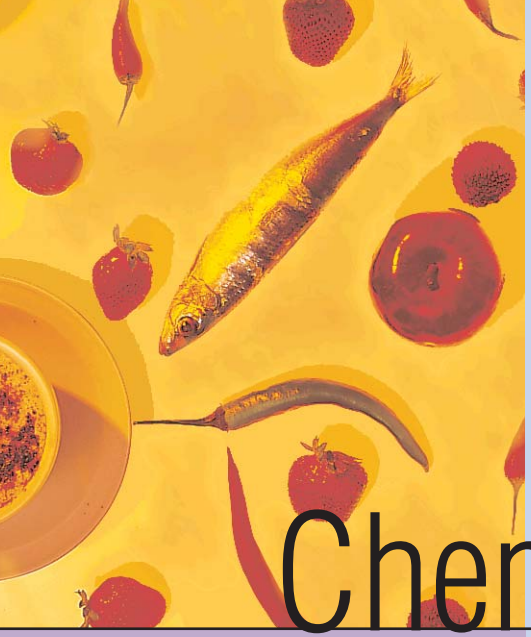

Vol. 7 No.3 June 2005

# ChemoSense

OPINION

## Musings on Sensory Crocodiles

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**In 1979, RoseMarie Pangborn wrote** an article[1] with the secondary title 'The Crocodiles are coming.' In this article, written for a short course, she described among other things a *quiz* that one should subject oneself to prior to doing any sensory testing. She also discussed some aspects of sensory physiology, namely taste as defined by consumer and by the physiologist, issues related to threshold values and (mis)uses of these values, magnitude estimation and unresolved problems with suggested areas for future research in sensory science. I was reminded of this article recently when I had three separate conversations that indicated to me that despite the intervening 25 years - the crocodiles are still coming.

The first conversation was with a professional in industry who had been told that her well-trained and experienced panel was 'useless' because they did not perceive the odor associated with a specific volatile compound in the product. The panel was deemed 'useless' because instrumentally it was known that a specific compound was in the product at a level above threshold. The assumption was that, therefore the panel should be able to perceive it. However, upon further questioning

*cont. pg 2*

## Just-About-Right Scales in Consumer Research

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**New product introductions are critical to the growth**, continuing success and competitive strategies of packaged goods companies. In order to improve the odds of having a successful launch - whether of an innovative product or a line extension - companies routinely incorporate consumer feedback in the product development process and obtain consumer reactions to product prototypes as they emerge from R&D. Whether it's food, beverage or personal care, the stakes involved are so high that this investment in consumer research not only makes sense, it's probably a necessity, and it can spell the difference between success and failure.

The research tools employed in the pursuit of a winning product formulation run from the simple to the highly sophisticated. The primary objective, however, is the same: provide the product development team with direction on how to increase consumer appeal.

In product categories where sensory properties are important determinants of consumer appeal, one of the most simple and direct ways to solicit feedback from a consumer is to ask whether a product is just right with regard to a certain characteristic or has too much or too little of that

*cont. pg 2*

## INSIDE:



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ISSN 1442-9098

# Musings on Sensory Crocodiles continued

the complainant said that the literature threshold value s/he was using was determined in water and that the literature did not indicate the purity of the compound. Threshold values are very nebulous figures, usually statistically defined - they are highly dependent on the purity of the compound tested (any contaminants may decrease the perceived threshold), the matrix that the test is performed in (water will give different values than oil than meat than wine) and they are very variable within and across people[2]. Therefore one should use a specific threshold value with great skepticism. Additionally, the threshold of two compounds may be very similar, but above threshold values (which are likely the situation in food) they may increase in intensity differentially or two compounds may have very different threshold values, yet they may be equally intense at higher concentrations. One cannot use thresholds as yard sticks - they only give relative information and one has to keep in mind all the potential pitfalls.

The second conversation was with a student from a different department on campus in the process of writing a thesis. The student was sent to me (sensory scientists are frequently, for better or for worse, viewed as the resident statisticians) to try to salvage something from his data. As usual in these cases a favorite quotation[3] came to mind:

> "To consult a statistician after an experiment is finished is often merely to ask him to conduct a post-mortem examination. He can perhaps say what the experiment died of"

This particular experiment had died from a major lack of planning! If the student had taken the *quiz* that Rose Marie Pangborn encouraged all of us to take prior to any study he would have had no problems. A very short form of the quiz, adapted by me, is:

1) What specific information do we require from the test?
2) What is the most direct way to acquire this information?
3) Do we have the resources (money, expertise, facilities, etc.) to do the work?
4) How will the experiment be designed, how do we determine reliability and reproducibility, what are the statistical risks (alpha, beta and power), how will the data be analyzed?

The student had done a great deal of work but he had not appropriately designed the experiment and had not incorporated methods to determine reliability and reproducibility. The result was that the best we could salvage was statements about 'possible tendencies.' We then proceeded to design a repeat experiment with all the checks and balances - his graduation date has receded some.

