

Where is the Science in Sensory?

By David S. Lundahl

I want to share with you a thought provoking article published in the November issue of Cereal Foods World (Cardello, 1997). In his article, Armand Cardello makes the point there have been few “breakthroughs” in sensory science during the past 30 years, and asks whether this is the end of sensory science. He goes on to argue that most of the advances in understanding basic sensory phenomena have come from progress in biochemistry and biophysics, not sensory science. While we have greatly improved our ability to control stimuli, these advances have largely been through computerization and automation. Most standard sensory evaluation methods have remained the same. Basic difference tests and intensity and hedonic scales have also not changed in the past 30 years. The 9-point hedonic scale was developed in the 1950’s. The central location and home-use tests have been commonly used for over 30 years. Analysis of variance developed in the 1940’s and 1950’s is still the predominant mode for sensory data analysis. Multivariate mapping techniques including principal components analysis, factor analysis, multidimensional scaling, and cluster analysis were developed in the 1950s’ and 1960’s. Newer multivariate approaches such as Procrustes analysis and partial least squares were first published over 30 years ago. As with the control of sensory stimuli, technology has made it easier to automate and execute complex data analysis. Instead of breakthroughs, we have experienced many, small advances. Cardello summarizes these thoughts by questioning whether we have reached some boundary to future knowledge or if we are seeing the end of sensory science.

The reasons for the recent slow pace in advancement are complex. First, sensory science has foundations in other fields of research, i.e. psychology, biochemistry, biophysics and statistics. Perhaps we need to rely on advancement in these fields to advance our own. Perhaps, it is the fact that many sensory professionals are generalists, lacking specific in-depth knowledge of these foundation fields. Perhaps, we are so applied that the sensory field should not be considered a definable science?

During the past five years, I have had the opportunity to manage a sensory program for a large manufacturing corporation, to own a supplier research organization and to serve as an academic faculty member in an institution of higher education. These experiences have given me an opportunity to view sensory applications from an industry, supplier and academic

perspective. In all three areas, research is becoming more and more applied. Today's, industrial sensory programs are focusing on automation, global consumer research and interrelating different types of sensory and non-sensory information (e.g. descriptive and consumer acceptance). Suppliers are focusing in serving the immediate needs of industry: providing quick, efficient and quality information. University sensory programs want to conduct basic research, but are experiencing decreases in public (federal and state) support. When funded by private industry, research is expected to be more applied with shorter term pay-off. Whereas, in the past the underlying motivation for university research was to seek truth through the spirit of exploration, the new motivation is financial survival.

Thirty years ago the free spirit to explore the unknown lead to advancements through fundamental sensory research. This required sensory science. That investment paid off with breakthroughs beneficial to industry and suppliers. Today, there are barriers that limit the free spirit of science. Research is more expensive today than in the past. Fewer funding sources exist that allow the free spirit of science to proceed without complete justification. Alliances among industry and suppliers are used to protect, rather than advance the free flow of information about new sensory innovations. The result is all too often the development of "black box" methods that have not been sufficiently validated as robust against applications under many different situations. Basic research needs an aim to spark the quest for the leading edge. This requires that researchers understand the needs of industry so that research programs can be devised that will ultimately serve the needs of the users of sensory information. All too often, university research is not conducted with vision to push the boundaries of science with potential applications in mind.

If need is the "mother of invention," then the needs of industry must be communicated to researchers involved in basic research. Re-stimulating the spirit of sensory science must begin with a "new dialogue" between industry, suppliers and academics. This dialogue should draw from the interdisciplinary strengths of our professional. It should focus on good science, with a vision for scientific breakthroughs that will meet the future needs of sensory professionals. This new dialogue should also transcend the barriers set up by alliances that have divided us. We should strive to find new and innovative ways to stimulate co-investment for basic research that will ultimately benefit industry, suppliers and academics alike.

There are many challenges ahead for the sensory profession. Armand Cardello used the arguments in his article to stimulate us to think and act. Neither he nor I believe sensory science is in its twilight years. Our clients are constantly pushing us to provide sensory information that

they can use to make more informed decisions. Many of their needs will require advancements based on scientific breakthroughs, not new applications of existing methods. As we move into the 21st century the Sensory Evaluation Division of IFT can help facilitate and stimulate dialogue and co-investment, and to break down barriers holding back the spirit of sensory science. As your new Chair-Elect (1998-99), I will use my tenure to facilitate this dialogue with the hope that we can influence individuals in key industry, supplier and academic positions to respond to this challenge. If we shrink from this challenge, we may in fact see the end of sensory science. The mother of invention will cease to exist since our clients will be turning to other disciplines to fulfill their needs.

I believe we will meet this challenge. Our clients will continue to push us to expand the limits of our scientific discipline. Sensory science has proven that sensory measurement does provide valid, robust information when applied in the right ways. With a new dialogue we can start to invest in the future and put the science back into sensory.