

# Poster presentations

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## Poster abstracts

### 0004 COMPARISON OF FOUR CONSUMER PROFILING METHODOLOGIES

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Sensory profiling has proven to be an important asset when marketing and developing new products. Despite the fact that traditionally this was carried out using trained assessors', recently a relatively large number of consumer profiling methodologies have been applied. It has been claimed that both approaches yield similar results. In this sense, the aim of the present work was to compare four consumer profiling methodologies (Projective mapping, Sorting, Quantitative Descriptive Analysis -QDA-, and a check-all-that-apply question -CATA-). Seven powdered orange juice drinks were evaluated by four groups of 50-60 regular consumers. Each consumer group evaluated the samples using one of the abovementioned methodologies. After completing each task, consumers were asked to rate the task's difficulty using a 9-point structured scale.

Results for each methodology were separately analyzed using univariate and multivariate statistical techniques. In order to compare results for the four methodologies, a multiple factor analysis (MFA) was carried out.

All the evaluated consumer profiling methodologies provided very similar information since the four sensory maps were alike as distances between samples were similar. Consumers' descriptions for the seven evaluated samples were similar regardless of the methodology considered. MFA performed considering simultaneously data from the four methodologies confirmed these results. Considering data from consumers' difficulty scores, it could be concluded that CATA and QDA were much easier than Projective Mapping and Sorting.

Although all four methodologies proved to be useful tools and provided similar information, CATA and QDA would be preferred over sorting and projective mapping for being easier and less time consuming.

### 0005 Consideration of an ideal point in Projective Mapping

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Projective mapping is an increasingly popular consumer profiling technique that has been reported as interesting and useful to show results. The aim of the present work was to evaluate the use of an ideal point in projective mapping tasks as a way to increase the amount of data gathered from this methodology. Eight chocolate milk desserts were evaluated by two groups of consumers. One group of 40 people performed a projective mapping task with a description phase. After completing the task, they were asked to indicate the location of their 'ideal chocolate milk dessert' in the evaluation sheet. Besides, 50 consumers evaluated the same samples and indicated their overall liking using a 9-point hedonic scale. Results from the projective mapping task were analyzed using multiple factor analysis considering the ideal sample as supplementary individual. The consensus location of the ideal sample corresponded to an intermediate point between two groups of samples. Considering consumers' descriptions, the ideal chocolate milk dessert should have an intermediate chocolate flavour and sweetness intensity, and an intermediate thickness. Results obtained by performing an external preference mapping on consumers' liking scores using samples' coordinates in the projective map provided very similar results, revealing a similar location for the region of maximum liking. The consideration of an ideal sample in projective mapping tasks could be an interesting and easy way of identifying consumers' optimum products within a group of samples and which sensory characteristics they should have.

## 0007 Contrast effects in sensory acceptability testing

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This study is a continuation of the contrast effect research carried out at ACCE International and presented during the 2009 Pangborn Conference. Previous work on contrast effect executed on vanilla and plain soy beverages showed that even fully balanced designs do not entirely prevent a flavour contrast effect from occurring but the presentation of flavour caused a significance bias in judgments of soy beverage acceptability. However, it was not known if this conclusion was valid for other food categories and /or flavours.

This study explored contrast effects in cereal acceptability assessment. Users of both honey nut and plain (unflavoured) cereal assessed paired, two honey nut and two plain cereal products for overall acceptability and specific attribute acceptability. The evaluation was executed in a single session (one day). Presentation of the products was fully balanced to prevent occurrence of carryover effects.

Based on the results, the position of the honey nut flavoured beverage, before or after the plain cereal, impacted the overall acceptability of the plain cereal. The plain beverage was deemed to be significantly less likeable when it was presented after the more palatable honey nut cereal, than when the plain cereal was presented first. The honey nut cereal was impacted less and only a small increase in product acceptability was observed for this flavour when it was presented after the less palatable plain flavour than when the plain flavour was presented first. These results were consistent with the prior results carried out for soy beverages.

