Quasi-Implication in Judgements of Sensory Attribution

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Introduction

The basic goal of categorization is to predict the probability of various unexperienced features of objects (Anderson, 1991). In addition, we propose that the prediction of the probability of unexperienced features is based on known oriented relationships between properties: to what extent does the color of a bird's feathers allow us to determine whether it is male or female?

Our assumptions are as follows: (1) the external environment is composed of objects, (2) each object sustains properties, (3) objects have properties in common, (4) this commonality of properties furnishes a structure in terms of oriented relationships between objects, and finally (5) the internal environment should reflect this structure in terms of relationships between properties.

In studying the relationships between properties, i.e., between the descriptors of objects, two types of relationships can be observed: *intensive* and *extensive* relationships. Here we will mainly study extensive relationships of implication through the Bayesian method of implicative analysis (Bernard & Charron, 1996) which is conducted in two phases:

(1) A descriptive phase which consists in determining, for each pair of properties, the eventual relationships of quasi-implication strictly observable in the data set (the sample); and

(2) An inductive phase (based on a Bayesian model) that allows generalizing the results of the descriptive phase to a larger population from which the sample was extracted.

Method

The data consisted of judgments attributing intensity values to perceived sensory properties (dessert creams). Twelve experienced professional sensory analysis judges participated in the experiment, there were six men and six women, aged 25 to 40.

Results

The results allow demonstrating that several properties commonly considered independant are in fact related to other:

Weak color quasi-implies weak bitter taste. Strong color quasi-implies weak caramel and weak hazelnut taste. Strong cocoa taste quasi-implies strong dark brown, medium powdery and strong cocoa taste. Weak powdery quasi-implies weak thickness.Weak cocoa taste quasi-implies weak consistancy, weak color, weak bitterness and weak thickness. Medium bitterness quasi-implies weak hazelnut taste and strong dark brown color, etc.

Conclusion

We have shown through descriptive and inductive analysis that extensive property relationships can be detected and quantified. It is nonetheless well to note that the quasi-implicational relationships found here are relative to the group of three products analyzed in this study and could be modified if the world studied contained other objects. The property implication chains that descriptive and inductive analysis have brought to light here might, for example, allow optimising sensory testing sessions by asking experts to evaluate only the most relevant properties (i.e., the independent properties). This analysis also allows predicting unexperienced object properties from known ones. For example, we have shown that "If a dessert cream has a weak color (is quite light), then there is a good chance that it will also have the weak bitterness property (not very bitter). We verified these quasi-implications by questioning the judges directly, " If a dessert cream is quite light, does that mean it will not be very bitter? " (and vice versa). Finally, we believe these results concerning the extensive implication of sensory properties can be extrapolated to other domains such as the study of representations and comprehension.

References

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