

SOCIETY OF SENSORY PROFESSIONALS

UNLOCK YOUR POTENTIAL

CREATE THE FUTURE OF SENSORY SCIENCE

2016 SSP Conference • October 26–28 • Sheraton Atlanta Hotel • Atlanta, Georgia, U.S.A.



#SSP2016

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SSP Conference
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Welcome to Atlanta!



The theme of this year's SSP conference is "Unlock your Potential: Create the Future of Sensory Science." Our program is focused on highlighting new areas of research, sharpening technical knowledge, and advancing professional development. Key topics will examine the opportunity to deepen collaboration with adjacent technical fields of study, such as sensory marketing and molecular science. We

have two joint workshops, which include a workshop with ASTM on "User Experience Design" and a workshop with Sensometrics on "Discrimination Testing in Practice." We also have three technical workshops, which will explore what "real" means to consumers and the trend toward label simplification, consumer perception dynamics, and amylase and texture perception. In addition, we are excited to have two special guest speakers. One will inspire us to "tell stories with our data" and the other will help us understand the power of empathy and emotions in our research.

Don't miss the Speed Posters from 9:00–9:50 a.m., after Thursday's Plenary Session. Each of the ten Speed Poster presentations will give you a taste what's new in sensory science. To learn more, head to the posters in the Exhibit Hall on Thursday, where over 70 posters will be available for viewing during break times. Browse the Exhibit Hall to get in touch with sensory tools and suppliers. While you're browsing exhibits, stop by the SSP booth (Booth 15) to give us your input on our long-term strategic plan.

We look forward to seeing you at the Gala on Thursday night, 7:00–10:00 p.m. This year's Gala will be at the World of Coca-Cola, an exciting venue to meet with other attendees while trying both classic and brand new flavors! Be sure to stop by the "Taste it!" tasting room, where there are over 100 beverage flavors from around the globe, and try something new at the Sampling Bar. Your other senses are in for a treat, too, including a pop culture art gallery, portrait wall, 4-D theater, and more. We will see you there!

We would like to thank our volunteers, presenters, and committee members for giving their valuable time and talent to this conference. We also share our gratitude with our sponsors and exhibitors for making this conference possible. Finally, we thank YOU, our valued attendees. We wish you an enjoyable time here at our 2016 SSP Conference in Atlanta, Georgia.

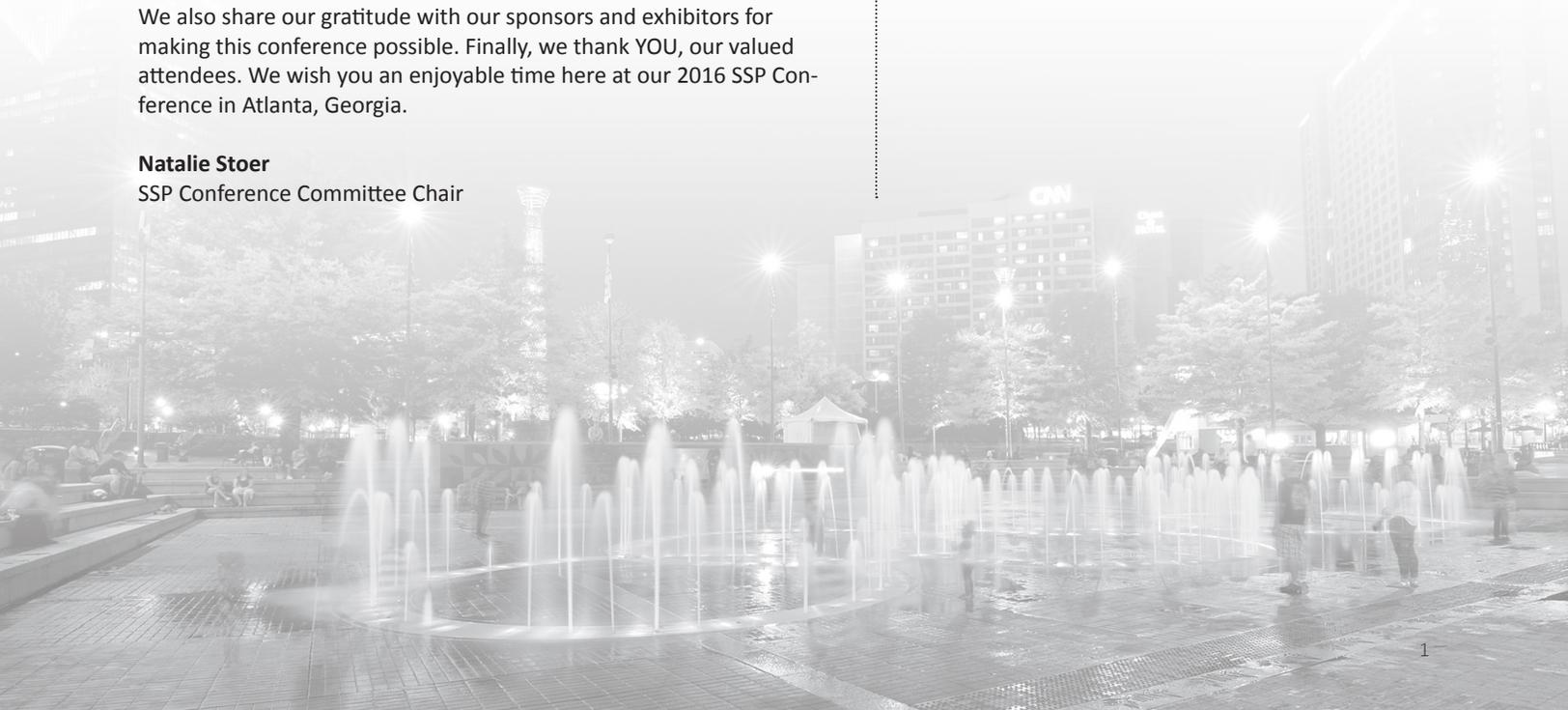
Natalie Stoer
SSP Conference Committee Chair

SSP Conference Committee

Chair: Natalie Stoer, General Mills, Inc.
Lisa Beck, Insight Factory LLC
Christine Caruso, Sensory Spectrum, Inc.
John Castura, Compusense Inc.
Gail Vance Civile, Sensory Spectrum, Inc.
Lauren Collinsworth, The Clorox Company
Darla Hall, Research Vibe, LLC
Lydia Lawless, The Hershey Company
Jason Newlon, The Procter & Gamble Company
Suzanne Pecore, P & D Consulting LLC
Robert Pellegrino, University of Arkansas
Stella Salisu, Belle-Aire Creations
Kristine Wilke, The Kellogg Company
Alexa Williams, PepsiCo

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Schedule-at-a-Glance

Wednesday, October 26	
8:00 – 8:30 a.m.	Conference Kick-off • <i>Capitol Ballroom</i>
8:30 a.m. – 12:15 p.m.	SSP/ASTM Workshop: Transforming Product Design through User Experience—Join the Revolution • <i>Capitol Ballroom</i>
12:45 – 1:30 p.m.	Opening Luncheon with Connectors Meet-and-Greet • <i>Capitol Ballroom</i>
1:30 – 2:30 p.m.	Opening Keynote: Mimi Morrin, “Sensory Marketing and Sensory Science: Finding the Common Ground” • <i>Capitol Ballroom</i>
2:45 – 4:15 p.m.	Professional Development: Sensory Talent Pipeline • <i>Atlanta 4–5</i> SSP–Sensometrics Joint Workshop: Discrimination Testing in Practice • <i>Capitol Ballroom</i>
4:15 – 5:45 p.m.	Cocktail Reception with Exhibits and Posters • <i>Georgia Ballroom</i>
Thursday, October 27	
8:00 – 9:00 a.m.	Plenary Session: Suzanne Pecore, “Sweet Success in the Evolution of Product Insights,” and Danielle Reed, “Sensory Clues Unlock Molecular Mysteries” • <i>Capitol Ballroom</i>
9:00 – 9:50 a.m.	Speed Posters • <i>Capitol Ballroom</i>
9:50 – 10:20 a.m.	Break with Exhibits and Posters • <i>Georgia Ballroom</i>
10:20 – 11:20 a.m.	Scientific Session: Idea Design Phase: Defining the Question • <i>Capitol Ballroom</i>
11:20 a.m. – 12:20 p.m.	Special Guest Session: Cole Nussbaumer Knaflic, “Storytelling with Data” • <i>Capitol Ballroom</i>
12:20 – 1:50 p.m.	Lunch with Exhibits and Posters • <i>Georgia Ballroom</i> Student Luncheon • <i>Atlanta 4–5</i>
1:50 – 2:50 p.m.	Workshop: “Real”: Current Insights into Consumer Attitudes and Perceptions • <i>Capitol Ballroom</i>
2:50 – 3:50 p.m.	Scientific Session: Product Design Phase: Strategies for Understanding Products and Consumers • <i>Capitol Ballroom</i>
3:50 – 4:20 p.m.	Break with Exhibits and Posters • <i>Georgia Ballroom</i>
4:20 – 5:20 p.m.	Workshop: Evaluation of Consumer Perception Dynamics 2.0 • <i>Capitol Ballroom</i> Workshop: The Interplay of Amylase and Texture Perception: An Interactive Demonstration • <i>Georgia 5–6</i>
7:00 – 10:00 p.m.	Gala* • <i>World of Coca-Cola (off-site venue)</i>
Friday, October 28	
8:30 – 9:45 a.m.	Professional Development: Michelle Gandolf Frietchen, “Emotions and Empathy: How a New Research Model Is Transforming Patient and Caregiver Experience at One of the Nation’s Largest Health Systems” • <i>Capitol Ballroom</i>
10:15 – 10:45 a.m.	Installation of Officers • <i>Capitol Ballroom</i>
10:45 a.m. – 12:00 p.m.	Closing Keynote: Cherie Floyd, “Delighting Consumers: What I Have Learned Over 20 Years from Hanging Out With Sensory Scientists” • <i>Capitol Ballroom</i>

*Single Day attendees and Exhibitors who did not purchase full Registration must purchase a ticket to attend

General Information

Registration

Registration will be located in the Capitol Prefunction Area at the following times:

Tuesday, October 25 5:00 – 7:00 p.m.
Wednesday, October 26 7:30 a.m. – 5:00 p.m.
Thursday, October 27 7:30 a.m. – 5:30 p.m.
Friday, October 28 8:00 – 11:30 a.m.

