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SENSORY EVALUATION TECHNIQUES

Volume I

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CRC

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Sensory Evaluation Techniques

Volume I

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CRC Press, Inc.
Boca Raton, Florida

Library of Congress Cataloging-in-Publication Data

Meilgaard, Morten.

Sensory evaluation techniques.

Bibliography: p.

Includes indexes.

I. Sensory evaluation. I. Civile, Gail Vance.

II. Carr, B. Thomas. III. Title.

TA418.5.M45 1987 681.2 87-6613

ISBN 0-8493-5430-7 (set)

ISBN 0-8493-5431-5 (v. 1)

ISBN 0-8493-5432-3 (v. 2)

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Direct all inquiries to CRC Press, Inc., 2000 Corporate Blvd., N.W., Boca Raton, Florida, 33431.

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International Standard Book Number 0-8493 5430-7 (set)

International Standard Book Number 0-8493 5431-5 (v. 1)

International Standard Book Number 0-8493 5432-3 (v. 2)

Library of Congress Card Number 87-6613

Printed in the United States

To Manon, Frank and Cathy

PREFACE

How does one plan, execute, complete, analyze, interpret, and report sensory tests? Hopefully, the practices and recommendations in these two volumes, cover all of those phases of sensory evaluation. The test is meant to provide enough information for a food technologist, a research and development scientist, a cereal chemist, a perfumer, or a similar professional working in industry, academics, or government to conduct good sensory evaluation. The books should also supply useful background to market research, advertising, and legal professionals who need to understand the results of sensory evaluation. They could also give a sophisticated general reader the same understanding.

As a "how to" for professionals, the text aims at a clear and concise presentation of practical solutions, accepted methods, and standard practices. The authors at first intended not to devote text and readers' time to resolving controversial issues. Unfortunately, we encountered quite a few which had to be tackled. This is the first book to give an adequate solution to the subject of similarity testing, see Chapter 6, Section II.G and Statistical Tables T11, T12, and T13 at the end of Volume II. Fully half of all sensory tests are done for purposes of similarity testing, for example when an ingredient must be substituted for another which has become unavailable or too expensive, or when a change in processing is caused by replacement of an old or inefficient piece of equipment. Another first is the unified statistical treatment of all ranking tests with the Friedman statistic, in preference to Kramer's tables. We have taken a fresh look at all statistical methods used for sensory tests and hope that you like our straightforward approach.

Also new is a system called Spectrum®, developed by one of us (GVC) for designing procedures of descriptive analysis (Chapter 8). The philosophy behind Spectrum is twofold; (1) to tailor the test to suit the objective of the study (and not to suit a prescribed format) and (2) that the choice of terminology and reference standards are factors too important to be left to the panelists, however well trained. These items should be chosen by the sensory analyst who needs all the accumulated experience of his or her profession for the task.

The authors wish the book to be cohesive and readable; we have tried to substantiate our directions and organize each section so as to be meaningful. We do not want the book to be a turgid set of tables, lists, and figures. We hope to have provided structure to the methods, reason to the procedures, and coherence to the outcomes. We want this to be a reference text that can be read for understanding as well as a handbook that can serve to summarize sensory evaluation practices.

The organization of the chapters and sections is also straightforward. Chapter 1 lists the steps involved in a sensory evaluation project and Chapter 2 briefly reviews the workings of our senses. In Chapter 3, we list what's required of the equipment, the tasters, and the samples, while in Chapter 4, we have collected a list of those psychological pitfalls which invalidate many otherwise good studies. Chapter 5 discusses how sensory responses can be measured in quantitative terms. Chapter 6 lists all the common sensory tests for difference, the triangle, duo-trio, etc., as well as the various attribute tests in use, such as ranking and numerical intensity scaling. Thresholds and just-noticeable differences are briefly discussed in Chapter 7, followed by what we consider the main chapters, Chapter 8 on descriptive testing, Chapter 9 on affective tests (consumer tests), and Chapter 10 on selection and training of tasters.

The body of text on statistical procedures is found in Chapters 11 and 12 but in addition, each method (triangle, duo-trio, etc.) is followed by a number of examples showing how statistics are used in the interpretation of each. Basic statistical concepts such as null and alternative hypotheses, Type I and Type II errors and their relation to alpha, beta, and the sample size "n", one-sided vs. two-sided tests, etc. are presented in Chapter 11. We refrain from detailed discussion of statistical theory, preferring instead to give examples. Included

in Chapter 12 are discussions of some commonly used experimental designs, such as the randomized block, split plot, and balanced incomplete block. Chapter 12 also includes a discussion of multiway treatment structures, such as factorial experiments and the ever more frequently used statistical technique of Response Surface Methodology (RSM) in which predictive equations are developed that relate a set of sensory responses to the levels of a set of processing parameters or, alternatively to the proportions of a set of ingredients. Also in Chapter 12 the use of multivariate techniques is briefly discussed. This is a subject still in its infancy and future editions of this book probably will contain expanded treatment of this topic.

At the end of Volume II, the reader will find guidelines for the choice of techniques and for reporting results, plus the usual glossaries, indexes, and statistical tables.

With regard to terminology, the terms “subject”, “panelist”, “judge”, “respondent”, and “assessor” are used interchangeably, as are “he”, “she”, and “(s)he” for the sensory analyst (the sensory professional, the panel leader), and for individual panel members.

Morton Meilgaard
Gail Vance Civile
B. Thomas Carr

ACKNOWLEDGMENTS

Thanks are due to our associates at work and our families at home for thoughts and ideas, and for material assistance with typing and editing. Numerous individuals and companies have contributed to the ideas of this book and their application in practice. In particular we wish to acknowledge the emotional contributions of Manon, Frank and Cathy, and the technical ones of our colleagues in ASTM's Subcommittee E-18 on Sensory Evaluation, of whom we would like to single out Louise Aust, Donna Carlton, Andrew Dravnieks, Jean Eggert, Patricia Prell, John J. Powers, and Elaine Skinner. Thanks are due to Rose Marie Pangborn and Ann Noble at Davis, Calif., to Elizabeth Larmond at Agriculture Canada, and to Roland Harper and Derek Land in the U.K. for suggestions and discussions over the years, and to Erik Knudson, Stephen Goodfellow, Dan Grabowski, Cathy Foley, and Clare Dus for help with illustrations, layout, and ideas, also to the Stroh Brewery Co. and Searle Inc. for permission to publish and for the use of facilities and equipment.

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Mr. Carr received his B.A. degree in Mathematics from the University of Dayton, and his Master's degree in Statistics from Colorado State University.

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