The last conversation was with one of my colleagues. In this case his student had done a quick 'sensory' study to derive some data that were then used to correlate with a chemical assay. The problem was that the 'sensory' data were very variable and the resultant correlation was not very good. In this case the 'sensory' test consisted of groups of students meeting once a week to rate the various products for the specified attribute. There was no training of the students to ensure that they all understood the attribute that they were scoring, there was no replication (which would have allowed one to determine reproducibility), the same people did not attend each week (thus there were major week to week variations). I pointed out that what the student had done was not 'sensory' testing but 'taste' testing and since the study had broken every rule of sound sensory practice, I was not at all surprised that the resulting data were extremely variable. As Rose Marie Pangborn quotes in 'The crocodiles are coming': "Sensory evaluation at all times, should be governed by one edict, and one edict only: common sense, for without good firm judgment, coupled with educated intelligent gut-feel, sensory testing will become a hopeless mess. Sensory evaluation, expertly conceived and executed, is an invaluable tool for food scientists. So called 'taste tests', however, inexpertly handled, are potentially dynamite and should be avoided[4]". Additionally, because of the large numbers of attendees at his tastings, the student had done a great deal more work than he would have needed to do if he had performed a properly executed sensory test - and if he had done the appropriate test the correlations may indeed have been much better - but we will now never know!

The last part of Rose Marie's article covers unresolved problems and areas for future research. It is heartening to see that in these areas there have been major steps forward over the past 25 years. There is now clearly a more critical, scientific approach to sensory science and a great deal less 'cultism'. There are now compilations of sensory descriptors and reference samples for use in sensory descriptive analysis[5]. There are also more robust experimental design techniques. The group of External Preference Mapping techniques now allow better integration of consumer responses with sensory measurements and the widespread use of multivariate data analysis. Techniques such as Partial Least Squares analysis allow us to draw conclusions on the effects of instrumentally and chemically measured factors on sensory responses.

However, the crocodiles are still out there and draining the swamp is still tricky! ■

**FOOTNOTES:**

[1] Pangborn, R.M. Physiological and psychological misadventures in sensory measurement or The crocodiles are coming. In: Sensory Evaluation Methods for the Practicing Food Technologist. Editor: M.R. Johnson, IFT Short Course. 1979-1980.

[2] Lawless, H.T. and Heymann, H. Chapter 6: Measurement of sensory thresholds. In: Sensory Evaluation: Principles and Practices. Kluwer Press, 1998.

[3] Ronald A. Fisher, Indian Statistical Association, India, 1938, vol 4, p. 17.

[4] From: Sensory Good Sense by N.L. Hirsh, Food Product Development 5(6): 27, 1971.

[5] An example would be the American Society for Testing and Materials publication DS68: Lexicon for sensory attributes relating to texture and appearance. Ed: Rutledge, K.P. 2004

Vol. 7 No.3 June 2005

aacss HERON ISL AND 2005

# AACSS at Heron Island 2005

## Third Announcement: Provisional Program

The Australasian Association for ChemoSensory Science (AACSS) will hold its 8th Scientific meeting at Heron Island, Queensland from 2-6 December, 2005.

All members of the Australasian and International Chemical Senses communities are cordially invited to participate.

### Who should attend?

Researchers and applied scientists in the chemical senses from research institutions and academia, industrial delegates, and accompanying families/guests, (who may stay at the Island at AACSS accommodation rates) are welcome. Admission to the meeting will be at the discretion of the AACSS Organisers.

### PROGRAM

### Provisional Program

The Conference Program will consist of Plenary Sessions, Symposia, Platform Sessions and Posters. Timing of the Program sessions will allow optimal enjoyment of the Island during the day. With all meals supplied, excellent use can be made of the days and evenings to integrate sessions with island activities. The first session will be in the early evening of 2 December to allow arrival at the Island and the last session will be in the morning of 6 December, allowing time for a final swim or walk on the coral sand before the boat leaves for Gladstone.

A number of Symposia* will be organised around core topics. Symposium topics include: Neuro-molecular and Physiological Mechanisms of Smell and Taste; Regeneration and Targeting; Chemosensory "Stem" Cells; Aquatic Animal Models; Chemical Communication; Central Nervous System Processes; Taste Mechanisms and Genetics; Neural Imaging; Clinical Issues, Sensory Loss and Aging; Role of Learning and Memory in Chemosensory Perception; Flavour Perception; Large Mammals; Insects, Mechanisms and Control; Human Applied Sensory Issues (Food and Other); Sensors, Electronic Noses, Air Quality Measurement, Robotics and other Applications.

* These may change, as circumstances demand

Submissions of abstracts for symposium, oral and poster papers must be sent to The Programme Chair, John Prescott, john.prescott@jcu.edu.au by **31st August 2005**. All abstracts will be refereed by the Program Committee.