## 0013 Training on two attributes simultaneously

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The training of a panel on descriptive tasting has been the object of a great deal of research and remains a hot topic. The proposed procedures typically involve training on a single descriptor in control solutions. We present a methodology of training on two tastes simultaneously with procedures for data collection and statistical analysis. For example, training on the bitter and astringent tastes in water on one hand and in cider on the other hand, illustrates the feasibility and desirability of this approach.

## 0014 Performance of m-AFC (up to four choices) compared with the A-Not A and the first stimulus-fixed dual-pair (4IRX) methods for the overall flavor discrimination, predicted by Signal Detection Theory

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The effects of number of stimuli in a test was investigated using five different methods (A-Not A, 2-AFC, 3-AFC, 4-AFC and 4IRX), when discriminating between the two different apple juices. For all procedures, the nature of differences was not verbally specified but a stimulus was specified as "reference" and the difference between the reference and the other was familiarized using a warm-up procedure. The 4IRX was procedurally equivalent to a dual-pair (4IAX) utilizing four stimulus in a test. But in this method, the first stimulus in each pair was always fixed to the reference stimulus, and thus in the present study, it was named as 4IRX and considered to adopt the duo-trio cognitive strategy.

Twenty four naïve consumers performed 5 experimental sessions and all the five methods in each session. The total number of tastings in a test was equalized across the five different methods, to avoid differential fatigue on different methods.

Estimates of  $d'$  calculated from each session showed that unlike the 4IRX, the performance of the A-Not A and m-AFC was significantly increased over repeated sessions, indicating their dependence on the familiarity to the reference. While for the 5<sup>th</sup> session,  $d'$  estimates of all the five methods were equivalent,

the A-Not A and m-AFC were inferior to the 4IRX when consumers' familiarity to the reference was insufficient. Perceptual memory interference as increasing the number of stimuli in a test was not observed. Fixed presentation in the 4IRX might be favorable for the complex flavor discrimination by stabilizing the discriminative dimension.

0015 Investigating the effects of the information disclosure of sodium reduction on the consumer discrimination using the same-different methods, the first stimulus-fixed dual-pair (4IRX) and a duo-trio with constant reference (RAB) methods

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Minor reduction of sodium can significantly influence not only the saltiness but also the overall sensory properties of the food. The performance of the two different discrimination methods utilizing the constant reference (4IRX and RAB) was investigated in comparison with the same-different test, under the two conditions: with and without the information exposure of the sodium reduction.

An independent samples design was used to study the effects of information exposure of sodium reduction on discrimination between two tomato juices. One hundred ninety two consumers firstly performed a pre-test consisted of 12 duo-trio with the reference in the middle (ARB). Based on these results, consumers were divided into two groups.

For the main-test, to equalize the total number of tastings in a method, each consumer performed six same-different, three 4IRX and four RAB tests in an experimental session. The order of methods tested in a session was counterbalanced over consumers. For the 4IRX, RAB, and the pre-test, the reference was fixed to a tomato juice with higher sodium content, attempting to familiarize consumers to the direction or domain of overall sensory differences between samples.

Results were analyzed in terms of  $d'$  estimates calculated from the pooled data for each method. Only in the RAB, the information exposure of the sodium reduction significantly enhanced consumers' discriminability. The 4IRX and RAB performed better than the same-different test under both the information exposure conditions, suggesting the possibility of adopting a different cognitive strategy from the previously assumed 'comparison of distances' strategy in these methods.