Guests

Guests planning to attend the Gala must purchase tickets in advance. Guests do not have access to scientific sessions, workshops, or the exhibit hall. Coworkers and business associates are not considered guests and must pay the appropriate registration fees.

Speaker Kiosk

The speaker kiosk will be available for speakers to review and/or upload their presentations the day before their scheduled session. The kiosk is located near the Registration Desk.

Connectors

If you signed up to participate in the Connectors program, be sure to meet up throughout the meeting. The Opening Luncheon will be an excellent starting point for students and early career professionals to connect with more experienced professionals.

Mobile Site

The 2016 SSP Conference is mobile! View the SSP program in a format that is optimized for navigation on a mobile device. Go to www.sensorysociety.org/meetings/2016Conference with your phone to access the SSP mobile site.

The SSP Mobile Site is sponsored in part by Q Research Solutions.

Charging Station

Is your mobile device running on empty? Plug into the charging station in the Georgia Prefunction Area for a recharge!

The Charging Station is sponsored in part by Sensory Computer Systems.

Complimentary WiFi

SSP has provided complimentary WiFi available throughout the conference.

Network: Sheraton Conference

Password: sensory

Proceedings

Electronic proceedings will be available online following the meeting to all SSP members. Watch your email following the conference for the announcement.

Photo Release

SSP staff will take photos throughout the conference for promotional use. By virtue of your attendance, you agree to allow SSP to use your likeness in future promotional materials.

Taste the Feeling!

Join us for the SSP Gala at World of Coca-Cola

Thursday, October 27

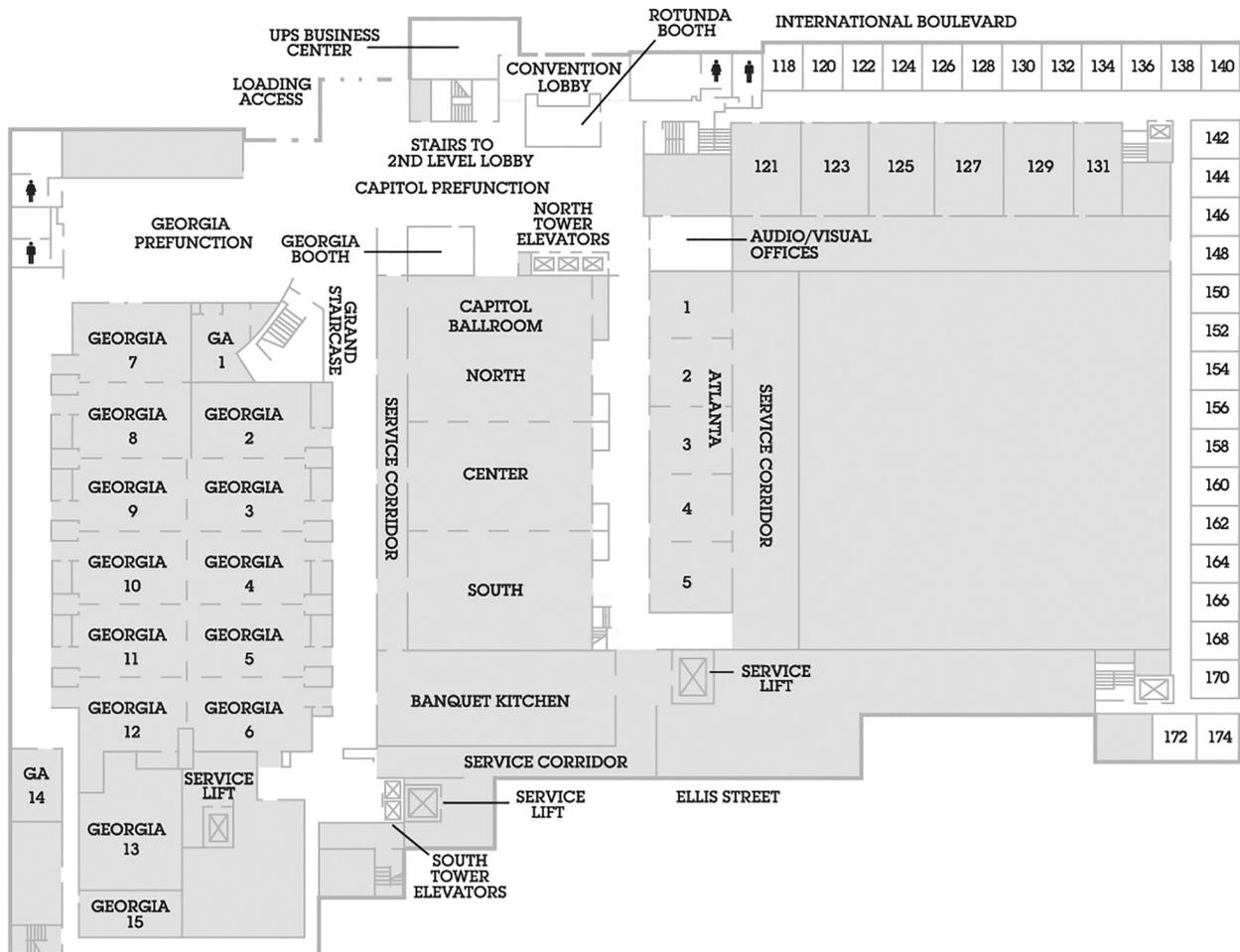
7:00 – 10:00 p.m.

- Sip cocktails on the Hub Patio
- Indulge at Gourmet Food Stations
- Delight in "Taste It!" Flavor Bar
- Experience the history of Coca-Cola
- Enjoy exclusive access to World of Coca-Cola Store

Shuttle service will be available to and from the Sheraton Atlanta.

Included with Member, Nonmember, and Student Member Registrations. All others \$195.

Sheraton Atlanta Hotel – Level 1



Schedule: Day-by-Day

Wednesday, October 26

7:30 a.m. – 5:00 p.m.	Registration Open	Capitol Prefunction
8:00 – 8:30 a.m.	Conference Kick-off	Capitol Ballroom
8:30 a.m. – 12:15 p.m.	SSP/ASTM Workshop: Transforming Product Design through User Experience—Join the Revolution	Capitol Ballroom
12:00 – 3:00 p.m.	Exhibitor Set-up	Georgia Ballroom
12:00 – 3:00 p.m.	Poster Set-up	Georgia Ballroom
12:15 – 12:45 p.m.	Break	Georgia Prefunction
12:45 – 1:30 p.m.	Opening Luncheon with Optional Connectors Meet-and-Greet	Capitol Ballroom
1:30 – 2:30 p.m.	Opening Keynote: Mimi Morrin, “Sensory Marketing and Sensory Science: Finding the Common Ground”	Capitol Ballroom
2:30 – 2:45 p.m.	Break	Georgia Prefunction
2:45 – 4:15 p.m.	Professional Development: Sensory Talent Pipeline	Atlanta 4–5
2:45 – 4:15 p.m.	SSP–Sensometrics Joint Workshop: Discrimination Testing in Practices	Capitol Ballroom
4:15 – 5:45 p.m.	Cocktail Reception with Exhibits and Posters <i>(All poster presenters stand by posters)</i>	Georgia Ballroom

SSP/ASTM Joint Workshop: Transforming Product Design through User Experience—Join the Revolution

8:30 a.m. – 12:15 p.m. • Capitol Ballroom

Speakers: Mark Capper, Kompas Strategy; Rafael Lopes, Envien Group; Judy Chung, The Clorox Company; Jandie Lane, Jandie Lane Brand Strategies

Organized Jointly By: ASTM-E18 Sensory Evaluation and Society of Sensory Professionals

This workshop links to the conference focus to “Unlock Potential and Create the Future of Sensory Science” by introducing an approach to guide product development that may be new to many of our sensory professionals: user experience design. Exploring user experience through the design-thinking process expands the sensory professional’s ability to influence business decisions, offer deeper consumer insights, and create transformational product solutions.

Workshop participants will explore the power of user experience design through experiential and interactive exercises following the design-thinking process—

1. Identifying market category **Opportunity** through Cultural Scanning
2. **Empathizing** with and understanding the Counterculture
3. **Defining** Cultural Myth to align with a brand
4. **Ideating** how to bring Cultural Myth to life

Speakers will demonstrate, through case studies of successful products and services, what is possible when user experience design is incorporated into the development process.

See www.sensorysociety.org/conference for the complete SSP/ASTM Joint Workshop program.



Opening Keynote: Sensory Marketing and Sensory Science: Finding the Common Ground

1:30 – 2:30 p.m. • Capitol Ballroom

Mimi Morrin, Fox School of Business, Temple University

Dr. Morrin will discuss recent research findings from the growing field of sensory marketing, including her own work on olfaction and haptics. She will then discuss some of the differences in methodological approaches and theoretical foci in the fields of sensory marketing and sensory science and propose areas of common interest and opportunities for mutually beneficial collaboration.