Why Heron Island? The AACSS meeting of 2002 on Heron Island was a great success. This rare geographical jewel in the Coral Sea is two hours by boat from Gladstone, Queensland, or 30 mins by helicopter. Heron Island offers you one of the most exciting conference venues imaginable. Built on a tiny coral atoll, surrounded by rich coral and marine life, it consists of a solitary luxury, low-built resort, and a marine research station. It is, without any argument, one of the most beautiful, exciting, yet relaxing places on Earth. Just do a web-search and see how many people around the world have raved about it. Over 60% of people on Heron Island, at any time, are from abroad. AACSS has negotiated an affordable package of accommodation with *all meals* provided in the rates. These are shown below in Australian Dollars (AUD$ 1 = US$ 0.75 in June 2005).

### HERON ISLAND RESORT BOOKINGS

A confirmed resort booking and transfers to and from the island is essential for registration at the Meeting. Rates quoted here are at a special 20% discount exclusive to AACSS Meeting participants and their parties. Stays may be extended at these rates before and/or after the Meeting, depending on room availability. *The Resort provides three meals inclusive in the room rates.*

Please make your hotel and island transfer bookings as early as possible. Room numbers are limited and will be available on a first-come first-served basis. AACSS accepts no responsibility for attendees' hotel, transfers or travel bookings or any matters arising therefrom. Attendees must see to their own accommodation and travel arrangements. All bookings must be finalised by the **Hotel Deadline: 31st August 2005.**

All your accommodation on Heron Island and launch/helicopter transfers must be made directly by you through Wendy Burchmore of Tourism Queensland Groups and Conferences. Once you have a confirmed booking the AACSS Organisers will contact you regarding registration.

Wendy.Burchmore@tq.com.au
Phone +61 7 3535 5837
Fax: +61 7 3535 5045

### ACCOMMODATION RATES

Per person, per night ***including*** full buffet breakfast, smorgasboard lunch, 3 course table de hote or themed buffet dinner daily including Saturday night seafood buffet, and many island activities.

**All prices quoted in Australian dollars and include 10% GST. The group rates below represent a discount of 20% on nightly tariffs.**

### TRANSFERS (table below)

The courtesy coach transfer departs Gladstone airport at 10.15 am and the launch departs the Marina **at 11.00 am**. The launch returns to the Marina **at 3.45 pm** with an immediate courtesy coach connection to the airport. **Flights departing Gladstone must depart no earlier than 4.20 pm.**

Helicopter transfers are operated on demand during daylight hours. The above timings are subject to change.

### Conference Registration Fees:

AUD$300.00 per attendee (no extra charge for accompanying persons).

All prices quoted in Australian dollars and inclusive of 10% GST.

| Accommodation and all meals | Per person per night TWIN SHARE | Per room per night SOLE USE | Extra Adult* | Extra Child* (3-14 years) |
|---|---|---|---|---|
| Turtle Room | $200.00 | $292.00 | $128.00 | $80.00 |
| Reef Suite | $228.00 | $320.00 | $128.00 | $80.00 |
| Heron Beachside Suite | $288.00 | $380.00 | $128.00 | $80.00 |
| Point Suite/Beach House/Wistari Suites | $384.00 | $476.00 | $128.00 | $80.00 |

### TRANSFER RATES

| Transfer ex Gladstone | Adult One Way | Adult Return | Child One Way (3-14 years) | Child Return (3-14 years) |
|---|---|---|---|---|
| Launch | 74.40 | $148.80 | $37.60 | $75.20 |
| Helicopter | $291.00 | $495.00 | $146.00 | $248.00 |

Students AUD$150.00 (see student assistance information below). Visa (and all card facilities) for conference fee payment is not available. Pay by cheque made in favour of AACSS 2005 Conference and mail to AACSS Organiser, P O Box 488, Gladesville NSW Australia 2111. Payment in cash can also be made to the Conference Organisers once you arrive on the Island. ***Take up the 10% Early Bird Discount if fees are paid by 1 July 2005.***

Student Assistance Some assistance, in the order of $500, is available to postgraduate students (generally 4th Yr/honours, Masters or PhD) attending the AACSS conference and presenting a scientific paper (oral or poster). Apply for funding by e-mailing a brief CV and description of your research project (250 words maximum) to James St John: james.stjohn@uq.edu.au by 1 July 2005.

### IMPORTANT CONTACTS & DATES:

**Step 1:** Deadline 31 August. Book your Heron Island Accommodation through Wendy Burchmore: Wendy.Burchmore@tq.com.au

**Step 2:** Deadline 31 August. Send Abstracts and Symposium proposals to Program Chair, John Prescott: john.prescott@jcu.edu.au

**Step 3:** Early Bird Deadline 1 July: Register and Pay Conference to The Conference Organiser, Graham Bell: g.bell@atp.com.au

**Students Assistance Deadline 1 July:** Apply to James St John james.stjohn@uq.edu.au

SEE YOU IN PARADISE! ■

# Just-About-Right Scales in Consumer Research continued

characteristic. These "just-about-right" scales (Figure 1) can be effective in research on food and beverages, where consumers, in addition to rating their liking of a product, are asked to evaluate a product on a number of attributes using this question format.