0018 PLS-DA applied to sensory profiling data with a particular focus on the selection on variables

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Several methods have been proposed to analyse sensory profiling data. These methods range from performing principal components analysis (PCA) on the averaged data over assessors to canonical variates analysis (CVA) passing by performing PCA on the dataset obtained by concatenating the assessors' datasets. Each of these methods has its advantages and drawbacks. As an alternative, we advocate the use of PLS-DA. We show how this method of analysis stands at the cross-roads of the methods mentioned above. It also makes it possible to exhibit statistical tools to assess the agreement among assessors and the discrimination of the products. Of particular interest we also discuss the relevance of VIP indices to assess the relative importance of the attributes. A selection of the attributes could be performed on the basis of these indices. The interest of the method is illustrated on the basis of a case study.

0020 Modelling to understand sweetness, sourness and flavour intensity scoring of red raspberries to facilitate marker assisted breeding

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This study explored the basis of three key attributes of raspberry flavour: sweetness, sourness and flavour intensity. Fruits were available from progeny (<188) from a cross of a North American subspecies (Latham) with a Scottish variety (Glen Moy) that had been planted in three environments: field (2006 & 2007) and covered polytunnels (2007) at SCRI; and polytunnel at a commercial site near Blairgowrie (2007). For sensory data, two panels (2006; 2007) of semi-trained assessors scored fruit purees for sweetness, sourness and flavour intensity. Metabolite data on sugars and organic acids, and for a subset of fruits raspberry ketone contents, were obtained from HPLC. Other data was available: e.g. flavour volatiles contents, °Brix, and 10-berry weights.

The first aim was examine the interrelationships between the three crucial flavour attributes. A second was to relate sensory scoring data to metabolite contents. The third was identifying fruit components that contributed to intensity of each flavour attribute.

Univariate modelling, explored correlations between sensory scorings showing sweetness directly correlated with flavour intensity, inversely to sourness. Sweet:Sour ratio was not significantly correlated to any attribute. °Brix was a good predictor of both sweetness and flavour intensity.

Partial least square regression related scoring to metabolite contents. Explanation of variance in sweetness and flavour intensity from sugars and organic acids data was encouraging ( $62% < R^2 < 80%$ ) and enhanced by inclusion of volatiles data. Interestingly raspberry ketone made only marginal contributions. Sourness was not adequately predicted from non-volatiles data. Specific fruit volatiles were significantly correlated with both sweetness and sourness.

0025 Bayesian Networks: an alternative method to understand the link between fragrances and emotions.

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A sniff test was carried out among 150 women on 6 fragrances from the French market. Consumer Emotions (E) and fragrance Personalities (P) were measured thanks to the Sense'n Feel™ non-verbal method, based on boards of pictures and developed by Adriant®. Other data were also collected on the products (overall liking and 6 olfactory items) and on the women (8 socio-demographic items).

Classical statistical analyses (frequency table, cross tabulation, ANOVA...) bring descriptive information about products and relationships between variables. Bayesian Networks were chosen as an alternative method to highlight unexplored links between variables. This modelling tool using both graphics and probability theories aims to set up a network between items and to create a model explaining a target (overall liking).

Combining Sense'n Feel™ data and Bayesian method allowed to get the following information: network connecting emotions, fragrance personalities and olfactory items, identification of the drivers of liking.

This study brought the following conclusions:

- No link between olfactory items and emotions or fragrance personalities, except P.Disturbing.Suffocating linked with the Heavy, Spicy and Woody items.
- Identification of links between emotions and fragrance personalities: e.g. P.Soft.Tender, P.Warm.Welcoming.Joy, E.Tenderness and E.Trust.
- Overall liking mainly explained by emotions (e.g. Tenderness, Joy) and fragrance personalities (e.g. Soothing.Calm, Soft.Tender), partially explained by olfactory items (Heavy) but not explained by socio-demographic data.

This work highlights that Bayesian method provides a schematic and synthetic overview of the links between items by using a model.

0026 Application of CATA questions to identify consumers' semantic space of mobiles and watches. Influence of age and familiarity

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Many researchers have studied users' perceptions of products; however, older users' perceptions are not deeply regarded. Differences in perceptions need to be considered if design aims to meet the expectations of this age group, especially if it involves technology, unfamiliar to this age group. Within this context, the aim of the present study was to analyse how two age cohorts of users perceive products of different familiarity grade (mobile phones and watches), using check-all-that-apply (CATA) questions, a technique not commonly used in the industrial design field.

