

Tongue~ Tried

SENSORY SCIENTISTS TELL WHAT KEEPS CONSUMERS COMING BACK FOR MORE

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WHEN SUPPER TIME ROLLS AROUND IN THIS postindustrial consumer age of ours, we're faced with enough choices to bring on a bellyache.

Do we want fast food or home-cooked? Eat in or take out? Burgers and fries or pizza? Last year Americans spent 46 cents out of every food dollar on meals away from home. Even when we opt for home cooking it doesn't always ease the dinnertime dilemma.

Take a stroll down the aisle of your local grocery and see why. For crying out loud, there has to be at least a dozen different kinds of orange juice alone. Once upon a time, mayonnaise was a pretty straightforward spread. Now your mayo options include regular, low-fat and no-fat.

If the kids are along, let's not even venture into the cereal section with its uncountable permutations of crackle and crunch, sugar and spice.

A large American supermarket typically stocks

Tasters from upper left: Lindsey Alley, theater major, Lakeland, Fla.; Rebecca Stifel, theater, St. Louis; and Travis Robinson, communication and theater, Chicago. Second row: Alley; Katina McCoy, broadcast journalism and theater, Carrollton, Mo.; and Benjamin Wade, theater, San Diego. Third row: Robinson; Alley; and Stifel.

30,000 different food items on its shelves. You'd think that would be more than enough, but last year the U.S. food industry rolled out another 13,000 new products, including more than 2,800 condiments and 2,300 drinks.

That adds up to a lot of competition, and companies want to be sure their products move off the grocery store shelves and into your shopping cart. So before they introduce the newest, improved version of a spaghetti sauce or fruit drink or baked beans, they want to answer a very simple question.

How the heck does it taste?

And, more important, do potential customers even like the stuff?

To answer those questions, companies call on the services of sensory scientists such as Hildegarde Heymann. A professor of food science and human nutrition, Heymann is training Mizzou's next generation of graduates in the subtle art and science of evaluating consumers' sensory perceptions about food.

"We are not super tasters. We aren't people who can taste something and say 'Oh, this has XYZ in it.' That is not what a sensory scientist is," Heymann says. "Sensory scientists are people who know how to use human beings as instruments to get information

about the sensory aspects of food—the smell, the taste and texture, the after-taste, the mouth feel.”

Long before Pavlov rang the first dinner bell for his pack of laboratory pooches, scientists and other curious souls have pondered human taste and smell. It's only been in the last few decades, though, that sensory evaluation has been recognized as a full-fledged science.

In a way, sensory science got its start on the battlefields of World War II. Military brass were so used to GIs grousing about Army chow that they didn't pay much attention to an avalanche of complaints about the new C rations.

American soldiers simply hated the olive-drab cans of unrecognizable gunk. Hated them so much that the troops often threw them away and foraged off the land. When GIs tried to feed C rations to German prisoners, the POWs howled

about inhumane treatment.

The Army called in civilian researchers to get to the bottom of

things. Those first sensory evaluation experiments confirmed that C rations did indeed taste terrible. The military counterattacked by expanding the can *du jour* selection, and the war machine rolled on.

In the process a whole new discipline of food science was born. Early researchers started by borrowing from psychologists. In recent years, sensory evaluation has become a blend of psychology, physiology, chemistry, statistics and physics.

Flavor chemists today use such technology as gas chromatography, infrared spectrometers and nuclear magnetic resonance to explore the chemistry of flavors. Texture scientists even have a new contraption called an electropalato-graph. While research subjects eat, this gizmo studies their tongue movements to measure how they react to a food's texture.

Tasters at left: Lindsey Alley and Katina McCoy. Opposite page: Benjamin Wade and Rebecca Stifel.

Even with all the new high-tech gadgets, people usually are the best judges of what other people will or won't like about food. People are the measuring tools that Heymann and her fellow researchers use in their work at Mizzou's sensory laboratory in Eckles Hall.

The lab looks more like the visiting area at a penitentiary than mom's kitchen back home. Betty Crocker and Mrs. Olsen are nowhere to be found. There's a small kitchen where food samples are prepared, and one side of the lab is lined with small cubicles. Panelists are isolated in these booths during tests so distractions don't skew the results.