Much too strong.....

Somewhat too strong ...

Just-about-right .....

Somewhat too weak.....

Much too weak .....

Figure 1. Example of a five-point just-about-right scale used in product evaluation. Other versions of the scale employ three or seven response categories, with the middle category labeled "just-about-right".

For example, in a study of carbonated soft drinks, consumers might be asked to evaluate the prototypes with regard to sweetness, strength of flavor and carbonation level (among other characteristics), indicating each time whether the level is too low, too high or just right. Based on consumers' answers to these questions, the soft drink manufacturer might adjust a prototype's sweetness, flavor and carbonation in an effort to improve its acceptability. Respondents tend to answer just-about-right questions with ease and researchers like the simplicity of the scale. Yet despite their intuitive appeal to researchers and research participants alike, these scales are not without limitations and potential pitfalls, and their results require careful interpretation.

In order to rate sweetness using a just-about-right (JAR) scale, respondents must decide how closely the sweetness of the product they are tasting matches their ideal sweetness. There can often be a disparity between the product formulations consumers will rate as "just right" and those that they actually like the most. Epler, Chambers, and Kemp (1998) asked to evaluate five lemonades differing in the amount of added sugar. Consumers rated the product using either a JAR scale that ranged from "not sweet enough" to "much too sweet," or rated their liking of the sweetness on a scale that ranged from "dislike extremely" to "like extremely." The optimal sugar concentration was determined in two ways: by identifying the formulation whose average JAR rating was closest to "just right" and by identifying the formulation with the highest average liking score. Using the data reported in that study, Figure 2 shows how the optimal levels can be determined using each measure.

For the JAR scale, the optimal sugar concentration was about 9.5%; for the overall liking scale about 10.5%. While the difference may seem small, it was large enough to make a difference in a preference test. A separate group of consumers, when presented with the two formulations, preferred the product optimized on the basis of liking over the one optimized on the basis of the JAR scale.

In another study the disparity between optimizing a formulation based on a JAR scale versus a liking scale was even greater. Optimizing the level of aspartame in a fruit drink on the basis of a JAR scale for sweetness predicted an optimal level of aspartame 20% lower than that predicted on the basis of overall liking (Popper, Chaiton & Ennis, 1995).

When products vary in more than just one dimension a similar question arises: is the formulation that maximizes overall liking the same as the formulation for which the sensory characteristics are all just right? In some instances (Moskowitz, Munoz & Gacula, 2003), a product that was just right on all attribute measures was not the same as the product that was liked the most, although it was still an acceptable product; in another instance (Marketo &

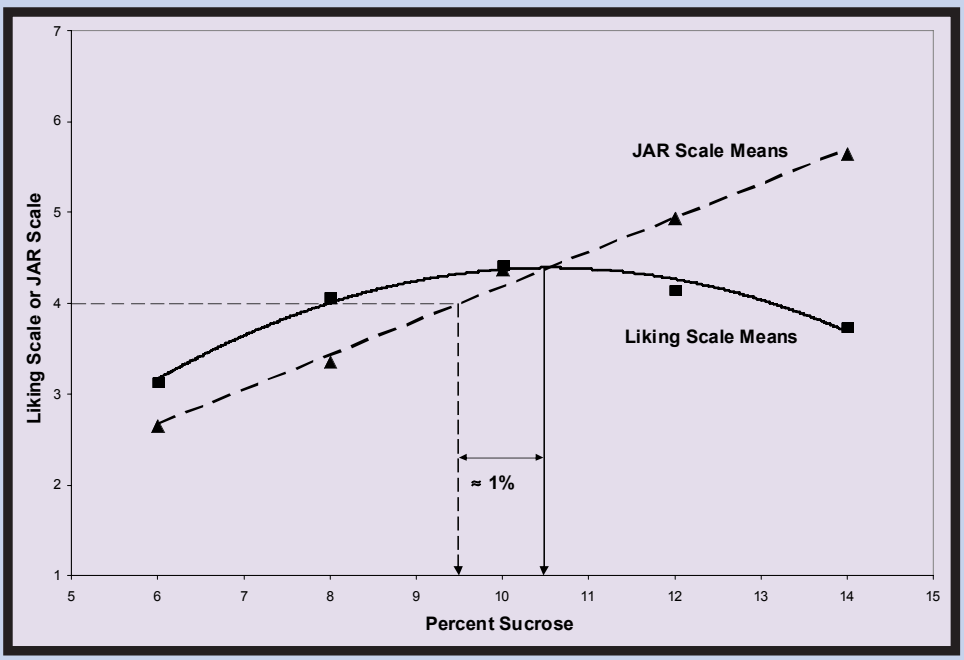


Figure 2. Optimal sucrose level in lemonade determined using a 7-point liking scale (solid line) and a 7-point JAR scale (dashed line). The optimum sucrose level is the level at which the liking curve reaches its maximum or the JAR line equals 4 (just-about-right). The difference in the optimal values is approximately 1%. Source: Epler, et al., 1998.



cont. pg 5

# Just-About-Right Scales in Consumer Research continued

Moskowitz, 2004), the two methods gave similar results.