Dr. Morrin founded and directs the Consumer Sensory Innovation Lab. Together with her team of doctoral students, she examines various ways the human senses impact the consumer decision-making process. She is a member of the editorial review board of Journal of Marketing, Journal of Consumer Psychology, Journal of Public Policy & Marketing, and Recherche et Applications en Marketing. She recently served as area editor for the Journal of Consumer Psychology. She has received several awards and external grants to support her research. She enjoys teaching customer data analytics at the undergraduate and master’s level, as well as doctoral seminars on consumer behavior and theory development. Professor Morrin received her Ph.D. degree from New York University, where she was a Consortium Fellow and won an Outstanding Teaching Award. She also is a graduate of Thunderbird, the American Graduate School of International Management (MBA) and Georgetown University (BSFS). Her background includes five years of corporate work experience in advertising (at Ted Bates) and brand management (at James River Corp and Playtex Family Products).

Wednesday continued

Professional Development: Sensory Talent Pipeline: Research Challenges and Impact of Technical Skill Development

2:45–4:15 p.m. • Atlanta 4–5

Moderator/Organizer: Kristine Wilke, The Kellogg Company

Building on the 2014 Workshop, “Training the Next Generation of Sensory Professionals,” this session will focus on current research challenges faced by our membership as well as discuss the potential connection between technical development and department capabilities. Results of a membership/company survey will be shared and the panel will discuss ideas and suggestions of how to navigate the research challenges.

SSP–Sensometrics Joint Workshop: Discrimination Testing in Practice

2:45–4:15 p.m. • Capitol Ballroom

Chair: Carla Kuesten, Amway Corporation

Speakers: Jennifer Kamerud, General Mills, Inc.; Sophie Hummer, Brown-Forman Corporation

Discussion Panel Facilitator: Lori Rothman, Lori Rothman Consulting, LLC

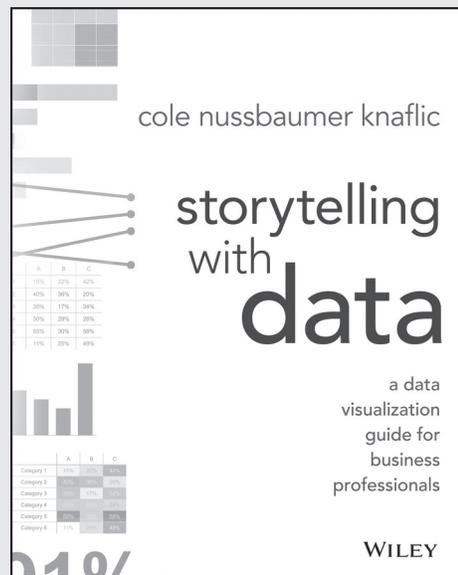
Discussants: Tom Carr, Carr Consulting; Bethia Margoshes, Margoshes Miller Consulting; Janet McLean, Diageo plc; Frank Rossi, PepsiCo

This workshop aims to explore the challenges faced by industry when selecting and applying discrimination testing tools, using real examples to illustrate the journeys taken, challenges addressed and solutions adopted. To encourage discussion and promote positive outcomes, this workshop will feature a 40-minute facilitated panel discussion involving the speakers and a number of invited discussants.

- Journey to Tetrad: Tales from Industry—Jennifer Kamerud, General Mills, Inc.
- Business Risk Assessment from the Application of Discrimination Testing—Sophie Hummer, Brown-Forman Corporation

Discover the Power of Data—*Storytelling with Data* on Sale Now!

Pick up your copy at the SSP registration desk for the special conference price of \$24.95—\$15 off the original price!



Book Signing

Cole Nussbaumer Knaflic will be at the SSP Booth (#15 in the Exhibit Hall) on Thursday, 12:30–1:50 p.m. Meet the author, purchase the book, and get your copy signed.

Thursday, October 27

7:30 a.m. – 5:30 p.m.	Registration Open	<i>Capitol Prefunction</i>
8:00 – 9:00 a.m.	Plenary Session: Suzanne Pecore, “Sweet Success in the Evolution of Product Insights,” and Danielle Reed, “Sensory Clues Unlock Molecular Mysteries”	<i>Capitol Ballroom</i>
9:00 – 9:50 a.m.	Speed Posters	<i>Capitol Ballroom</i>
9:50 – 10:20 a.m.	Break with Exhibits and Posters (<i>Even-numbered poster presenters and all speed poster presenters stand by their posters</i>)	<i>Georgia Ballroom</i>
10:20 – 11:20 a.m.	Scientific Session: Idea Design Phase: Defining the Question <i>Moderator: Lauren Dooley, The Kellogg Company</i> 10:20 a.m. 1. Donya Germain and Lisa Beck. Why sensory makes business sense 10:40 a.m. 2. Clare Dus. Leveraging online listening, creative consumer, and sensory methodologies to unpack a concept: A case study in luxury 11:00 a.m. 3. Uyen Phan. Motivations of everyday food choices: An application of the food choice map	<i>Capitol Ballroom</i>
11:20 a.m. – 12:20 p.m.	Special Guest Session: Cole Nussbaumer Knaflic, “Storytelling with Data”	<i>Capitol Ballroom</i>
12:20 – 1:50 p.m.	Lunch with Exhibits and Posters (<i>All poster presenters stand at posters: 1:20–1:50 p.m.</i>)	<i>Georgia Ballroom</i>
12:20 – 1:50 p.m.	Student Luncheon	<i>Atlanta 4–5</i>
1:50 – 2:50 p.m.	Workshop: “Real”: Current Insights into Consumer Attitudes and Perceptions	<i>Capitol Ballroom</i>
2:50 – 3:50 p.m.	Scientific Session: Product Design Phase: Strategies for Understanding Products and Consumers <i>Moderator: Dawn Chapman, Covance Food Solutions</i> 2:50 p.m. 4. Christopher Simons. Contextualizing context: Investigating the role of environmental cues on product acceptance using immersive technologies 3:10 p.m. 5. Katherine Gallo. Comparing visual food images vs. actual food when measuring emotional response of children using emojis 3:30 p.m. 6. Alexandra Grygorczyk. Why some psychographic scales may not be telling you what you think they are	<i>Capitol Ballroom</i>
3:50 – 4:20 p.m.	Break with Exhibits and Posters (<i>Odd-numbered poster presenters stand by their posters</i>)	<i>Georgia Ballroom</i>
4:20 – 5:20 p.m.	Workshop: Evaluation of Consumer Perception Dynamics 2.0	<i>Capitol Ballroom</i>
4:20 – 5:20 p.m.	Workshop: The Interplay of Amylase and Texture Perception: An Interactive Demonstration	<i>Georgia 5–6</i>
4:20 – 5:00 p.m.	Poster Take-down	<i>Georgia Ballroom</i>
4:20 – 6:30 p.m.	Exhibitor Take-down	<i>Georgia Ballroom</i>
6:30 – 7:00 p.m.	Shuttle Service to Gala	<i>Outside hotel by ground level UPS store</i>
7:00 – 10:00 p.m.	Gala*	<i>World of Coca-Cola (off-site venue)</i>
9:30 – 10:15 p.m.	Shuttle Service from Gala	<i>Baker Street</i>

* Single Day attendees and Exhibitors who did not purchase full Registration must purchase a ticket to attend

Plenary Session

8:00 – 9:00 a.m. • Capitol Ballroom



Sweet Success in the Evolution of Product Insights

Suzanne Pecore, P & D Consulting LLC

The application of sensory science in industry has evolved from the early days of conducting single, isolated tests on demand. The sensory scientist is now well integrated as a strategic business partner and plays a critical role in developing insights during the conceptual stage, development, launch, and maintenance of a product. Suzanne Pecore, an accomplished sensory scientist, uses examples from her 35+ year career to demonstrate how connecting the myriad types and amount of data into cohesive insights facilitates successful product design.

Suzanne Pecore is a sensory consultant specializing in the practical application of sound sensory and consumer methodology to ensure successful product development and quality maintenance. She has over 35 years of experience as a sensory professional within the global food and beverage industry, formerly with McKesson Contract Research, The NutraSweet Company, and General Mills. Suzanne is also active in furthering the sensory profession through her own research, development of young scientists, and leadership in professional sensory organizations (SSP, ASTM, and Pangborn Symposia).



Sensory Clues Unlock Molecular Mysteries

Danielle Reed, Monell Chemical Senses Center

Sensory observations have provided essential clues to unlock mysteries of the molecular infrastructure that determine our sense of taste and smell. In 1879, after working in his chemistry laboratory all day, Constantine Fahlberg bit into a dinner-time bread roll and found that his hand was covered by a new sweet taste molecule, saccharin. This observation set off a chain of events that later led to the discovery of the sweet taste receptors. Likewise, in 1931, while working in his laboratory, chemist Arthur Fox made an accidental sensory observation that led to the discovery of the bitter taste receptors.

Dr. Danielle Renee Reed received her Ph.D. degree in psychology in 1990 from Yale University, focused on the role of metabolism on fat preference. She did a postdoctoral fellowship at the University of Pennsylvania, where she studied genetic variation in bitter taste and in obesity in humans. In 2000, she accepted a faculty position at Monell Chemical Senses Center in Philadelphia. Dr. Reed has attained the rank of member (equivalent to full professor) and currently serves as co-chair of the Monell Postdoctoral Training Program and director of the NIH-supported Genotyping and DNA/RNA Analysis Core, which provides training and research support in genotyping and quantification of nucleic acids. In 2008, she received the AChemS Award for Outstanding Research sponsored by International Flavors and Fragrances. Dr. Reed has been a member of the editorial board of AChemS's Chemical Senses since 2014 and a member of AChemS since 2001. She is a reviewer or member of NIH study sections related to chemosensation, genetics, and metabolism.

