilized a scoring test, such as the one in this

laboratory, to analyze cookie samples with various concentrations of mung bean paste.

The scoring test in this laboratory used three bread samples; the samples were ranked on a scale from 1-5 to determine how dry the samples were, particularly in comparison to each other. This scale has numerical value and can provide somewhat objective data while hedonic scales, such as in Campbell et al study on acceptability of healthier cakes, give more subjective data (Campbell 2001). Ranking is a method of classification where a series of sample is placed in order of intensity of some specific attribute. It is a good consumer test for acceptance or for order of preference. This was applied to the 5 bread samples and the enteral feeds where smell, flavour, colour and texture were analysed. The overall objective of this laboratory was to become familiar with various sensory evaluation tests, the proper way to conduct sensory evaluation tests and possible reasons to use or not use each type of test. Another aspect of this lab was to learn about how human senses may affect food perception; it addresses the colour affect and smell on perceived taste and preference. METHOD

6 experiments were conducted on a range of food samples; each requiring different sensory tests. The tests were conducted in a well lit lab, and each test was separated in different areas of the lab. Access to water was available to cleanse the pallet between tests in which tasting a food sample was involved. Samples that were meant to be tasted were contained in small plastic cups or on a plain white paper plate. Anonymous codes were given to samples which were meant to be unknown by the tester. Then each sample had to be described and rate various sensory aspects, some tests were

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based on mere appearance of samples, others required samples to be tasted. Data was collected for each response.

1. Two samples of cola drink-paired comparison test:

This comparison test was conducted to determine which sample of cola given was perceived to be the least and greatest bitterness, the characteristic being evaluated. Each coded sample was poured into the white plastic cups and consumed with a drink of water between each sample. The results were recorded.

2. Two samples of tinned grapefruit-paired comparison test:

This comparison test was conducted to determine which sample of grapefruit was preferred in relationship to its appearance only. Results were recorded and descriptive observations were also made as to the reason of choice.

3. Two samples of fat-: paired comparison test:

This paired comparison test was conducted to determine whether the flavour of one sample is preferred. Each coded sample was spread on the same sample of bread and consumed. Water was drunk between the two samples so that they would not be contaminated by other flavours. Results were recorded and descriptive observations were also made as to the reason of choice.

4. Three samples of bread- Triangle Trio test with scoring:

This triangle test was conducted to determine whether the texture of one sample is drier than the other. The samples from a selection of 5 were selected onto the given white paper plates. Each coded sample in turn was consumed with water drunk in between. A scale of 1-5 with one being the  
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driest was set and results were recorded in accordance with the scale.

Descriptive observations were also made as to the reason of choice.

#### 5. Five samples of bread- Ranking Test (Hedonic)

This test was to place samples in order of preference for colour, flavour and texture. As before, 5 coded samples were collected on white paper plates.

Prior to tasting the colour of the samples were assessed and recorded using a scale of 1-5 with one being the lightest. Then each sample in turn with water being consumed between each sample were assessed and recorded for the flavour and texture. The same scale was used, 1-5 with 1 being the least preferred for flavour and 1 being the driest for texture. No descriptive observations were made.

#### 6. Four samples of enteral feeds- Ranking Test

This test involved four different samples of enteral feeds and was to determine the acceptability of these products to patients. Each sample was consumed and ranked in order of personal preference, based on smell, colour and taste. Thought was then given as to how this test would be adapted for children.

Example of questionnaire for the above sensory evaluation tests

#### QUESTIONNAIRE/RESULTS

1) You are presented with two samples. Please indicate in the space below which sample is bitterer.

Code No. BDA



2) You are presented with two samples. Please indicate in the space below which sample looks more appealing based on appearance.

Code No. XFE

3) You are presented with two samples. Please indicate in the space below which sample has the preferred flavour.

Code No. CEC

4) You are presented with three samples. Please indicate in the space below which sample differs from the other two.

The code number of the sample which is different is PCR – driest (3)

DMF- slightly moist (4)

JAQ – moist (5)

5) You are presented with five samples. Please score them from 1-5 (1 being highly dislike and 5 being highly like) based on the colour, texture and flavour of each sample.