One possible explanation, advanced by Epler et al., for the discrepancy between JAR and liking scale optima is that JAR scales induce a response bias when the attributes carry certain negative health connotations. In the case of sweetness respondents may perceive a very sweet product as being unhealthful. When tasting such a product, they may say it is "too sweet" because they are aware of the potentially negative consequences of consuming such a product on a regular basis. At the same time, they may actually like the way it tastes, which is reflected in their hedonic ratings. Only one study (Bower & Baxter, 2003) has attempted to confirm this hypothesis by comparing JAR and liking ratings of sweetness among two groups of respondents that differed in their concern with "healthy eating". Unfortunately, the results were inconclusive.

While health concerns may or may not be a source of response bias in the use of JAR scales, experienced researchers know that there are certain attributes that, by their nature, are likely to induce a response bias. It is hard to imagine that an orange juice could have too much "fresh orange flavor," and many respondents would rate the level of fresh orange flavor as "not enough" regardless of the formulation. Similar biases may exist in the case of the amount of chocolate chips in a chocolate cookie, or the amount of cheese on a pizza. In both instances, researchers can expect respondents using a JAR scale to express a desire for more, even though their liking ratings may begin to decrease as the level of chocolate chips or the amount of cheese rises above a certain level.

The reverse skew can also occur, say when respondents are asked to rate the bitterness of coffee: the responses will skew towards too much, since bitterness is considered "bad." However, a certain amount of bitterness may actually be a positive in terms of overall liking, JAR ratings to the contrary.

What direction to product development do JAR ratings provide? Consider the results for a hypothetical product shown in Table 1.

The results suggest that the sweetness and citrus flavor of the product should be increased; less clear is whether the carbonation level should be raised. The results definitely do not tell the product developer how **much** of a change in sweetness, flavor, or carbonation would be required to increase the just right percent. It is tempting to conclude that a bigger increase is needed in the case of citrus flavor than sweetness since the percentage of too low responses is greater for citrus flavor than for sweetness. But that is not necessarily the case. The sensitivity of the JAR scale to formulation changes is usually not known and may differ by attribute (Moskowitz, 2004). It might require only a small increase in flavor, but a large increase in sweetness to address the perception that these attributes are too low. And it is not known whether such increases would alienate respondents who currently view the levels of these attributes as just right, leading to a greater percentage of future respondents rating the product too sweet or too high in citrus flavor. Finally, the possible interaction among attributes needs to be considered when making formulation adjustments (increasing the citrus flavor may change the desired level of carbonation).

| | Carbonated Soft Drink Ratings | | |
|---|---|---|---|
| | Too Low (%) | Just Right (%) | Too high (%) |
| Sweetness | 30 | 55 | 15 |
| Citrus flavor | 50 | 40 | 10 |
| Carbonation | 22 | 65 | 13 |

Table 1. Hypothetical ratings of a carbonated soft drink on three just-about-right scales, summarized in terms of the percentage of respondents rating the product just right, too low, or too high.

It is also tempting to conclude from the results that an increase in citrus flavor has the greatest potential to improve the overall acceptability of the product, since this was the shortcoming noticed by the greatest percentage of respondents. But this conclusion could also be erroneous. Consumers might be more tolerant of deviations in flavor level than they are in sweetness, making sweetness the higher priority in terms of reformulation. Furthermore, even though the overall level of satisfaction was greater for carbonation than for the other two attributes, it is possible that for those that considered the carbonation too high or too low, this shortcoming was a bigger detractor than anything else.

Such interpretive difficulties underscore the need for researchers to link the just-about-right ratings to the respondent's level of liking. Using one of several analysis techniques, it is possible to rank order the shortcomings in terms of their importance to overall liking, thereby focusing the attention of product development on the critical attributes. In some cases, an attribute garnering a relatively moderate percentage of complaints (e.g. carbonation too low) may be shown to have a high impact on the overall liking of some respondents.

While a more in-depth analysis can make the results from JAR scales more actionable for the product developer, including JAR scales may still be problematic, as was demonstrated in a study by Popper et al. (2004). In the study, respondents rated their overall liking for four dairy desserts. Some

*cont. pg 6*

# Just-About-Right Scales in Consumer Research continued

respondents rated only overall liking. Other respondents, in addition to rating their overall liking, rated the products on a series of JAR scales, such as sweetness, thickness and flavor intensity. The study showed that the respondents that answered the JAR scale questions rated their overall liking of the products differently than those that rated only overall liking.