Speed Posters

9:00 – 9:50 a.m. • Capitol Ballroom

Selected poster presenters will present their research in three slides and no more than 5 minutes. Many diverse topics and points of view will be presented in a short period of time.

8. Edward Crossen. A comparison of sensory attributes of fruits and vegetables dried using solar and electric forced-air dehydrators
13. Michelle Niedziela. Beyond hedonics: Emotions, neuroscience and sensory marketing in product design
18. Shannon Gibbons. Expert panel co-creation: The use of expert panels to identify and describe successful flavor pairings. A powerful tool to shorten the development process
20. Lotika Savant. A practical approach to determine the “unique” contribution of correlated attributes to the consumer’s overall impression of a product
33. Rhoda Makled. Maximizing candle fragrance evaluation
46. Alexandra Walsh. Integrating implicit and explicit emotional assessment of pleasurable meal experiences
48. Deborah Wright. Utilizing mobile olfactive technology with ASTM standards to evaluate product performance on odor elimination
62. Md Kamal Hossain. A cross-cultural comparison of purchasing intentions, natural product packaging design and labeling information of naturally developed *Moringa*-based beverages by Bangladeshi and German consumers
68. Rebecca Liu. Investigating the impact of the “all-natural” labeling on perceived food quality and liking using immersive technologies
80. Kristen Robeson. Healthy versus wholesome snacks: Exploring consumer perceptions and identifying sensory cues



Special Guest Session: Storytelling with Data

11:20 a.m.–12:20 p.m. • Capitol Ballroom
Cole Nussbaumer Knaflic,
storytellingwithdata.com

Stories resonate and stick with your audience in ways that data alone does not. Why wouldn't you leverage the power of story when communicating with data? Join this engaging session, during which Cole Nussbaumer Knaflic discusses the untapped potential of combining the magic of story with best practices in data visualization for communicating effectively with data. Being able to tell stories with data is a critical skill in our world of ever-increasing data and desire for data-driven decision making. An effective data story can mean the difference between success and failure when it comes to communicating the findings of your study, raising money for your non-profit, presenting to your board, or simply getting your point across to your audience. You'll leave the session ready and excited to tell stories with your data.

Cole Nussbaumer Knaflic is the author of Storytelling with Data: a Data Visualization Guide for Business Professionals and writes the popular blog www.storytellingwithdata.com. Her unique talent was honed over the past decade through analytical roles in banking, private equity, and most recently as a manager on the Google People Analytics team. At Google, she used a data-driven approach to inform innovative people programs and management practices. Cole traveled to Google offices throughout the U.S. and Europe to teach the course she developed on data visualization. She has also acted as an adjunct faculty member at MICA, where she taught Introduction to Information Visualization.

Cole has a B.S. and MBA degree from the University of Washington. When she isn't ridding the world of ineffective graphs one pie at a time, she is baking them, traveling, and embarking on adventures with her husband and two young sons in San Francisco.

Workshop: "Real": Current Insights into Consumer Attitudes and Perceptions

1:50 – 2:50 p.m. • Capitol Ballroom

Moderators: Laura Jefferies, Brigham Young University; Sarah Kirkmeyer*, Givaudan Flavors Corp.

Speakers: Sarah Kirkmeyer, Givaudan Flavors Corp.; Judy Lindsey, Product Dynamics, a division of RQA, Inc.; Katie Marston, Pepsico Global R&D; Greg Stucky, InsightsNow Inc.; Julia Tyrpin, Griffith Foods Inc.

The trend of simplifying labels and listing only pantry-type ingredients is challenging nearly every aspect of the development process. As consumer and sensory researchers, it is critical to understand consumer perceptions and find the opportunities to deliver the best products. Significant business writing, blogs, and news stories in the popular press have increased consumer awareness and perhaps misconceptions of ingredients, labels, and claims. Consumer opinions are changing day-to-day as a result of these influences and researchers have a responsibility to bring objective evaluation and rigor to this topic, apply innovative research to anticipant demand, and translate insights into consumer relevant products. To bring this to life, leading industrial consumer and sensory researchers will provide their perspective using case studies and examples across a variety of consumer research approaches. This session will not focus on legislation or methodologies, rather on insights that provide a snapshot in time in what we understand to foster thought-provoking questions.

Workshop: Evaluation of Consumer Perception Dynamics 2.0

4:20 – 5:20 p.m. • Capitol Ballroom

Moderators: John Castura*, Compusense Inc.; Michael Meyners*, Procter & Gamble Service GmbH

Speakers: Tom Carr, Carr Consulting; Margaret Hinds, Givaudan Flavors Corp.; Jennifer Kamerud, General Mills, Inc.; Carla Kuesten, Amway; Kenneth McMahon, School of Food Science, Washington State University; Suzanne Pecore, P & D Consulting LLC; Michelle Reyes, The Pennsylvania State University; Carolyn Ross, School of Food Science, Washington State University

Over the last decade, so-called rapid methods for sensory evaluation have been developed to permit consumers to characterize products. The possibility to analyze both sensory perception data and hedonic and other data arising from the same consumers presents new opportunities, but also new challenges to investigate hedonic drivers and other interesting aspects.

The workshop will begin with a brief introduction to methods used to capture the dynamic product properties from consumers, and how data from these methods are combined to learn more about the products being evaluated. Main conclusions from a related workshop held at Eurosense in Dijon, France, will be shared. Challenges and solutions with temporal data collection and combining data from different methods will be discussed in facilitated discussion in smaller groups. Discussion facilitators will join a panel discussion, and significant amount of time will be allocated for discussion among panel discussants and the audience. The ultimate goal of the workshop is to jointly generate a better understanding of the methods, factors influencing their applicability for particular business objectives, and how the data from the methods can be combined to develop a deeper understanding of the products being evaluated.

Workshop: The Interplay of Amylase and Texture Perception: An Interactive Demonstration

4:20 – 5:20 p.m. • Georgia 5–6

Moderator: John Smythe*, Tate & Lyle

Speakers: John Hayes, Sensory Evaluation Center, Dept. of Food Science, College of Agricultural Sciences, The Pennsylvania State University; John Smythe, Tate & Lyle; Ann Colonna, Food Innovation Center

This workshop will demonstrate how conventional thinning/thickening mechanisms interact with the often overlooked impact of starch breakdown from the amylase in our saliva. After a brief introduction discussing genetic differences and how they impact sensory perception across a variety of perceptual modalities, the workshop will then focus on understanding how genetic differences can lead to perceptual differences in specific to amylase activity. Special focus will be given to how this effect can make traditional sensory measures of descriptive profiling difficult. Participants will taste various samples and rate them for gross time-intensity changes in thickness. Some samples will have no amylase active starches, and therefore are likely to be perceived similarly, while other samples will have easily digested starches that can greatly influence how they are perceived to breakdown in the mouth. In this process, the speakers hope to alert the participants of confounds on traditional sensory methods and encourage them to take a deeper look at why certain factors (like mouth thinning) are difficult, if not impossible, to emulate with instrumental methods. Additionally, participants will discuss novel techniques to understand phenomena that are difficult to get panelist alignment on. While this is of special interest in the case of amylase thinning as the properties of a product in the mouth can change in thickness, density, and even sweetness as starches are converted to simple sugars with amylase activity, the goal is to encourage researchers to consider other modalities as well.

Gala

7:00 – 10:00 p.m. • World of Coca-Cola (off-site venue)

Fee: \$195 (Included with Member, Nonmember, and Student Member Registration)



Taste the Feeling! Join us at the World of Coca-Cola to experience the celebrated beverage in ways you never imagined! Begin the evening sipping a cocktail with your fellow sensory professionals on the Hub patio. This will be followed by dinner featuring gourmet food stations that will ignite your senses. You will then experience the "Taste It!" Flavor Bar and delight in the delicious frozen beverage concoctions made by Coca-Cola mixologists. Engage your other senses throughout the remainder of the night with visits to the Coca-Cola portrait wall, historical artifact gallery, and a 4-D theater. The World of Coca-Cola Store will also be open exclusively for SSP. Shuttle service will be available to and from the Sheraton Atlanta.

*Indicates a workshop organizer.

Friday, October 28

8:00 – 11:30 a.m.	Registration Open	<i>Capitol Prefunction</i>
8:30 – 9:45 a.m.	Professional Development: Michelle Gandolf Frietchen, “Emotions and Empathy: How a New Research Model Is Transforming Patient and Caregiver Experience at One of the Nation’s Largest Health Systems”	<i>Capitol Ballroom</i>
9:45 – 10:15 a.m.	Break	<i>Georgia Prefunction</i>
10:15 – 10:45 a.m.	Installation of Officers	<i>Capitol Ballroom</i>
10:45 a.m. – 12:00 p.m.	Closing Keynote: Cherie Floyd, “Delighting Consumers: What I Have Learned Over 20 Years from Hanging Out With Sensory Scientists”	<i>Capitol Ballroom</i>



Professional Development: Emotions and Empathy: How a New Research Model Is Transforming Patient and Caregiver Experience at One of the Nation’s Largest Health Systems

8:30 – 9:45 a.m. • *Capitol Ballroom*
 Michelle Gandolf Frietchen, *Cleveland Clinic*

Find out how Cleveland Clinic, in collaboration with a research partner, designed a custom market research approach to understand patient emotions before, during and after the patient experience. It not only inspired the creation of powerful patient vignettes, with the use of innovative emotions research and traditional segmentation research; it also completely revamped the orientation process for new caregivers and is helping to transform the current culture for all existing employees across an organization of 40,000 caregivers. You will walk away with an understanding of this inspiring, hot-off-the-press case study. Take the toolkit with you—along with strategic insights from Cleveland Clinic Market Research & Insights you can apply to build empathy and understanding of your consumers, research partners, and/or customers.

