

Sensory analysis is a method used to describe the sensations that humans perceive with their 5 senses when in contact with a product (hearing, touch, sight, olfaction, taste).



Interactions between human and surrounding products are of 2 types : product description or personal feeling. Sensory analysis can be applied to any kind of products.

Senses and sensations

The **sight** refers to the perception of light, colors, shapes;

hearing to the perception of sound;

taste to the perception of savors by the tongue during tasting;

smell to the perception of odors either by direct inhalation or by retro-nasal route during mastication;

touch to the perception of products consistency (hard, elastic, gummy, etc) and to trigeminal sensations (temperature, pungency, astringency, etc).

A sensation is the phenomenon by which a physiological stimulation (external or internal) causes in a conscious human being, a specific reaction that produces a perception.

The three components of a sensation

Quality

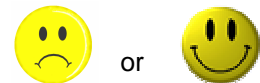


or

Intensity

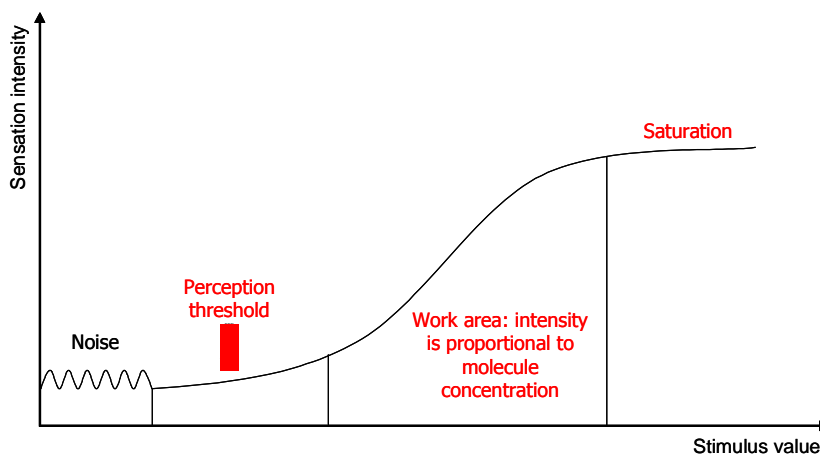
weak or STRONG

Hedonism



or

- Quality refers to the qualification, the description of the sensation.
- Intensity of the sensation is a function of stimulus concentration:



- Hedonism is related to the pleasant / unpleasant aspect of the sensation.

Three major rules to get reliable results in sensory analysis

1. Hedonism must be separated from the other 2 components (quality, intensity).

☛ **Why? to maintain results objectivity.** Indeed, our brain is not able to tell why we like or dislike a product. The idea it expresses is influenced by social codes, beliefs, or the image we have from the ideal product.

☛ **How? Sensory tests are separated into 2 types:**

a- consumer tests

b- analytical tests (discriminative and descriptive)

More about sensory tests

a- Consumer tests

- They only deal with the hedonic part of sensations i.e. I like / I dislike
- No question is answered on the quality or intensity of perceived sensations
- The answers obtained are linked to a context (date, country, environment, etc). It is a photography of the preferences of a given people at a given time
- They are conducted with naive consumers (everybody is able to say if he / she likes or dislikes a product)
- Consumers are selected based on the marketing target selected (a consumer of the evaluated product or a potential consumer of the aimed target for a new product)
- The testing conditions must be the nearest as possible to the real consumption conditions: they are usually conducted at home, in the street, in a room or in a laboratory.

b- Analytical tests (discriminative and descriptive)

- They deal with qualitative and / or quantitative dimensions of perceived sensations.
- They never concern hedonic aspect
- Their aim is to get an objective evaluation of the product
- They are conducted with participant at least initiated (i.e. that knows the methodology of the test)
- They imply a training of panelists on methodology, recognition of perceived sensations, appropriation of shared vocabulary and quantification of these sensations
- There are requirements in terms of results sensitivity and reliability.
- The tests are always conducted in a sensory laboratory with individual boxes.



Discriminative tests

- Recommended whenever it is aimed at comparing products with slight and unknown differences (they answer the question “are these products different?”).
- Conducted with participant at least initiated, but sometimes with naïve consumers (example: is the recipe change perceived by the consumer?).
- Presentation of products is simultaneous, and the order of evaluation is imposed. Then panelists can re-test the products in the order they want. They must provide an answer.
- Different types of discriminative tests: pair comparisons, A - non A, duo-trio, triangular, P among N, ranking.
- These tests can go before descriptive or hedonic assessment.

Descriptive tests

- Recommended whenever it is aimed at describing products for which differences are clearly perceptible and cannot be measured by an instrument.
- The products compared belong to a same market segment.
- Products are defined based on descriptors; and to each descriptors is associated an intensity that corresponds to the level of perceived sensation.
- Different types of descriptive tests: flavor profile (NF V09-16 - Arthur D. Little : 1950), Quantitative Descriptive Analysis (Stone & Sidel : 1974), free profile (Williams & Langron : 1984), flash profile (Sieffermann : 2000), time-intensity method. The Quantitative Descriptive Analysis is the most used.

2. Samples must be anonymous in order to make them uniform.

☞ **Why? To avoid biased results by preventing testers from recognizing or spotting a product.** This allows results objectivity and avoids any influence from a brand a packaging or any information that would enable to identify the product.



☞ **How? The parameters of sample presentation must be uniform** (container, quantity, aspect, temperature, cooking, etc) **and samples are coded with a random number** composed of 3 digits. Samples are delivered to each tester in a different order (design of experiment).



In France, laboratory testing conditions must comply to the recommendations of NF-V09 105 standard.

3. Question a group of persons and get individual answers.

☞ **Why? to take into account the variability of human sensitivity** (no standard observer for smell and taste). The results obtained are more reliable.

☞ **How? Properly define the group composition depending on the type of test:**

- for consumers tests, the larger the group the better the results (at least 60 persons: poll principle). The parameters for consumers recruitment are the age, sex, social / professional category, consumption habits, etc.
- for analytical tests: 10 to 15 experts for descriptive tests and 18 to 30 qualified panelists for discriminative tests. The parameters for trained panelists recruitment are the availability, motivation, sensitivity, ability to understand evaluation scales and to work within a team. The experimenter demand from the group fidelity (ability to give reproducible / repeatable responses when the same product is tested), accuracy (ability to give an average value of measurements close to the real value), exactness (ability to give individual measurements very close to the real value) and sensitivity (smallest difference that a human is capable of detecting between 2 values of parameter or smallest value that a human is able to detect).