If JAR scales are biasing respondents' overall evaluations of products, then including them in studies designed to measure a product's overall liking may be ill advised. Popper et al. (2004) found that intensity scales, which ask respondents to rate the level of sensory intensity on a scale from low to high, did not have the same biasing effects that the JAR scales did, even though the same attributes were being rated. The difference between the two scale types is that in answering JAR questions respondents need to consider how products differ from an ideal, which may focus them on reasons why they like or dislike a product, something that intensity scales may not. Other research (Wilson & Schooler, 1991) has shown that asking respondents to consider reasons for their preferences may subsequently alter their preference choices.

With the difficulties surrounding the use of JAR scales*, why do they remain so popular? One reason is that alternative research methods can be more costly. Systematically varying a number of key formulation parameters and inferring the optimal formulation from the overall liking responses may require more prototypes than product development thinks it has the time or money to produce and test. Similarly, formulation direction based on a correlation with intensity ratings, whether collected from consumers or from a trained sensory panel, also requires a fair number of prototypes or in-market products in order to be robust. Compare that approach to one of testing only one or two prototypes (and maybe a competitor) and using just-about-right scales for formulation direction, and the appeal of just-about-right scales for product development is immediately apparent.

JAR scales do not give the specificity of direction that product development often requests, which can lead to inefficient testing-and-retesting in order to get the formulation right. Nevertheless, just-about-right scales, in the hands of knowledgeable researchers and along with the appropriate analyses, can do a just-about-right job of serving as a score card for comparing a number of products and indicating areas where there are major product deficiencies.

* This article discusses some of the limitations and caveats surrounding the use of just-about-right scales. A subcommittee of ASTM Committee E-18 is drafting a detailed guide concerning the benefits and risks associated with the use of just-about-right scales. That document will also include examples of the statistical analyses most appropriate for JAR scales ■

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# Where is sensory now, and where is it going?

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## The Need for Change

**Anyone attending a food science convention** or a fragrance conference can't help noticing the abundance of people. If we measure the growth of a field by numbers of bodies sensory appears to be healthy, growing, and ever-stronger. Yet beneath that robust appearance there seems to be melancholy, resignation, and weariness reminiscent of *fin de siecle exhaustion* that was talked about a hundred years ago.

What's wrong with applied human sensory science? What happened to that wonderful field which began some forty years ago, spurred on the by a growing appreciation of the food and beverage industries that the sensory aspects of food and drink were key to continued growth through consumer acceptance? Amerine, Pangborn and Roessler's seminal contribution, 'Principles of Sensory Evaluation of Food', proudly published by Academic Press as one of its first in the field, stood high as a beacon to novices, inviting us into the field to share this future.

Well, it didn't work out that way. Over the years sensory researchers in companies have had to change their names to sensory professionals to, in the words of the late Rodney Dangerfield, 'get respect'. Once deeply involved in expert panels, sensory researchers have migrated to low cost consumer testing, trying to compete with more broadly based marketing researchers. Although not originally focused on consumer research and certainly not having the exposure to different facets of consumer research, sensory has had to find ways to justify its existence in the corporation. Low cost product testing, with some standard statistical methods has continued to be one of those justifying strategies.

## We've Lost our Way - and We Must Find a New and Better One

In the fifteen or so years that sensory researchers in companies have evolved into low cost market researchers for product testing, a lot has been lost. In the late 1970's and 1980's methods for product optimization and category appraisal were being developed, funded by the more generous budgets of market research, who could afford to pay for tests and extensive analyses of product arrays. A lot of thinking went into those early studies. Quite a number of new developments were made.

Low cost research thinking changed all that. Certainly there was progress, such as multi-dimensional maps. However, sensory researchers were not exposed to the critical thinking that turned these maps or other data-sets such as response-surface results, into meaningful, actionable, insightful reports and directions. There were statistics galore, but the low cost budget strategy was revealing the real lack of insights around data. We had all turned into research machines - 'Tests R Us'. How do we know - just go to a corporate meeting about a new product development project, and see the competition between sensory and market

# Where is sensory now, and where is it going? continued

research. Listen to the words of both camps - the conventional market researcher and the sensory researcher, both of whom want to do the project. The differences will be clear.

## Three Prescriptions to get us Moving Again

**Stop whining and asking for respect.** Earn respect by doing important research. Get a real budget, and spend it on high level data collection, modeling, and reportage. Don't be satisfied by tables and cheap fielding / reportage. It's not working anymore. Contribute to real product success. By the way, if no budget is forthcoming, think about what that's telling you.