Two studies were carried out in which 142 and 140 participants assessed a series of images of mobile phones (15) and watches (16) respectively, by answering CATA questions. Half of the user sample was aged between 20-30 years and the other half was aged over 55 years. Data were analysed using Friedman's test, ANOVA and Multiple Factor Analysis.

Results allowed the identification of the values different groups of users pursue when using these types of products. Outcomes demonstrated not only how certain terms apply only to a specific age group, but also how these relate to specific design features. In addition, results also indicated which adjectives are strongly correlated when describing these kinds of products, and how these perceptions differ considerably among age groups and grade of familiarity with a product. Consequently, it evidences the necessity to concentrate on the needs and expectations of the different age groups.

0027 Modelization of user preferences for industrial products by means of neural networks: Logical framework and practical application

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When users emit judgments on their preferences with respect to a certain industrial product, they have carried out a decision-driven process conditioned by multiple factors. If the emitted judgment is based on the user perception, a relation between the product attributes and the emitted judgment must exist. However, this relation is difficult to attain due to its complex and diffuse nature. In these conditions, neuronal networks are able to reveal the relations between the inputs and the outputs.

In the product design scope, researchers have achieved relative success in obtaining models of the users preferences. This study presents a logical framework for the application of the artificial intelligence to obtain user preferences models. A sample of 100 paddle rackets were selected for the experiment and coded in 92 attribute levels. The sample was shown to 6 representative users, who were asked to assess the products using a 7-point likert scale, answering to the question: "Would you buy the racket shown?" Once the answers were obtained, 87 of the rackets were selected to train the generated model of neural networks and 13 rackets to test the prediction capacity of the model. The results obtained in this practical application attest the validity of the proposed model, as its capability of predicting users' responses is highly reliable.

0028 Application of neural networks to predict users' perception of the functionality of products

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The present work further develops previous investigations in which a logical framework was proposed. Such framework was aimed to provide a base for the application of artificial intelligence to the modelization of product users' preferences, by means of neural networks. In a prior study case, it was applied to general aspects paddle rackets. Subsequently, their capacity to predict specific aspects of the product perception, not related with their primary functionality, was validated.

In this study, the framework is used to predict the perception of a specific aspect of a product- a motorbike helmet, directly related to its primary function- security. A sample of 133 paddle rackets were selected for the experiment and coded in 29 attributes with a total of 111 attribute levels. The sample was shown to 4 representative users, who were asked to assess the products using a 7-point likert scale, answering to the statement: "The helmet shown is secure". Based on the product attributes and the answers of the users, 4 neural networks were generated, trained and validated with part of the product sample. Results suggest the model's robustness, being applicable to a diversity of products and levels of detail of the aspect perception to predict.

0029 A calculation on monosodium glutamate and 5'-inosinate synergy

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Monosodium glutamate (MSG) and sodium 5'-inosinate (IMP) are two of the main ingredients providing umami taste. A mixture of MSG and IMP shows synergy; their umami strength is higher than the sum of individual strengths. To maximize umami strength and minimize utilization of MSG and IMP it is crucial to understand this synergy. In 1967 Yamaguchi published  $y = u + \beta \cdot u \cdot v$  as equation for umami synergy ( $y$  is equivalent taste intensity of the mixture in concentration MSG (g/dl),  $u$  and  $v$  are concentrations (g/dl) of MSG and IMP.  $\beta$  estimated at 1218).

Yamaguchi compared mixtures of IMP and MSG with pure MSG by means of paired comparisons. 20 MSG-IMP mixtures were each compared to five MSG samples. Probit analysis for each mixture gave equivalent MSG concentrations. Subsequently the relation between MSG-IMP mixture and equivalent MSG strength was obtained by regression.