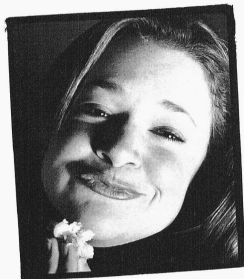
The furnishings are sparse. Product samples are delivered through a hatch in the front of each booth. Inside is a table and chair; there's a spit cup and a glass of water for tasters to rinse their mouths between tastings.

Heymann and her students run two distinct types of tests here: consumer preference tests and analytical tests. Preference tests are the least complicated. Researchers simply take a product, ask a panel of targeted consumers to give it a try, and then grill them about how much they like it.

“That's really all I can ask of a consumer, because most people have never thought about why they like something,” Heymann says. “We all have idiosyncratic likes and dislikes, often for very weird reasons. We're very good at knowing what we like and dislike, but we're very bad at explaining why. The next time you eat something, try to explain to yourself why you like it. Most people bog down.”

That's why the analytical panels are necessary. “In analytical sensory evaluation we also use human beings as our measurement instruments, but we train these people for a particular task we want them to do,” Heymann says.

Take strawberry ice cream for example. For an analytical test, Heymann and her students teach panel members a precise vocabulary to describe the product in minute detail—the simplicity or the com-



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plexity of the strawberry flavor, the stickiness of the ice cream in their mouths, the melt rate and the fatty mouth feel.

Researchers can then put the two test results together and tell a food producer whether consumers will like a new product and why. That depth of information gives product developers something to aim for when they develop a flavor. It can also give them a hook on which to hang a clever advertising slogan.

After decades of research, scientists have explained some of the physical processes involved in human taste. They're closing in on others, but some components of taste are still a mystery.

Why, for example, does a strawberry taste the way it does?

"I wish we knew," Heymann says. "First of all, a strawberry does not taste like a strawberry. It *smells* like a strawberry." Our sense of taste, she explains, is limited to the chemical receptors on our tongues—what we call taste buds—which can discern only four characteristics and nothing else: sweet, sour, bitter and salty.

"Everything else associated with what we call taste is actually smell," Heymann says. Something as simple as a strawberry can have hundreds of different chemical compounds that give it that distinct flavor.

It gets even more complicated, because there are many other components that make up our perceptions of food. There's the texture—the crunchiness of an apple, for example. There's the temperature of the food when we eat it, the chemical sting of chili peppers, the bubbles in carbonated soft drinks.

Our brains take all those messages and blend them into a single perception about a food. That complexity makes it even harder for food producers to develop new products that will sell like hot cakes. We all know we should cut down our fat intake, and manufacturers are ready to cash in on that market. They're scrambling to produce low-fat products, but

darn it, most people like the taste of fat.

"Fat molecules are very slippery. They slip in your mouth," Heymann says.

"That lack of friction is what we like about fat. When we take fat out and try to replace it with something else, we lose that slipperiness."

When they design new products, food companies also have to take their target markets into account. There are some constants to the human palate. For example, we all seem to have a sweet tooth, and we tend to avoid bitter foods, except for such acquired tastes as grapefruit, coffee and tonic water.

There are a few genetic variables in human taste. In general, women are much more sensitive to odors than men, and they're better able to describe the odors they smell. For the most part, though, our reaction to different foods is a learned behavior. From the cradle on, we're trained in very subtle ways to like some and to dislike others.

The chocolate bar you buy in the United States is likely to have much more sugar than one produced for the European market. It's the same thing with breakfast cereals. Americans tend to have a much higher need and tolerance for sweeteners than Europeans.

Because of variations like those, food companies can tailor their products to different cultural and demographic niche markets. As these companies stake out their territories, they're turning more and more to scientists like Heymann, who can help them build the products their customers want.

"The marketer's job is to make a product sound so enticing that you buy it the first time," Heymann says. "It is the sensory scientist's job to make you come back and buy it again. I have to be sure that the perceptions you get—even though you can't articulate them—make you love this product when you put it in your mouth." ❁

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