**Start going into new areas, such as systematized development of product concepts**. Stop the tentative movements and hesitant redefinitions. Stop looking inwards and contemplating the purity of your heritage. Rush into some new area like experimentally designed concepts, and apply the latest thinking to developing product concepts. Certainly you'll be afraid of treading on someone else's territory. But that's certainly better than treading water all the time in a holding action, trying to prevent your own drowning.

**Start really educating yourselves in the important issues covered by consumer research.** It's more fun and certainly safer to ask about the proper lighting in a sensory booth, the appropriate product for a descriptive test, the type of water to rinse with, the proper way to allocate variance in the test, etc. etc. etc. Think about these types of questions. These are clerical questions. They make you part of the priesthood. But, more importantly, where are your questions about how to use the data, what kind of key development and marketing decisions should the company make based on the data? This is where you will really contribute.

So - what's the bottom line here? For this author, the bottom line is pretty straightforward. It's time for sensory to go forward, get out of the mentality of a low-cost supplier, and get into the heart of the corporation as a real contributor. It's not about head count any longer, and it's not about the number of tests you can do for your company within a year, within a fixed budget. That kind of thinking will get you outsourced into the sensory factory, into the 'Tests R Us' world. For those who want to grow professionally within the company, or who want to be true research consultants, it's time to start doing more important work, with a budget, and with state-of the-art methods. That will propel us all into a much more promising future ■

# NEWS



## AACSS to meet at Heron Island in December 2005

See page 3 for details.

# Useful Chemical Senses Book

*Tastes and Aromas: The Chemical Senses in Science and Industry,* Edited by Graham Bell and Annesley J. Watson. 214 pages. Published by UNSW Press and Blackwell Science, 1999. ISBN: 0-86840 769 0. Hard Cover. Price: US$ 30 / AUD$ 40 (includes tax if applicable, postage and handling). Order from: g.bell@atp.com.au

A limited number of this extremely useful volume are, for a short time only, available at a 50% discount. *Tastes and Aromas* has been hailed as a great teaching aid and resource for the practicing sensory scientist. Written by leaders in their fields as fundamental information, the volume retains its value and is rich in scientific and practical quality. Beautifully packaged in hard cover, it will continue to be a durable reference for many years to come.

Chapters include mini-reviews by (first authors) Stoddart; Bartoshuk; Youngentob; Prescott; Lyon; Weller; Bell; Saito; Lambeth; Noble; Morgan; Best; Barry; Sullivan; Key; Mackay-Sim; Atema; Hibbert; Barnett; and Levy.

Content covers the chemical senses in human culture; fundamentals of smell; taste; pungency; oral touch and pain; applied sensory evaluation; cross-cultural studies; perfumery and flavour chemistry; wine preference; psychophysics; sensory mapping; physiology of odour encoding; anatomy, growth and aging; emerging chemosensory technologies; sensors; marine chemical signals; electronic noses and chemosensory machines.

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# WineSense:

## Cork Woes Reduced by new Sensory Tool

*By Graham Bell*

**In the last issue of Wine Sense**, we reported that the largest wine cork company in the world, Amorim, had sidelined sensory analysis in favour of gas chromatography and mass spectrometry (GCMS) of the cork taint 2,4,6-trichloroanisole (TCA) taken up by the solid phase micro extraction method (SPME). It was claimed that 70% of batches of cork tainted with TCA have been eliminated in the USA since the introduction of this tool (see *ChemoSense*, 7(2) March 2005).

But the wine industry continues to flee from the use of cork and its taint problems, while consumers grow increasingly pleased with the convenience and possibly better quality or perceived value of wine sealed under screw caps.

### Consumer Rejection Threshold- a rational approach with wide application

On the brighter side, for cork, there is some new evidence that TCA taint in cork might be measured more rationally with positive consequences for the wine industry.

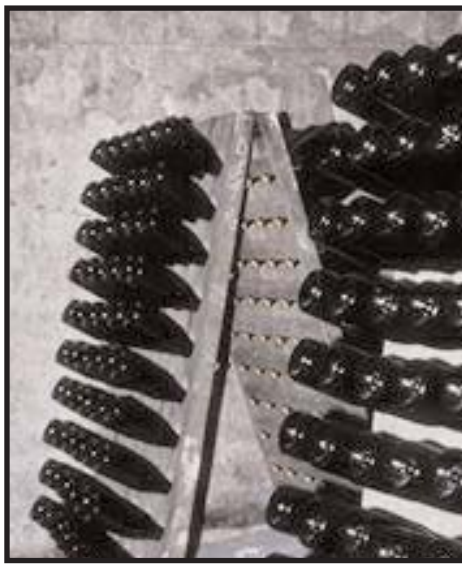
This time, the news comes from human chemosensory research, in a recent edition of *Food Quality and Preference* (2005, FQP, 16, 345-349). Prescott, Norris, Kunst and Kim show that the point at which wine consumers begin rejecting white wine containing TCA - they have called this the "Consumer Rejection Threshold" (CRT) - was significantly higher (by about 50%) than the detection threshold (DT) for TCA by the same subjects.