Michelle has worked in Market Research & Insights at Cleveland Clinic for 23+ years. In her role, she has managed the Market Research Department since 2001 and has been involved in strategic initiatives such as improving the patient experience, business development, and branding. Michelle holds a bachelor’s degree in marketing and quantitative business analysis and a master’s degree in consumer/industrial research. She is versed in both qualitative and quantitative research methodologies. She is a professionally trained focus group moderator and has moderated more than 100 focus groups and one-on-one in-depth interviews for a range of service lines and business units. Michelle has also conducted several positioning, advertising tracking, and image and awareness studies.

Michelle serves on multiple committees within the Cleveland Clinic and is the co-chair of Women in Search of Excellence (WISE), an employee resource group which strives to provide opportunities for personal and professional growth for Cleveland Clinic female caregivers.



Closing Keynote: Delighting Consumers: What I Have Learned Over 20 Years from Hanging Out With Sensory Scientists

10:45 a.m. – 12:00 p.m. • *Capitol Ballroom*
 Cherie Floyd, *Kellogg North America Snacks*

To survive in the packaged goods segment, we must strive to delight consumers every day which is easier to say than to do. Drawing on 20 years of experience bringing new food products to the market place, Cherie will share with you her “lessons learned” from her past successes and failures working hand-in-hand with her sensory scientist partners in the U.S. and global markets. She will also provide some hypotheses on how we will need to operate in the future as the world becomes more complex and how sensory scientists will play an even more important role in shaping the ways we can win by delighting consumers.

Cherie Floyd is currently the vice president of Kellogg North America Snacks R&D, responsible for product lines including Special K Snacks, Nutri-Grain Bars, Rice Krispies Treats, Keebler Crackers and Cookies, Cheez-It, and Pringles. Cherie joined Kellogg in 2003 as a product development scientist and has held numerous roles in various business units both inside and outside the U.S., working on cereal, snacks, frozen waffles, and frozen vegetarian products as well as long-term technical and idea pipeline building. Prior to Kellogg, she had seven years of experience with General Mills and Pillsbury as a product developer on a variety of food platforms, including cereal and bakery items. Cherie has a B.S. degree in food technology from Texas Tech University and an M.S. and Ph.D. in food science from Texas A&M University.



Thank You Volunteers!

Exhibit Sales

Christine Caruso (co-chair), Sensory Spectrum, Inc.
Gail Vance Civile (co-chair), Sensory Spectrum, Inc.

Sponsorship Committee

Lisa Beck (co-chair), Insight Factory LLC
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Student Events Committee

Robert Pellegrino (chair), University of Arkansas
Suzanne Pecore, P & D Consulting LLC
Natalie Stoer, General Mills, Inc.

Student Awards

Honoring Jean F. Caul

Award for Outstanding Presentation on Use of Scientific Principle
Donor: The Wolf Group

Jean Caul's role in sensory evaluation is inestimable. ASTM Committee E-18 on Sensory Evaluation named Jean a "Pioneer" of the field and awarded her one of the first Peryam Awards. She wrote and published the first definitive article on descriptive sensory analysis—the flavor profile method, which served as a foundation for a myriad of descriptive methods. Her advocacy of descriptive sensory analysis, her early use of consumer testing, and, along with other pioneers, her absolute commitment to the use of near perfection in the application of good scientific principles in planning, conducting, analyzing, and interpreting data from sensory studies set the standard for test execution that allows sensory analysis to be a respected research tool.

Honoring Beverley Kroll

Award for Outstanding Presentation that Develops or Expands a Method
Donor: P&K Research

Beverley J. Kroll is president and CEO of Peryam & Kroll Research, a company she cofounded some fifty years ago with another pioneer in the field of sensory research, Dr. David R. Peryam. Bev is a recognized expert in the application of consumer research methods to product development and has contributed to the new product successes of many of the world's leading consumer packaged goods companies. Among Bev's writings are some of the earliest papers and published reports on sensory testing and the use of the 9-point hedonic scale (developed by Dr. Peryam). She also is recognized for her development of a hedonic scale for children. Her business leadership has enabled the application of research methods to industry and thereby laid the groundwork for today's science and practice of sensory consumer testing.

Honoring Elaine Skinner

Award for Outstanding Presentation on an Applied Topic
Donor: Sensory Spectrum, Inc.

Elaine Zlobick Skinner pioneered strategic sensory influence in a business environment and developed a strong business sensory model at General Foods. During her almost 40 years at General Foods she brought strong analytical and business skills to R&D, marketing, and operations projects that needed sensory input. Elaine's characteristic openness to new ideas, new methods, different approaches, and rational arguments made her a valuable team member across the company. However, Elaine's greatest asset was her mentoring skills, which created a rich environment for growth for the sensory scientists, psychophysicists, and statisticians that worked for her. Her legacy is the concept of strong sensory scientists as part of strategic teams in business providing insights on product evaluation and consumer research.

Posters

Schedule

Wednesday, October 26

- 12:00 – 3:00 p.m. Poster Set-Up
4:15 – 5:45 p.m. Cocktail Reception with Exhibits and Posters (*All poster presenters stand by posters*)

Thursday, October 27

- 9:00 – 9:50 a.m. Speed Posters
9:50 – 10:20 a.m. Poster Session & Exhibits (*Even-numbered poster presenters and all speed poster presenters stand by their posters*)
12:20 – 1:50 p.m. Lunch, Poster Session, & Exhibits (*All poster presenters stand at posters: 1:20–1:50 p.m.*)
3:50 – 4:20 p.m. Poster Session & Exhibits (*Odd-numbered poster presenters stand by their posters*)
4:20 – 5:00 p.m. Poster Take-Down

Speed Posters

Selected poster presenters will present their research in three slides and no more than 5 minutes. Many diverse topics and points of view will be presented in a short period of time.

Poster Titles

Speed Poster presenters are indicated with (*).

7. Debolina Chatterjee. Effect of tapioca flour (TF) on sensory flavor and texture profiles and physicochemical attributes of cooked low-fat chicken breast patties
- * 8. Edward Crossen. A comparison of sensory attributes of fruits and vegetables dried using solar and electric forced-air dehydrators
9. Kathryn Fox. Characterization of dairy and dairy-alternative milk beverage
10. Gimhani Uthpala. Study on firmness variation, mineral composition and sensory attributes of two gherkin (*Cucumis sativus* L.) varieties (Ajax and Vlasset) of fermented pickles
11. Hong Zhuang. Differences in sensory descriptive texture profiles between cooked chicken breast fillets (pectoralis major) and thighs
- * 13. Michelle Niedziela. Beyond hedonics: Emotions, neuroscience and sensory marketing in product design
15. John Hayes. Evaluating acceptance of vaginal applicators using preference mapping
16. Sara King. Does a change in data capture method affect sensory descriptive analysis results?
17. Shannon Gibbons. The world of food texture: Defining characteristics and areas of overlap
- * 18. Shannon Gibbons. Expert panel co-creation: The use of expert panels to identify and describe successful flavor pairings. A powerful tool to shorten the development process
19. Gabriela Sanchez Brambila. Effect of soil fertility on flavor attributes of *Vidalia* sweet onion (*Allium cepa* L.) and their relationship with consumer preference and onion chemical compounds
- * 20. Lotika Savant. A practical approach to determine the “unique” contribution of correlated attributes to the consumer’s overall impression of a product
21. Catherine Belisle. Peach lexicon and a look into deeper quality analyses
22. Helena Bolini. Shelf-life study: Lactose and sugar-free chocolate
23. Helena Bolini. Open frontiers of innovation and development with consumer research: A case with chewing gum mint flavor
24. Edgar Chambers. Comparison of sensory testing between different panels on flavor characteristics of coffee
25. Alison Burngasser. Documenting the relationship between scent character, rest time, and fatigue in descriptive analysis panelists
26. Minghua Cheng. Comparative study on practicability of 9-point hedonic scale and 5-point hedonic scale for beverages
27. Caryn Crawford. Fragrance needs
28. Courtney Crist. Application of automated facial expression analysis and qualitative analysis to assess emotional and descriptive responses to off-flavors in milk beverages
29. David Gomez. Association between CATA and hedonic data: A study on the visual characteristics of dry dog food by consumers in the U.S.
30. Margaret Hinds. Using temporal check-all-that-apply (TCATA) to investigate dynamic perceptions of sensory attributes and food-evoked emotions during yogurt consumption
31. Taylor Jaffe. Determination of the sensory flavor attributes of smoked food products
32. Christie Ledeker. Alternatives to just about right scales for obtaining feedback on product diagnostics
- * 33. Rhoda Makled. Maximizing candle fragrance evaluation
34. Natalie McElwee. Understanding challenging flavor profiles through a unique approach of decoupling the sensorial experience
35. Kenneth McMahon. Perception of sparkling wines of varying carbonation levels using quantitative descriptive analysis (QDA) and temporal check-all-that-apply (TCATA)
36. Valerie Mialon. When time is of the essence—Rapid mapping of emotional and sensory characteristics of products
37. Valerie Mialon. Gamification—What sensory research can learn from engaging consumers
38. Valerie Mialon. The reality of difference testing—A practical appraisal of tetrad, triangle and A not A
39. Robert Pellegrino. Olfactory performance can be influenced by background noise, positive concurrent feedback and the presentation order of olfactory tests
40. Maridel Reyes. Characterizing dynamic sensory properties of nonnutritive sweeteners with temporal check-all-that-apply (TCATA)
41. Ali Schultz. Using complexes to shorten descriptive analysis training time in an industrial setting
42. Christina Sipes. Comparing emotion measurements: CATA versus visual stimuli

