Quantifying sensory data

April 2 2014, by Katie Jacobs

All samples given to taste-testers must be prepared in exactly the same way. Credit: Sensory Evaluation Center

Bite into a juicy pear or a spicy hot pepper, and thousands of electrical impulses race to your brain. Taste buds pick up signals for basic taste qualities like sweet and sour, and your tongue also senses secondary taste components like astringency and numbness. These signals blend with

your sense of smell to create a food's flavor.

Scientists know how taste works, but the intricacies of what makes one flavor more appealing than another are still murky. Trying to unlock these mysteries are the researchers at Penn State's Sensory Evaluation Center, a facility designed for high-tech sensory evaluation and consumer testing.

Companies from across the country contact the center to help evaluate their food products. The center uses taste tests and focus groups to gather data, harnessing a variety of IT methods to collect and analyze it. Rachel Primrose, a sensory technologist, said the center's faculty and staff have evaluated products ranging from pillowy pierogies to peaches from nearby Gettysburg.

It may seem that it would be difficult to measure sensory detail with numbers. After all, how do you quantify something as nebulous as a taste or texture? Primrose said they design surveys to measure values such as aroma, texture, saltiness and likelihood to buy the product in the future.

"We create our ballots based on the needs of the company. No ballot is exactly the same," said Primrose. "The software—we use Compusense five—gathers the data from the tester and analyzes the responses, giving us results via graphs and tables."

When testers arrive at the center, they're ushered into one of 12 individual testing booths. Each booth is outfitted with a computer, as well as a serving window covered by a lifting lid that looks much like a bread box, through which samples can be passed. Participants can't see each other or the research technologist, who sends the questions from a console of her own.

Wine is one of the many substances tested in the center due to its complex flavor profiles. Credit: Sensory Evaluation Center

While waiting for the participants to arrive, Primrose and members of her team of 15 undergraduate students prepare the products that will be tested. Samples are made with meticulous attention, with great care taken to ensure all food is handled in precisely the same way, both for food safety and consistency reasons.

"The prep process has to be identical for all samples. They need to be taken out of the fridge at the same time, cooked for the same duration and served at the same temperature," Primrose said. "If there's even the slightest difference, it could skew the results."

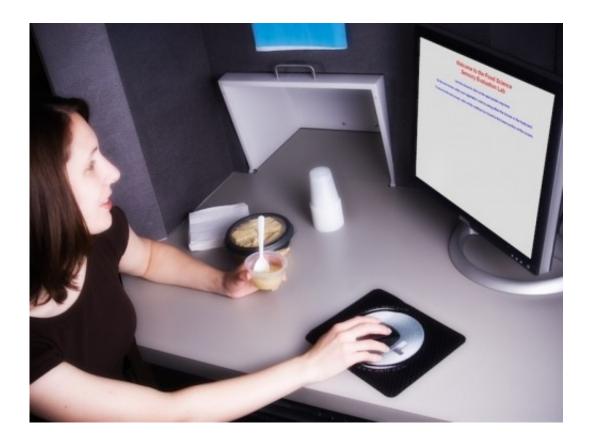Samples are slipped through the serving window, and panelists are given

exact tasting instructions. Participants record their answers as they appear on the screen, and once they submit all their answers, the results are compiled and an analysis is ready almost instantly.

To create the analysis, the Compusense five software takes the raw data from the surveys and breaks it down in ways most beneficial to the overall objective. If a company wants to determine the preference between two products, the data collected can show just that. If a manufacturer wants an idea if a new product will be successful or not, data collected on liking, purchase intent and other means can help.

Just as important as the questions asked and the analysis methods used are the people selected to do the testing. Some centers choose their panelists randomly, but Primrose said that Penn State's center is more discerning.

She maintains a database of volunteers wanting to participate in a taste test and sends out surveys to find the perfect panelists for each individual study.

A participant sat in a tasting booth, following the directions on her screen. Credit: Sensory Evaluation Center

"Say a company wants to test a new grape juice," Primrose said. "They would want the panelists to be familiar with that type of product, so I may send out a survey asking how often they drink grape juice with the goal of finding people who consume it at least once a month."

The center doesn't just cater to companies. It also serves as a state-of-the-art research facility for students and scientists. Erin Fleming, a graduate student, uses the center to study oral astringency—sometimes experienced as the rough, almost sandpaper-like feeling you experience when sipping a dry red wine.

Fleming uses the center to conduct tests to see how differences in a

person's salivary composition play a role in individuals' tolerance of astringency in foods like chocolate and wine and appreciates the technologies available at the center.

"Twenty years ago, researchers and scientists had to use paper ballots and do all analysis by hand; it was very time consuming," Fleming says. "Especially for grad students, who don't have an indefinite amount of time at the University, the technology allows us to accomplish what we wouldn't have been able to otherwise. The software, especially, allows us to do our job more efficiently."

Provided by Pennsylvania State University

Citation: Quantifying sensory data (2014, April 2) retrieved 4 May 2024 from
https://phys.org/news/2014-04-quantifying-sensory.html