The basic CRT method involved a simple indication of preference for pairs of wines in a series of two apparently identical wines by a group of 58 adults. One glass contained the base wine (previously sealed under a screw cap) and the other the same wine "spiked" with a known amounts of TCA, at increasing concentrations. The pairs were presented at 2 minute intervals and after mouth rinsing in with filtered water. The position of the tainted sample was randomised in each pair and the pairs were presented in ascending order of strength of the taint.

The study found that above 3.1 ppt TCA, these wine drinkers rejected the tainted wine sample, thus defining the CRT. The DT was lower at 2.1 ppt. A replication study found a similar CRT of 3.7 ppt. These studies also suggested that 10% of subjects are either highly insensitive to TCA or do not find it objectionable.

This finding provides an apparently reliable estimate of the TCA concentration in white wine (chardonnay in this case) that is rejected by a majority of wine consumers.

The CRT may allow better estimates of the cost of cork taint to the industry and allow adjustment (relaxation) of criteria for rejection of cork batches. A test using CRT relates the concentration of TCA to



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the assessed quality of the wine by the person for whom the wine is intended: the consumer.

A rejection threshold is therefore a more rational instrument than detection or recognition thresholds, with their notoriously large variances, or chemical analytical methods that might have little bearing on the human response to actual concentration of TCA. For speed of processing of cork batches at the beginning of the process chain, an analytical method calibrated against CRT would probably provide the optimal outcome. In the meantime, wine quality assurance laboratories would do well to consider the usefulness of the CRT in preference to methods which add unnecessary cost to their businesses.

The rejection threshold "tool" will impact more widely on sensory issues than those described above. It offers advantage over traditional threshold and analytical tools wherever the boundaries in the composition of a material (be it a solid, liquid or gas) need to be established, and where the composition might make a difference to human judges. Such judges may be consumers in a market, or the public, such as passengers in a vehicle, exposed to a changed quality in anything that can be conveyed to them by their own senses. For example, in the field of air quality, the method will be useful to determine the cut-off point beyond which air is no longer of acceptable quality and at which a calibrated instrument might effect an appropriate response.

The issue of TCA and other taints in wine will not go away while biological material such as cork is used as a closure to a valuable but labile product such as wine. Nor will the need to use human judges, in the evaluation and instrumental calibration process, conveniently evaporate, while it is humans who are the end users and ultimate judges of acceptance ■

# Upcoming Events

| | |
|---|---|
| 10-13 July 2005 | **38th Annual AIFST Convention and FoodPro 2005**<br>Sydney Convention & Exhibition Centre<br>Info: www.aifst.asn.au |
| 31 July - 6 August 2005 | **Summerschool 2005**<br>**Human Olfaction**<br>Dresden, Germany<br>thummel@rcs.urz.tu-dresden.de<br>http://www.tu-dresden.de/medkhno/riechen |
| 7-11 August 2005 | **Pangborn Sensory Science Symposium**<br>Harrogate, North Yorkshire, UK.<br>Abstract Deadline 31 January 2005<br>Info: www.pangborn2005.com |
| 30 August - 1 September 2005 | **Sensory Evaluation - An Introductory Workshop**<br>Queensland DPIF, 19 Hercules St., Hamilton, Brisbane, Australia.<br>Heather.smyth@dpi.qld.gov.au |
| 3-5 November 2005 | **Second Interdisciplinary and International Wine Conference**<br>"Bacchus in Bourgogne"<br>Beaune-Dijon, Bourgogne, France.<br>Bacchusinbourgogne@escdijon.co<br>www.bacchusinbourgogne.com |
| 12-16 November 2005 | **Society for Neuroscience**<br>Washington DC<br>Info: www.sfn.org |
| 2-6 December 2005 | **AACSS on Heron Island**<br>(Australian Great Barrier Reef)<br>**Australasian Association for ChemoSensory Science**<br>8th Annual Meeting<br>Accommodation:<br>Wendy.Burchmore@tq.com.au<br>Conference info: g.bell@atp.com.au<br>Program info:<br>john.prescott@jcu.edu.au |
| 2-4 August 2006 | **8th Sensometrics Meeting: Imagine the Senses**<br>Ås, Norway.<br>Contact: www.sensometric.org |
| 21-25 October 2006 | **Society for Neuroscience**<br>New Orleans<br>Info: www.sfn.org |
| October 2006 | **AACSS**<br>**Australasian Association for ChemoSensory Science**<br>**9th Annual Meeting**<br>Adelaide, South Australia |

**ChemoSense** (ISSN 1442-9098)
Web: http://www.chemosensory.com
Published by **E-Nose Pty Ltd**
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## Coming up in ChemoSense

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Is the air we breathe killing us?
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