43. Aussama Soonrunnarudrungsri. Possibility of visually impaired/blind people as descriptive trained panel: The initial stage
44. Kadri Koppel. Evaluation of aromatic attributes of fragrances with different preparation methods
45. David Thomson. A new indirect approach for capturing emotion in product research
- * 46. Alexandra Walsh. Integrating implicit and explicit emotional assessment of pleasurable meal experiences
47. Stephanie Williams. Sensitivity and usefulness of tetrad testing compared to triangle testing on beverages containing high-potency sweeteners
- * 48. Deborah Wright. Utilizing mobile olfactive technology with ASTM standards to evaluate product performance on odor elimination
49. Michael Gasho. What really went wrong? A comparison of two approaches to penalty analysis
50. Alejandra Ochoa. Descriptive aroma volatiles of four commercial coffees prepared using four brew methods
51. Blythe Beavers. Descriptive aroma and flavor attributes of four commercial coffees prepared using four brew methods
52. Stephanie Binder. Sensory evaluation of a teff- and dairy-enriched flatbread
53. Sirichat Chanadang. Preference testing of novel fortified blended foods with infants and young children in Tanzania
54. Sirichat Chanadang. Motivations for food consumption during specific eating occasions in Turkey
55. Brizio Di Donfrancesco. Sensory profiles, consumer acceptance, and palatability of dry dog food manufactured with sorghum
58. Amanda Grzeda. Are advertising over-quotas required for comprehensive product understanding?
59. Pam Hartwig. Are grid questions reliable for mobile surveys?
60. Will Harwood. Comparison of menu-based or adaptive choice-based conjoint analysis to identify consumer desires for protein bars and beverages
61. Kadri Koppel. Flavor, acceptance and antioxidant content of pomegranate juice and green tea blends
- * 62. Md Kamal Hossain. A cross-cultural comparison of purchasing intentions, natural product packaging design and labeling information of naturally developed *Moringa*-based beverages by Bangladeshi and German consumers
63. Laura Jefferies. Effects of gender, age, and product usage frequency on the overall acceptance of various foods in central location tests
64. Erica Kenney. The role of segmentation in understanding consumers' emotion for coffee
65. Juyoung Kim. Korean consumers' food texture evaluation using lexicons in four different languages
66. Daniel Kim. The effects of wine components on the sensory perception of wine faults
67. Han Li. Pre-thickened beverage products for a dysphagia diet: Sensory profiling and external preference mapping
- * 68. Rebecca Liu. Investigating the impact of the "all-natural" labeling on perceived food quality and liking using immersive technologies
70. Patti Wojnicz. Assessing the impact of value perceptions and a product reward option on product evaluations
71. Valerie Mialon. The impact of consumption on consumer liking: Why product developers must look beyond single liking exposures
72. Kenneth McMahon. Sparkling wine sweetness: Its influence on sensory properties and consumer acceptance
73. Antoinette Morano. Calibrating panelists at international locations can be challenging, even with similar and identical sensory languages. Cross-cultural differences can contribute to variability
74. Michelle Niedziela. Tasteful packaging: How health and ethical messaging can affect the consumer experience
75. Kari O'Brien. Does context really matter? Understanding how the application context may affect results when applying personal care products
76. Megan Parker. The role of temporality and label on consumer acceptance of natural sweetener blends in protein beverages
77. Laila Seppa. Apple Workshops—Liking of apple and other fruits among children
78. Anita Sisopha. Connecting the dots between commodity ingredients and descriptive sensory research
79. Li Juan Tan. Study on how sweetness perception in milk products influences overall product acceptability among adults and children in Asian countries
- * 80. Kristen Robeson. Healthy versus wholesome snacks: Exploring consumer perceptions and identifying sensory cues

Abstracts

(1) Why sensory makes business sense

D. GERMAIN, L. BECK (1)

(1) Insight Factory LLC, Houston, TX, U.S.A.

From up-front brand development to prototype R&D, from in-plant quality control to product launch and from in-market optimization to competitive benchmarking, sensory science is at the core of and important to business and marketing decision making. Over the years many sensory scientists have struggled to communicate with other business units, define the importance of sensory and find their place at management's table. Qualitative interviews with sensory buyers (brand/marketing teams) and sensory suppliers (internal and external) will be conducted in addition to quantitative online research among sensory practitioners, which will be used to thoroughly understand the needs, barriers, drivers and opportunities for sensory scientists within the broader businesses. From the use of qualitative research and quantitative research to communication, training, presenting and clarity of expectations, this presentation will provide examples, case studies, research results and proven strategies to enable the sensory scientist to better understand how and why sensory makes good business sense. Sensory scientists will learn how to present sensory results in a way business partners will take notice of, understand how to position sensory data for maximum impact in an organization and discover how to be an advocate for sensory.

(2) Leveraging online listening, creative consumer and sensory methodologies to unpack a concept: A case study in luxury

A. Retiveau-Krogmann (1), E. Toronto-Doyle (1), C. DUS (1),

G. Civile (1), Y. Koelliker (1)

(1) Sensory Spectrum, New Providence, NJ, U.S.A.

How does one build a luxurious or premium experience into an everyday product? What are the elements of product design that create a sense of luxury? Which of those elements should be built into a consumer product to cue luxury? Qualitative in-person and online consumer methods can provide answers to those questions. When supplemented with descriptive methods and interpreted through the filter of technical sensory expertise, even richer insights are uncovered. In this research, multiple tools and techniques are used to demonstrate the powerful impact of combining social media listening, creative consumer, online ideation and sensory methodologies to unpack the concept of luxury. This technique provides developers with insights on how to integrate luxury cues into everyday products. First, themes emerge from a thorough review of online luxury boards. Elements of design are uncovered with special focus on the senses: look, feel, taste/flavor of luxury. Second, a sensory exploration of a category with known ties to luxury is conducted. Qualitative descriptive evaluation and quality ratings of a series of handbag are supplemented with online product reviews and blog postings to decipher key components of the luxury experience in the category. Third, creative consumers articulate perception of luxury elements in an everyday category: chocolate. Product and package elements that indicate luxury are discussed. Combined with descriptive product review, specific flavors and texture are identified that signal a premium, luxury experience in the category. Last, an online ideation session led by a sensory facilitator uncovers ideas on how to bring luxury cues to a category not often associated with that concept: bathroom cleaning. This study provides a simple example of how sensory and consumer methodologies can work hand-in-hand to uncover rich insights at the innovation stage and lead to targeted development efforts, ensuring the sensory experience matches the concept.

(3) Motivations of everyday food choices: An application of the food choice map

U. PHAN (1), E. Chambers (2)

(1) Food Science & Technology, University of Georgia, Griffin, GA, U.S.A.; (2) Sensory Analysis Center, Kansas State University, Manhattan, KS, U.S.A.

People choose foods for various reasons. The most common one is because they like them. However, there are more factors contributing to the process of making food decisions. This study aimed to explore and validate the motivations underlying food choice using the food choice map technique. The study included 100 one-on-one interviews, in which the respondents were asked to build a map of all the foods and beverages they typically eat in a usual week for morning, midday, snack, and evening meals. The respondents also provided the reasons and the eating context for each of the choices on their map. The individual food and beverage items were then categorized into the corresponding food groups. The reasons were classified into 15 motivation constructs, i.e., liking, habits, need and hunger, convenience, health, pleasure, traditional eating, sociability, price, weight control, affect regulation, social norms, social image, choice limitation, and variety seeking. Correspondence analysis was used to identify the motivational drivers of consumption for both eating occasions and food groups. Meal was found to be different from snack both in food motivations and food patterns. Pleasure was the driving factor for snack but not that important for meal. Different food groups also were chosen with different motivations. Grain, pasta, and meat were linked to convenience, variety seeking, traditional eating, and price, while nuts, seeds, and legumes were associated with need and hunger, health, and weight control. The findings of the study could be used as inputs when dietary changes are desired, whether those changes are related to new or revised products being promoted by industry or are dietary changes that result from government or social policy issues.

(4) Contextualizing context: Investigating the role of environmental cues on product acceptance using immersive technologies

C. SIMONS (1), R. Liu (1), B. Linne (1), D. Hathaway (1), R. Bangcuyo (1), J. Zumach (1), K. Smith (1), A. Pierce (1), M. Hannum (1), G. Guttman (1)

(1) The Ohio State University, U.S.A.

