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The Quick and Tasty Survey: Opportunities from Sensory Tests

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The goal of this report is to get other researchers interested in food marketing to take advantage of sensory research activities undertaken by colleagues in food science departments. Food science performs sensory consumer tests for a number of reasons such as testing acceptability of new products and measuring consumers' ability to differentiate between products and product formulations. These tests may be undertaken for research purposes by academia or for marketing purposes by industry. A food scientist may need to test the impact of a new processing technique on flavor or texture, or a horticulturalist may want to evaluate new fruit varieties with better production characteristics to test their ability to replace those on the market. Both acceptance tests and difference testing is common. Most university consumer testing labs will also perform tests for outside clients on a fee basis. Industry clients may be looking for consumer feedback on reformulations, product-line extension, or new products. Client-driven consumer food tests are generally aimed at taste preferences or product acceptability, and clients want the answers quickly. For producers, processors, and retailers, it provides unbiased third-party testing.

In all types of sensory tests consumers will generally be asked about product characteristics such as texture, flavor, and aroma, as well as overall liking and acceptability in Likert-scale questions. Willingness to buy questions are not always asked in sensory tests, though they generally sharpen the significance of the impact of product attributes when compared to acceptability question results. This omission could be due to the limited interaction that occurs between economists and food scientists. But a desire to keep test length down when food-product preparation time is high can come into play as well. For economists, sample size and sample selection may limit the usefulness of taste tests for

evaluating other food-demand issues. However, both sensory and economic factors matter and are important for food marketing, and combining these research aspects is valuable.

The Institute of Food Technologists (2009) notes 12 programs with sensory and consumer science degrees: Cornell University, Purdue University, University of California at Davis, University of Minnesota, Kansas State University, Rutgers University, University of Georgia, University of Tennessee, North Carolina State University, University of Arkansas, University of Illinois, and Virginia Tech. Since these universities have a concentration in the sensory area they are likely to have more faculty members involved and potentially a more active testing program. A total of 27 universities, nearly all are Land Grant institutions, perform consumer testing though programs varying in size and capabilities (Institute of Food Technologists 2009). Nine have a sensory testing laboratory in a metropolitan area of greater than one-half million. Only the University of Minnesota, Oregon State University (at its Food Innovation Center Experiment Station in Portland), and Ohio State University are in metropolitan areas with populations over one million. Some, like the Food Innovation Center, are equipped with licensed commercial kitchens and focus group facilities, as well as product development specialists (Food Innovation Center 2009). Since the Center also does offsite testing they are equipped with a battery of tablet personal computers that can be used for intercept surveys as well. For this reason alone economists doing consumer research should find reasons to cooperate with their food-science counterparts to take advantage of using a joint set of equipment for off-site testing.

There are many benefits to economists for cooperating with sensory food scientists, even on smaller tests. Small tests may be most useful for testing new research designs or survey questions to collect in larger consumer surveys. Often someone else is footing the bill, so this is a good opportunity to pre-test an idea with perhaps only a small charge to get the questions programmed and the results

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This research was partially supported by the USDA through the Multicommodity Research Special Grant.

transmitted. Another benefit of the interaction could be that by contributing economic analysis to the food scientists' studies, greater recognition of each other's fields develops and also builds college relations. The process can provide students with a useful experience in data analysis for the food industry, which could benefit their resume.

While client-driven studies are providential they may require some creative thinking or utilization of new analytical techniques. A test at Oregon State University's Food Innovation Center tested consumers to see if they could differentiate between wine in bottles closed with natural cork or with a screw cap. Quality and liking ratings were gathered on Likert scales, as was willingness to buy, which was on a five-point scale from definitely yes to definitely no. Consumers' ratings of the wine were taken both with and without knowledge of the closure type. Logistic analysis revealed that liking was most critical in willingness to purchase, but path analysis revealed that a screw-cap closure reduced expected price both directly and via its reduction in quality perception, which was the most critical factor in price expectation (Marin and Durham 2007).

A more recent study involved a blind sensory-perception test of conventionally produced versus grass-fed beef and then went on to evaluate the impact of sensory and production-practices information on willingness to purchase either product in a conjoint framework. Typical sensory tests may only provide a small sample from which to examine credence attributes. In this particular test 120 consumers were recruited, to ensure having over 100 observations. However use of a multi-response conjoint format with six choice sets turned the 112 consumers who showed up into 672 observations. These numbers provide a good statistical test of impacts from personal characteristics as well as sensory ratings on choice between grass-fed and conventional ground beef. Though not ideal in terms of the number of actual participants, it provided useful information.

In addition to the data collected in the sensory test itself, the screening process for this study drew over 800 responses. A recruitment notice on Craigslist¹ directed those interested to an online survey

used to screen participants. The screener provides a chance to collect more observations on the perceptions and opinions of "target market" consumers and their shopping habits, and can provide some types of pre-testing of questions for other surveys. The screener can collect demographic information that can be merged into the test data set later, reducing the number of questions needed during the actual consumer test.

Another consideration is whether the sample recruited is representative. The grass-fed beef test deliberately recruited half the sample to be buyers who were more likely to be interested in grass-fed beef. Because this process creates a stratified sample rather than a random sample, analysis and reporting must account for these differences in the population. It is wise to provide estimates of choice probabilities or premiums for what you identify as your average or conventional consumer and for your niche consumer but not for the overall sample average, to prevent misuse of the data.

Off-Site Tests

The OSU Food Innovation Center is equipped with tablet computers (touch-screen laptops) outfitted with the same software as that used in the sensory laboratory, which it takes to a variety of venues including grocery stores, farmers markets, and public markets and events. The advantages of tests conducted outside of the laboratory include a larger sample and a greatly reduced expense per observation. Because food tasting is generally a sufficient attraction for recruitment, sensory consumer tests that are performed off-site generally do not require the use of any incentive. As before, some consideration must be given to whether a particular food product may not be of interest to the entire population. The disadvantages for data collection during an off-site food test include less time per participant, since are not being paid for their time, which generally means less information can be gathered; in addition, the population demographic may not be as balanced as in the laboratory since the sample population cannot be screened prior to recruitment.

Boundless opportunities exist to gather marketing information about usage and how individual characteristics contribute to product demand. A test of raw and pasteurized artisan cheeses produced

¹ Craigslist is "a centralized network of online communities, featuring free online classified advertisements – with sections devoted to jobs, housing, personals, for sale, services, community, gigs, résumés, and discussion forums" (Wikipedia n.d.).

findings on usual purchase amounts, packaging and size preferences, trusted sources of information, and the value of information to change a consumer's mind about safety of raw cheeses. The token pricing question selected by the food scientists was an interval scale where a person revealed the most they were willing to pay (MWTP) for artisan cheeses, which was evaluated with an ordered logistic model. It showed that the MWTP increases with incomes over \$40,000, preferences for goat and sheep milk cheeses, and liking for pungent and sharp cheeses, and decreases with age. However, this particular study demonstrates some of the difficulties of working with off-site sensory tests. The pricing question could have been better designed, and additional questions to evaluate demand would have been useful. In this particular test the number of questions had to be limited to keep time per participant low and accomplish the primary informational goals related to raw-cheese marketing.

Considerations for Efficient Joint Economic Sensory Studies

How can economists work more efficiently with food scientists, and in particular with client-driven sensory research? First of all, planning ahead is

critical to take advantage of client-driven sensory tests with their short turn-around time. In addition to questions under consideration for future studies, it may be useful to develop a template of pricing questions that could be adapted to the product at hand. It may be valuable for researchers in this area to join together to evaluate choice questions and analytical methods for their suitability by product type, sample size, and product complexity.

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