SAMPLE CODE Colour Flavour Texture

PCR 1 1 1

DMF 5 3 4

MAC 2 2 4

WRD 4 5 5

JAQ 3 5 5

6) You are presented with four samples. Please score them from 1-5 (1 being highly dislike and 5 being highly like) based on the colour, smell and flavour of each sample.

SAMPLE Colour Smell Flavour

Fortisip 1 2 2

Fortijuice 3 3 3

Ensure 1 1 1

## RESULTS AND DISCUSSION

Paired Comparison Test- The results of the paired comparison test conducted in this laboratory showed that sample BDA was the preferred cola sample, XFE being the preferred grapefruit and CEC was chosen for the fat sample. The paired comparison test is a useful tool for evaluation of product acceptability, allowing for an association between a specific characteristic and consumer acceptability. It is a simple differentiation test but if more analysis is needed, it should be used in association with other tests. The advantages of a paired comparison over other types of difference tests are simplicity and less sensory fatigue.

Though some potential bias may have been apparent as others groups visible reactions towards the samples could be seen. Future tests should be carried out in isolation of others.

Duo Triangle Test- The results showed that sample PCR was the driest and DMF was the least dry. This test is best used to determine what different components exist between samples. These tests are useful for differentiation and description, but do not measure magnitude of different attributes; may be paired with a scale/rating and preference evaluation to better assess differences and acceptability.

Again data accuracy may have been corrupted by bias, due to other groups being able to see each other's reactions; evaluations may be more accurate if not exposed to opinions of other groups.

Ranking Test- In an effort to curb the fat content in peanut butter cookies and maintain consumer acceptability, Adair et al. used a scoring test to rate different quantities of mungbean paste as a substitute for butter in peanut butter cookies. Different attributes of flavour (buttery, peanutty and other flavour) as well as fracturability and hardness of the cookies were scored by a panel along with acceptability. The scoring scale was 1-10 hedonic scale with a reference sample given that was assigned a placement of 5 on that scale. The study found that fat content could not be reduced by more than 50% without losing acceptability (Adair 2001).

A similar study was conducted by Campbell et al. where the acceptability of low-fat sugar free cakes was evaluated using a hedonic scale of 1-9. Low-fat low-sugar cakes scored lower the hedonic scale that regular cake (Campbell 2001). Although hedonic scales don't measure a specific characteristic of a sample, the overall sample is evaluated using the scale. This type of test could provide data to be paired with a scale test to show a correlation between sample characteristics and acceptability.

The scoring test conducted in this test used a scale ranking 1-5 with 1 being the least preferred and 5 being the highest preference for the selected bread samples. Bread sample PCR scored the lowest for all three points of colour, flavour and texture. Bread sample WRD scored the highest overall for all three points.

This same method was used on the three samples of enteral feeds, though this time flavour, smell and colour were being assessed. Fortijuce was ranked the highest on all three of its attributes. This test could be adapted for children by using the simple method of ‘smiley face’ stickers. For each sample they liked they would put a sticker against it. At the end acceptability of the product will be concluded by the total number of stickers at each product.

There was possibility for error in evaluation and data collection for this test. As there were 5 samples that had to be selected and individually labelled on the provided white plates, it would be easy to mix up codes and also for the mix up of samples. Since ranking must occur after all samples have been tried, forgetting the flavour and texture for each sample would also distort results due to inaccurate evaluation and data that could have resulted from sample confusion. Again, there was the same problem of a bias reaction due to others being visible when sampling.

In the future, the ranking tests could be conducted with better labelling. Ranking tests are utilized to relate characteristics to preference, but do not account for degree of difference between attributes; if this is desired it may be paired with an evaluation that scores/rates attributes.

Other factors to be considered are the test environment and the preparation and presentation of the samples as the tests carried out in this experiment were not in a true test environment. Many distractions were apparent and samples became messy and muddled through the high number of people carrying out the same tests. .

## CONCLUSION

Sensory evaluation test continues to play an important role in responding to human senses and relating it to food acceptance. There are several different types of sensory evaluation tests, all of which have advantages and disadvantages; the right one must be used to the most accurate and relevant data. Sensory evaluations must be conducted properly to minimize possible bias or else risk inaccurate data which would lead to inaccurate data analysis.

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