With current tools it is possible to analyze the data in more detail. Upon consideration the model should consist in two parts. The first part describes strength of the mixtures. The second part describes the psychophysics process determining the odds in the choice process when there is a strength difference. With graphical models and Bayesian estimation the two parts can be separated.

Relative to the new model Yamaguchi predicted slightly higher strength at low concentrations of IMP and slightly lower strength at high concentrations of IMP.

The new modelling approach was found to increase understanding. The odds at strength difference were related to relative differences in umami strength and IMP/MSG ratio.

0032 Relation between consumers liking and sensory characteristics of young red wines from Rioja Alavesa

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Nineteen wines were evaluated by a trained 10-member panel and by 254 consumers to know the relations between consumer liking and sensory characteristics in Rioja Alavesa young red wines. Ten wines were made by carbonic maceration (CM), 5 of them with Tempranillo (T) grape variety and the other 5 with Tempranillo and Viura grapes (T+V), and 9 wines were made by destemming (DS), 5 with T variety and 4 with T+V.

Trained panel scored the intensity of 8 attributes of odour, 8 of aroma and 6 of taste and mouth-feel sensations in each wine in triplicate, using a discontinuous 7-point scale. Each consumer scored the odour and flavour liking degree for 5 wines on a discontinuous scale from 1 ("I dislike a lot") to 7 ("I like a lot"). ANOVA and principal component analysis were applied using SAS® software.

Results showed that MC wines presented higher scores for odour liking and acidity, and lower scores for tree fruit odour. Wines made with T+V grape varieties presented higher scores for odour liking and herbaceous odour, and lower scores for astringency. There are not liking differences for flavour in

dependence on the winemaking process or grape variety. Also, odour liking would be explained to a greater extent by some concrete attributes, whereas the importance of concrete attributes on the flavour liking is less clear. The results show the relative higher importance of odour characteristics to find differences among the wines and to explain the consumers liking.

0033 Analyzing trees issued from a hierarchical sorting task using HMFA

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The hierarchical sorting task consists in categorizing objects in several steps. Subjects are asked to place objects into groups, then to make subgroups among those groups and so on. The obtained results can be represented into trees, contrary to non hierarchical sorting task which contains only one partition per subject.

The goal of this poster is to present a strategy to analyze those trees based on Hierarchical MFA (HMFA).

The dataset built from the trees is as follows:

- The objects are 16 cards. Each card contains a geometric shapes combining 7 criteria (shape, color, size...) following a fractional experimental design  $2^{7-3}$ .
- Each tree level is a partition, hence a qualitative variable.
- Each group of variables is a child. Overall, 170 children aged from 3 to 10 years old were asked to perform a hierarchical sorting task.

For each child, the hierarchical levels will have the same weight in the analysis. Then, children will have equal weights. Eventually, groups of children will have equal weights by taking into account additional information (such as gender). Therefore, the HMFA is needed to treat this dataset.

From this analysis, we obtain two sorts of results :

- An average representation of the geometric shapes. This result shows which cards are close to each other and shows which criteria were important for children.
- For each child, levels representation were built to approach the dynamic of the trees. Paths are constructed to link the levels and the most common paths can be identified.

0034 Exploration of time-resolved sensory effects of designed salt mixtures in culinary food applications

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Temporal Dominant Sensations (TDS) is an easy-to-use sensory data acquisition tool that allows untrained panelists to record the most dominant temporal sensory sensation (obtained from a pick list) as a function of time. The collected data are commonly represented as a time x attributes contingency table with counts for each panelist/replicate and visualized by complex curve fitting models. Unfortunately, these models completely ignore the binary nature of the data, eagerly over-fit and result in meaningless curvature.

In this work, TDS-data were modeled by means of generalized linear models with a binomial link function and a penalty term for rough curvature (i.e. imposing smoothness). The resulting curves - so-called sensograms - are generally more robust due to imposed prior knowledge and are much easier to interpret.

