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Sensory analysis — Methodology — Magnitude estimation method

*Analyse sensorielle — Méthodologie — Méthode d'estimation de la
grandeur*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 11056 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Subcommittee SC 12, *Sensory analysis*.

Annexes A and B of this International Standard are for information only.

Introduction

Magnitude estimation is a psychophysical scaling technique where assessors assign numerical values to the estimated magnitude of an attribute. The only constraint placed upon the assessor is that the values assigned should conform to a ratio principle; i.e. if the attribute appears to be twice as strong in sample B in comparison with sample A, the value assigned to sample B has to be twice that assigned to sample A. Attributes such as intensity, pleasantness or acceptability may be assessed using magnitude estimation.

Magnitude estimation can offer advantages over other scaling methods, in particular when the number of assessors and the time available for training are limited. Magnitude estimation offers a high degree of flexibility for both the panel leader and the assessor. Once trained in magnitude estimation, assessors are generally able to apply their skills to a wide range of samples and attributes, with minimal additional training.

Magnitude estimation method is also less susceptible to "end-effects" than those methods which employ continuous or discontinuous response scales. These "end-effects" occur when the assessors are unfamiliar with the extent of the sensations being presented. Then assessors might assign one of the initial samples to a category which is too close to one of the ends of the scale. Consequently, they then find themselves short of graduations and are obliged to classify samples perceived as being different into the same category. This should not occur with magnitude estimation since, in theory, there are an infinite number of categories.

Allowing each assessor to start the process at any numerical value, i.e. to use their own scale, gives rise to a particularly important "assessor" effect. However, there are various ways of solving this problem:

- the analysis of variance (ANOVA) allows the "assessor" effect and the interactions to be taken into account;
- the assessors can be forced to a common scale by use of a reference sample to which a value has been assigned;
- the data supplied by each assessor can be reduced to a common scale by applying one of numerous rescaling methods.

It is up to the experimenter to choose the most appropriate approach based on the circumstances.

The magnitude estimation method is not the most efficient technique for determining small differences between stimuli or for conducting assessments in the vicinity of a detection threshold.

Sensory analysis — Methodology — Magnitude estimation method

1 Scope

This International Standard describes a method for applying magnitude estimation to the evaluation of sensory attributes. The methodology specified covers the training of assessors, and obtaining magnitude estimations as well as their statistical interpretation.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3534-1, *Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms*.

ISO 3534-3, *Statistics — Vocabulary and symbols — Part 3: Design of experiments*.

ISO 4121, *Sensory analysis — Methodology — Evaluation of food products by methods using scales*.

ISO 5492, *Sensory analysis — Vocabulary*.

ISO 6658, *Sensory analysis — Methodology — General guidance*.

ISO 8586-1, *Sensory analysis — General guidance for the selection, training and monitoring of assessors — Part 1: Selected assessors*.

ISO 8586-2, *Sensory analysis — General guidance for the selection, training and monitoring of assessors — Part 2: Experts*.

ISO 8589, *Sensory analysis — General guidance for the design of test rooms*.

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 3534-1, ISO 3534-3, ISO 5492 and the following apply.

3.1

magnitude estimation

process of assigning values to the intensity of an attribute of the products or to their hedonic value in such a way that the ratio between the assigned values and the assessors' perception of the attributes are the same

3.2

external reference

sample which is presented to the assessor to which a numerical value is pre-assigned by the panel leader

NOTE It is the first sample of the series in relation to which all subsequent samples are then assessed.