Traditionally, sensory consumer testing is completed in sensory booths where the influence of non-product (i.e., environmental) attributes is managed. However, these highly controlled environments strip away meaningful contextual information important in forming consumer perceptions, liking, and behaviors. In a series of studies, we have utilized immersive technologies to restore and manipulate environmental audiovisual and olfactory cues to investigate how the brain prioritizes contextual information and how it influences the perception and liking of foods and beverages. Over a variety of virtual consumption and preparation scenarios, including a coffeehouse, food court, and home kitchen, we consistently find hedonic data collected in these contextually relevant immersive environments to be more discriminating and a more reliable predictor of future product liking compared with data collected by the same people in traditional sensory booths. Additionally, we find consumers to be more engaged in the virtual environments—an outcome that likely also contributes to improved data quality. Recently, we explored which, if any, contextual information stream (visual, auditory, or olfactory) preferentially underpins these con-

sistent outcomes by manipulating their congruency and assessing the impact on preference and liking. We found that exposure to completely incongruent streams of information decreased product liking more so than exposure to any individual incongruent stream alone, perhaps because the concurrent presentation of these incongruent streams maximized their saliency. Exposure to the treatment conditions additionally influenced panelist assessment behavior. Panelists spent more time evaluating products in the first presented all-congruent control condition compared to the incongruent conditions. Furthermore, repeated exposure to the control condition resulted in significantly shortened evaluation times. Together, our results underscore the importance of context in shaping hedonic decisions and behaviors. Using immersive technologies provides a novel approach to restoring or manipulating this relevant information.

(5) Comparing visual food images versus actual food when measuring emotional response of children using emojis

K. GALLO (1), M. Swaney-Stueve (1), D. Chambers (1)
(1) Kansas State University, Manhattan, KS, U.S.A.

In recent years, the body of sensory research on consumer emotions has grown, yet studies have largely focused on adult subjects. Research with children comes with unique challenges, such as the attention span of the participants. Simplified approaches, such as the assessment of images rather than actual foods, may be appealing to researchers looking to streamline a study or eliminate the need to have children onsite for testing. The purpose of this study was to compare children's liking and emotional responses to food images and actual foods. In the first study, children answered questions about liking and emotions in response to images of eight foods (fresh spinach, baby carrots, orange juice, white grapes, cheddar cheese, chocolate graham snacks, lychee gummy candy, white bread). Emotion responses were collected using a check-all-that-apply format with emojis as variables. In the second study, children were asked liking and emotion questions after seeing the sample and after tasting the sample. Overall liking scores were higher for actual foods compared to food images. Additionally, testing with actual foods resulted in increased use of positive emojis and decreased use of negative emojis for both food appearance and post-taste emotions. The largest differences in liking and emotion results were seen in response to the lychee gummy candy, which most children had not tried before. From this study, the children's responses differed between a conceptual evaluation (image only) versus literally seeing and tasting the product and were not interchangeable.

(6) Why some psychographic scales may not be telling you what you think they are

A. GRYGORCZYK (1)
(1) Vineland Research and Innovation Centre, Vineland Station, ON, Canada

Differences in product preferences among consumers are often best predicted by consumer personality types rather than standard demographics such as age or ethnicity. Psychographic scales, including the food neophobia scale and product involvement scale, are frequently used to profile consumer personality types. Involvement scales, are a popular type of psychographic scale used to identify consumers with a high level of involvement with a product or activity of interest. These scales have been used extensively to understand the product preferences of consumers with varying degrees of involvement in areas such as wine, fruits and vegetables, and garden plants. However, there is currently little understanding of how stated involvement translates to consumer behavior. The present research attempted to better understand the

implications of involvement by evaluating the ability of a number of variables to predict outdoor plant purchasing. A multinomial logistic regression was used to determine the contribution of an established involvement scale, objective gardening knowledge, number of weekly hours spent gardening, and a self-assessment of gardening skill level on plant purchasing. It was found that while the involvement scale correlated with self-assessment of gardening knowledge, neither of these variables significantly contributed to predicting plant purchasing. However, higher objective gardening knowledge and time spent gardening significantly contributed to prediction of increased plant purchasing. The involvement scale appears to provide insight into a consumer's theoretical excitement about garden plants. However, because consumers tend to project the best version of themselves in consumer studies, this theoretical excitement may not translate to actual gardening expertise or plant purchasing. This study highlights the importance of choosing personality profiling methods that match your project objectives and will provide guidance on making the right choice.

(7) Effect of tapioca flour (TF) on sensory flavor and texture profiles and physicochemical attributes of cooked low-fat chicken breast patties

D. CHATTERJEE (1), G. Sanchez Brambila (1), H. Zhuang (1)
(1) U.S. National Poultry Research Center, USDA-ARS, Athens, GA, U.S.A.

The present study investigates the effect of different concentrations of tapioca flour (TF) on the physicochemical and sensory qualities of low-fat chicken patties. TF also was compared with potato flour and garbanzo flour, as well as egg white. Tapioca is a starch extracted from cassava root. Starch plays an important role in improving the texture quality of meat, as well as cooking yield. Various starches have been used as binders (Skrede, 1989), and the combination of starch and egg white also is known to improve texture in meat (Carballo et al., 1996). Potato starch also has been used to improve hardness in low-fat frankfurters (Bloukas and Paneras, 1993). Incorporation of modified starches like barley has improved water-holding capacity, moisture retention, and reduced shrinkage in low-fat ground pork (Kumar and Sharma, 2004). Three different tests were carried out with various concentrations of TF, salt, and other flours. The first test consisted of three different formulations of TS (1%, 2%, and 4%) and a control (0%). The second test had a control (0%) and four different formulations ([2%, 0%], [2%, 0.38%], [2%, 0.75%], [0%, 0.75%]) of TF and salt (NaCl), respectively. The third test consisted of four 2% formulations of egg white and various starches (TF, potato flour, and garbanzo flour) and a control (0%). Three separate collections of chicken breasts were carried out from a local poultry farm. Three replicates of patties were formulated, processed, and tested in order to see their effects on texture. The patties were stored at -20°C until cooked. Physicochemical attributes, pH, color (illuminant C and L^* , a^* , and b^*) drip loss, and cook loss, were measured. Sensory profile was performed by a trained sensory panel for cohesiveness, hardness, juiciness, chewiness, grittiness, meaty/chicken flavor, broth-like, saltiness, sweetness, and sourness. Quality parameters, A-K texture, water-holding capacity, and expressible moisture, also were measured.

(8) A comparison of sensory attributes of fruits and vegetables dried using solar and electric forced-air dehydrators

E. CROSSEN (1), L. Jefferies (1)
(1) Brigham Young University, Provo, UT, U.S.A.

Dehydration of foods using direct sunlight has been used for thousands of years. However, because of largely uncontrollable conditions, direct exposure to free radicals, and exposure to pests,

this method is largely inferior to commercial electric forced-air drying. Solar dryers, which use the sun as an energy source, aim to solve many of these problems while still providing a method of food preservation feasible for developing countries. Past research has focused on optimizing solar dryers for use in the South Pacific islands and Africa, but no comparisons between the solar dryer and traditional methods have been performed. This research aims to compare the quality of product dehydrated using a solar dehydrator versus an electric-forced air dehydrator using sensory and analytical data. Five products were selected to represent a large cross-section of fruits and vegetables that could be preserved by drying. These products are carrots, tomatoes, peas, grapes, and apples. Three runs of 15 kg of each product were dried in the summer and fall of 2015. After allowing the moisture contents to equilibrate for at least 2 months, the tests were performed. The sensory research has so far shown that there is no clear preference for the overall acceptability for product dried using either drying method; a slight preference for the aroma of fruits dried using the forced-air method; and a slight preference for the texture of vegetables dried using the solar dryer. Further research is being done to compare the color, texture, and vitamin content of the fruits and vegetables dried using each method in order to determine if solar drying results in quality comparable to traditional forced-air methods.

(9) Characterization of dairy and dairy-alternative milk beverage

K. FOX (1)

(1) Ingredient Incorporated, Bridgewater, NJ, U.S.A.

There has been an increase in dairy-alternative milk beverages that compete with traditional dairy-based milks due to factors such as environmental concerns and changes in consumer preference. Manufacturers of plant-based dairy alternatives formulate their products to mimic the gold standard texture of 2% dairy milk. Ingredient Incorporated mapped key commercial products that represent the dairy and dairy-alternative beverage space in order to identify textural gaps between dairy and dairy-alternative milk beverages, as well as to understand the textural landscape of dairy and dairy-alternative milk beverages. The texture profiles of 25 unflavored dairy-based and dairy-alternative milk beverages from various bases (soy, almond, rice, and coconut) were evaluated via descriptive analysis. Dairy-alternative beverages included in this study varied in fat level, sugar level, and plant milk base. Organic and conventional milk beverages also were included in the study. The dairy and dairy-alternative milk beverages formed four distinct clusters, with in-mouth viscosity and residual chalkiness and mouth-drying driving the differences between the products. Fat-containing dairy milks were thick and low in chalkiness and mouth-drying, while non-fat dairy milks were thin and low in chalkiness and mouth-drying. Almond, coconut, and select soymilks were thick, chalky, and mouth-drying, and rice and select soymilks were thin, chalky, and mouth-drying. From these findings, Ingredient Incorporated identified several development paths to drive innovation and growth in this segment. A variety of ingredients, such as starches and hydrocolloids, can be utilized to transform the texture profile of dairy-alternative milk beverages.