The smooth sensogram method was applied to study the time resolved sensory effects evoked by different salt combinations (e.g. sodium, potassium and ammonium chloride) generated by mixture designs and applied to culinary food applications. The knowledge about time resolved sensory effects was used to support salt formulation strategies in sodium salt reduction and health themes.

0035 Characterization and perceptual mapping of luxury women's fragrances using sorting, projective mapping and conventional descriptive analysis

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Perceptual mapping: sorting and projective mapping are the untraditional methods to understand product characteristics. The tasks require panelists to group products together (sorting) or to place products on a two dimensional space (projective mapping) according to the similarities and dissimilarities. These techniques are less time consuming and less expensive than the conventional descriptive analysis (DA). The objectives of this study were to: (1) determine if perceptual mapping techniques are useful in understanding sensory characteristics of fragrances compared to the conventional DA; to (2) compare the results of perceptual mapping obtained from descriptive and consumer panels; and to (3) assess consumer reproducibility of perceptual mapping tasks. Twelve commercial women's fragrances were used. Two samples were duplicated for the consumer perceptual mapping study to determine consumer reproducibility. Descriptive panelists ( $n = 12$ ) and fragrance users ( $n = 117$ ) separately participated in perceptual mapping studies. Conventional DA was also conducted with trained panelists. Multidimensional scaling was used to analyze the sorting data, whereas generalized procrustes analysis was used to analyze the projective mapping data. The DA data were analyzed using principal components analysis and cluster analysis. Configurations of these three sensory techniques were similar. Perceptual mapping configurations provided meaningful and consistent product sensory maps regardless of the training level of panelists. Consumers showed reproducibility in performing perceptual mapping tasks. Perceptual mapping was effective as an exploratory sensory technique for screening a large number of products. The experimenter should have the option of using consumers rather than descriptive panelists in understanding product sensory characteristics.

0037 Additional uses of actual vs. ideal data for product development

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Most often, the differences between actual and ideal attribute levels are used to help design an optimum product by assessing how far the current prototype is from the optimum. We discovered two additional ways of analyzing the data to generate consumer and product insights. First, consumers generally perceive their own product more favorably than when tested on a blind basis. We have found that this perception of their own product generally matches ideal ratings. Therefore, this information could be used to design new products to beat or match competition with a meaningful product advantage. That is, we should develop products that on a blind basis beat or match the perception of their own brand (as shown by ideals). Secondly, we also used actual vs. ideal data to segment consumers, and demonstrated how this analysis could turn an unimpressive result (lack of liking differences) into actionable consumer/product insights. Consumer segments were created using cluster analysis based on differences from ideals. Results showed that on the aggregated level, liking and sensory differences were very small among test products. However, segmentation based on the differences between actual and ideals led to two distinct consumer segments, which responded to the test products differently. In addition, reasons for clustering on differences from ideal instead of clustering on ideals alone are discussed. This paper uses examples to illustrate how these analyses were conducted, and discusses how the results were utilized.

0040 Extending the accounting to scaling differences approach in a TV sensory panel

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Scaling differences will often constitute a non-trivial part of the assessor-by-assessor interaction in sensory analysis. In Brockhoff and Sommer (2008) a simple mixed model approach was suggested to identify and account for scaling differences in sensory profile data, where the product averages are included as a simple random covariate. The random coefficient model leads to a simple decomposition of

the assessor-by-product interaction into two parts: The scaling differences and the remaining disagreement variability.

The present paper shows the result of this approach on a sensory data set from the TV industry showing that the scaling effect is significant (on 5% level) for 9 out of 15 attributes and close to significant for several of the remaining 6 attributes.

The modelling is extended to be able to also take replication/session structures into account in the simple mixed model approach. The result of this approach shows that the assessor-replication within product interaction is significant (on 5% level) for 12 out of 15 attributes. In this case, should be interesting to investigate the scaling effects. It is significant (on 5% level) for the same 9 attributes at the simple mixed model approach.

The 12 products in the TV data come as a 2-way structure with 4 pictures shown on 3 TVs. The scaling effect is significant for 7 out of attributes and close to significant (on 5% level) for several of the 8 remaining attributes.

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0041 Understanding of some basic statistical models in Senpaq, their application to sensory data, and their practical value to undergraduate students

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Sensory panel data analysis is an important process used to monitor and interpret product differences as well as panel performance. While other well documented and trusted statistical methodologies exist, Senpaq, a statistical software program, can also be used to analyze the data. Senpaq generates information which is easily interpreted by sensory professionals. The focus of this paper was primarily on the generated ANOVA tables, P-values, and means. These simple statistical methods of analyzing data are often used and are basics in statistical knowledge. In order to use this program to its fullest potential, a detailed analysis and explanation of the mathematics and statistics behind the outputs is necessary, which serves to consolidate understanding of its usefulness and application. While important for sensory professionals to have an understanding of the mathematics and statistics involved in the analysis, this application is also beneficial for students pursuing a career in the statistical field. It provides a bridge from classroom learning to how mathematics and statistics can be applied in the real world.

0042 A Simplified Approach to Tracking the Performance of Experienced Sensory Panelists

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The performance of four trained sensory descriptive panelists with 14 years experience was tracked using Senpaq software. Of initial interest was whether experience enhanced panelists' performance and whether panelists' performance would degrade over time with age and extended experience.

Panelist performance appeared to vary greatly as indicated by the performance measures within the software. This variability could be attributed to the complex and somewhat inconsistent nature of the products tested, rather than the software. A simpler approach was initiated, using some components of the Senpaq software.

Performance on four basic taste attributes was examined. The variance of panelists' individual product rep scores from the mean of the entire panel (n=8-12) was graphed. A value of  $\pm 1.0$  was determined to be the expected range in which the scores of these experienced panelists should fall. Frequencies outside the range were calculated; the higher the frequency, the poorer the performance.

Higher frequency scores were greatest in early studies, particularly for sweetness. As experience increased, out-of-range scores decreased for most tastes indicating experience does enhance performance.

A recent measure of acuity confirmed 3 experienced panelists successfully identified threshold concentrations of most basic tastes. This suggests keeping them on as panelists is appropriate despite age and extended time on the panel. One panelist showed that additional training or retirement is necessary.

Once confirmed, this simple approach could be applied to track all panelists and to measure performance on more complex attributes such as texture.

0044 Using ANOVA-PLS for improved interpreting and prediction of an electronic nose response for wine ageing characterization

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One of the most important problems related to the electronic nose is to interpret the sensors responses in terms of their sensory meaning. For this reason in this work we identified the volatile organic compounds with a GC-MS and olfactometry and evaluated the capability of the electronic nose to discriminate red wines. The main subject was to identify sensorial differences between wine ageing in traditional system (barrels) and wine treated by the alternative methods (chips, staves).

In addition we used ANOVA-PLS for data analysis in search of to correlate information coming from GC-MS (quantitative evaluation), olfactometry (qualitative evaluation) and electronic nose (general pattern description) and finally to assign an aroma description to each sample evaluated by the electronic nose.

The parameters obtained were compared by another classical method as PLS-DA. The results showed that more information could be obtained from the wine characterization by combining three different experiments. PLS-DA and ANOVA-PLS, seem to perform rather similarly estimate the variance of the parameter evaluation. PLS-DA has more bias and gives models with more latent variables than ANOVA-PLS. ANOVA-PLS is also sensitive to weighting of the variables in the sense that we get analysis of different techniques and is necessary to avoid colinearity problems.

0045 Comparing computer intensive tests for panel consonance through Monte Carlo simulation

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For a panel training to be considered successful is desired the panel to be consonant, i.e. the assessors to agree with each other. In specialized literature one can find some statistics able to estimate or test panel consonance, some of them based on principal components. Recently, three new computer intensive tests have been proposed for testing the variation explained by the k first principal components. The aim of this paper was to adapt them for the consonance context and compared them with two (not so recent) tests found in the literature, through Monte Carlo simulation. Several cases were generated from the combination of different sample sizes, number of variables and number of virtual assessors. The new tests have shown an excellent performance and must be considered when testing panel consonance.

0048 Relation between holistic methods and preference

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Two methods of sorting were studied on 16 advertisements on juice: the Free Sorting or Categorisation and the Hierarchical Sorting. For the Free Sorting, objects were grouped depending on different criteria chosen by the participants. For the Hierarchical Sorting, volunteers were asked to group products following their own attributes but in several steps; they thus obtained a hierarchy of products as result. Then participants had also to rate the advertisements following their preference. This study aimed to relate holistic methods and preference at a global and an individual view. For a global view, it appeared that both products space created by Hierarchical or Free Sorting can predict internal or external preferences. By looking to the axes 1-2-3-4 of the products spaces resulting from Free or Hierarchical Sorting, preferences are as well represented on the both products spaces, nevertheless by focusing to the axes 1-2, preferences are better projected on the Free Sorting products space. From an individual view, concerning the Hierarchical Sorting the higher the number of groups made and the hierarchy levels are and the better preferences are linked to the sorting. However, in the Free Sorting, more consumers are grouping according to preference. In conclusion, holistic data are linked to preferences: For a global

view factorial analysis (MCA or MFA) can be used for preference mapping. For an individual view, as sorting is often linked to preference, holistic methods can't be compared to descriptive methods but rather to a mix description and preference method.

0050 Comparative study of free sorting and hierarchical sorting - a case with advertisements

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At the moment, different holistic methods to typify products are on the market. For example, napping or free sorting are generally used. This study aims to assess a new family of methods: the hierarchical sorting, by comparing it with the free sorting, used as a reference.

The data has been collected by using 16 advertisements (created and structured on an experimental design) that panelists had to sort, following specific protocols of free sorting on the one hand and of hierarchical sorting on the other hand.

The comparison is based on three points: factorial representation of the advertisements, factorial representation of the panelists and words used by the panelists.

Regarding the first point, similarities have been pointed out given that the representations of the advertisements look like each other. Yet, the hierarchical sorting suggests a more analytic way of sorting. For the second point, both representations of the panelists underline the factors of the experimental design used by each panelist in his sorting. But hierarchical sorting induces supplementary information, in particular it gives the importance of each factor assigned by a panelist at each level of hierarchy. Finally, words analysis is particularly interesting to understand precisely the sorting of the panelists. Results show that the words used reflect the factors of the experimental design. But the hierarchical sorting highlights also the importance of each word at each level of hierarchy.

To conclude, hierarchical sorting enables to analyze at each step of the sorting, both individual and global dynamics.

0052 Comparing Napping, Flash Profiling and Conventional Profiling

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Recently, a number of fast descriptive sensory methods have been described to comply with industry wishes to faster obtain sensory results. It is important to understand the reliability and validity of these methods.

This study has applied and compared the fast evaluation methods Napping[1] and Flash Profiling[2] with a conventional descriptive profile. Each evaluation was carried out by expert assessors (ISO 5492:2008). All assessors were from the same panel pool but assessors taking part in one evaluation could not take part in one of the others. In all evaluations the same product range of nine commercial Danish lever pâtés were used.

The Napping procedure was carried out as one Global Napping and three Partial Nappings on specific sensory modalities and with one repetition. Flash profiling was carried out with three repetitions, while the conventional profile consisted of four repetitions.

As the methods differ in both the amount of time spend on training, the number of repetitions and attributes as well as the describing depth of the results, reliability and validity are important issues to address. Product space configurations obtained by the different approaches are compared using Hierarchical Multiple Factor Analysis and residual variance is compared and presented.

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