(10) Study on firmness variation, mineral composition and sensory attributes of two gherkin (*Cucumis sativus* L.) varieties (Ajax and Vlasset) of fermented pickles

G. UTHPALA (1)

(1) University of Sri Jayewardenepura, Nugegoda, Colombo, Sri Lanka

Two gherkin varieties in brine fermentation (6 month) were analyzed for composition of fruit moisture and minerals in raw

fruits (AOAC methods), firmness measurements, Ca and Na ion absorption, and sensory evaluations for fruits within fermentation. Vlasset and Ajax varieties contained 96.30% and 95.54% moisture, respectively. Mg, K, and Zn were higher in Ajax, while Ca and Na were greater in Vlasset. Both showed K to be highest, followed by Zn, Na, and Ca. According to the statistical evaluation results obtained, there were no significant differences ($P > 0.05$) between the two varieties considering color, odor, and overall attributes, although the texture attribute differed significantly ($P < 0.05$). First, sixth, and third month of Vlasset brine fermentation were having the highest average ranks, while the third month of Ajax brine fermentation had the lowest rank. Considering mesocarp firmness, Vlasset was noted to maintain higher firmness throughout 6 months of fermentation compared to Ajax. Firmness variation (exocarp and mesocarp) of Vlasset showed the same pattern, while Ajax differed. There was a positive correlation between the texture attribute of sensory data with firmness of mesocarp tissue (Pearson correlation of 0.714, with $P = 0.009$). Nevertheless there was no significant correlation between the texture attribute of sensory data with firmness of the exocarp tissue (Pearson correlation of 0.168 with $P = 0.601$). A positive correlation ($r = 0.829$) between Ca and Na ion absorption irrespective of variety was observed. The de-brining process showed lower retention of Ca and Na ions in Ajax than Vlasset. Even though the initial moisture content was higher in Vlasset, the better textural quality could be supported by its availability of higher initial dietary fiber, Ca and Na minerals, and higher firmness in mesocarp tissue than exocarp.

(11) Differences in sensory descriptive texture profiles between cooked chicken breast fillets (*pectoralis major*) and thighs

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Muscles can be classified into white and dark meat based on their functions and appearance. Chicken muscles have both white meat (breast meat) and dark meat (legs and thighs). The sensory texture quality of both chicken breast and thigh meat can be affected by the postmortem time (deboning time) at which those muscles are removed from chicken carcasses. The objective was to compare sensory profiles between cooked chicken white and dark meat with different deboning times. Broiler breast and thigh samples were deboned at 0.75, 2, or 24 hr postmortem. Sensory descriptive texture attributes of cooked meat were evaluated by eight trained panelists using 0–15 universal intensity scales. Results showed that there were no significant interactions between muscle type and deboning time for texture attributes of juiciness, cohesiveness of mass, and wetness of wad. The average scores of fillet juiciness and cohesiveness of mass were higher than those of cooked thighs ($P < 0.05$). There was no difference for wetness of wad. For the attributes of bolus size, rate of breakdown, and chewiness, the average scores of the fillets deboned at 0.75 or 2 hr were higher than those of cooked thighs regardless of thigh deboning time ($P < 0.05$). However, there were no differences between 24 hr deboned fillets and the thighs. For the attributes of cohesiveness and hardness, the average scores of 0.75 hr or 2 hr deboned fillets were higher than those of cooked thighs ($P < 0.05$); however, the average score of 24 hr deboned fillets was lower than that of 0.75 hr deboned thighs ($P < 0.05$). There were no differences between 24 hr fillets and 2 hr or 24 hr deboned thighs. These results demonstrate that deboning time of chicken meat significantly affects the differences in sensory descriptive texture profiles between cooked chicken fillets and thighs.

(13) Beyond hedonics: Emotions, neuroscience and sensory marketing in product design

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The use of neuroscience and psychological research methodologies has become a hot topic in consumer research. With the high failure rate of new market introductions, despite initial successful testing with traditional sensory and consumer tests, product developers are seeking new approaches to aid in product design. Sensory marketing is a relatively new field and involves creating and influencing the product experience through the senses (sight, sound, touch, taste, smell). The perceptive-hedonic experience of products routinely measured with liking scores can be investigated more deeply by collecting the emotional responses that color and even influence the experience via the senses. Understanding the impact of taste, smell, sight, sound and feel on overall product perception can help in product development, innovation, design and optimization. Further, it is imperative to marry the brand perception, packaging experience and product attributes (such as sensory attributes or aesthetics) to convey one cohesive message to create the optimal consumer experience. Through measuring the non-conscious consumer response to products, concepts and before/after results it is possible to make decisions for product development and marketing and in developing product claims. Using a sensory marketing approach and neuroscientific and psychological methodology, it is possible to better understand consumer needs (and product need-gaps) to build better products (a top-down as opposed to a bottom-up approach to research) and consumer technical models for innovation. If we start with understanding consumers using a combination of qualitative and quantitative research with applied consumer neuroscience, then we can build a real story into the drivers of behavior and liking of consumer products.

(15) Evaluating acceptance of vaginal applicators using preference mapping

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Vaginal applicators are used for a variety of applications, such as insertion of tampons, vaginal suppositories carrying medication, and gels for the purpose of lubrication and medication delivery. In spite of the widespread use of vaginal applicators, there is very little research available in the public domain regarding applicator features that are desirable to women. Based on previous studies the factors that have been shown to be important to women in vaginal applicators are a) disposable, single use versus reusable; b) pre-filled versus user filled; c) material of applicator; d) ease of use; e) ease of storage; and f) ease of disposal. Other attributes such as length, color, and visual appeal have not yet been investigated in the domain of applicator acceptability. Eighteen commercial vaginal applicators available for insertion of tampons and vaginal medication were evaluated by 102 women on overall liking, as well as on various sensory attributes, including perceived length, perceived width, visual appeal, ease of use, ease of grip, comfort of contacting surface, being environmental friendly, and color liking. Using internal preference mapping, we observed that women had a higher degree of liking for plastic tampon applicators compared to cardboard tampon applicators, as well as other plastic applicators used for insertion of vaginal suppositories and gels. When sensory data collected from the same participants was analyzed along with the liking data using external preference mapping, sensory attributes such as color, visual appeal, ease of grip, ease of use, and comfort of contacting surface were shown to drive the higher degree of liking for the plastic tampon applicators, whereas length was shown to negatively affect liking. Results from this study are

instrumental in our efforts for designing an optimal applicator for the vaginal suppositories being developed in the lab.

(16) Does a change in data capture method affect sensory descriptive analysis results?

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Research facilities often compare historical to newly obtained data sets. The question arises, can data from recent studies be compared to older studies in which different data collection devices were used? The objective of this study was to determine if data capture device type has a significant influence on sensory descriptive analysis results. Twelve trained assessors evaluated four snack bar products in triplicate on three devices (iPod, iPad, laptop with monitor) using unstructured line scales. Four-way univariate analysis of variance indicated no significant difference in 19 of 20 attributes for product \times device interactions. All products were ranked in a similar manner for attribute intensities on all devices. The monitor differed significantly from the iPad and iPod in device effect in 18 of 20 attributes. The source of the device differences could be due to screen size or input method (stylus); further research is required to evaluate the effect of using a stylus. No significant differences were found between the iPad and iPod, but average scale level largely followed a trend in which higher average scale responses were obtained for smaller screens. Generalized Procrustes analysis was used to obtain a consensus configuration of product \times device objects, which showed very similar arrangements for all products. There was no evidence that ellipse sizes differ across devices. Thus, in spite of level differences, products were ranked similarly in intensity and provided similar product information. A lab that switches from one device type to another can expect to obtain data that would lead to similar business conclusions.

(17) The world of food texture: Defining characteristics and areas of overlap

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Food texture is an important aspect of the product experience, with varying textures cueing consumer reactions or acceptance of a product (e.g., freshness, healthiness, or efficacy) and influencing the other sensory modalities. In the world of solid and semi-solid food textures, the texture attributes and intensities of those attributes can define a product category—differentiating it from other categories entirely or showing overlap with others. These key textural differences (or similarities) are important for documenting the fingerprint of the product and category and for ensuring alignment between consumer expectations and the sensory characteristics and alignment with other products in the category. In order to better understand the defining texture spaces among food products, three general categories of solid and semi-solid food products were evaluated for texture by an expert panel trained in the Spectrum Descriptive Analysis Method: meat, chips and crackers, and semi-solid foods ($n = 12\text{--}13$ products/category). The results were mapped, and defining textural characteristics for each category were identified and described. Further, areas of textural overlap were identified (both within and across categories). This research highlights the universality and versatility of texture scales, allowing not only comparison within a category (“apples to apples”) but also across categories (“apples to oranges”).

(18) Expert panel co-creation: The use of expert panels to identify and describe successful flavor pairings. A powerful tool to shorten the development process

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Food and beverage pairings are traditionally developed within the scope of the restaurant industry, especially in fine dining. More recently, product-product pairings have received a surge in interest in the entire product development process—from concept to finished product. These flavor pairings have the potential to enhance the within and among product experience, resulting in unique and novel flavor combinations within a product or when two products are combined. Many flavors successfully pair with other flavors; however, the process of identifying pairs is often lengthy and hit-or-miss. This research highlights the application of an expert panel to shorten the process of identifying successful flavor pairings and document the reasons for this success. A group of Spectrum Method-trained panelists worked with three orange substrates: fresh orange, dried orange, and orange marmalade plus 150+ products to identify singular and multi-component flavor pairings for each. One 2-hr session yielded over 140 pairing combinations, ranging from “mainstream” combinations to unique sensory experiences. The expertise of panelists was leveraged to document characteristics of successful and unsuccessful pairings, using descriptive terminology. In this case study, successful pairings (more than 90) were characterized by higher balance/blend; the less successful pairings were less blended with disparate flavors. Additionally, while certain flavors successfully blended with fresh orange they did not pair well with other orange substrates. This reinforces the concept that not all orange flavors (or flavor pairings) are created equal. Flavor creations must rely on individual ingredients and their unique sensory experience. This research leverages the breadth and depth of the sensory experience and expertise of a well-trained panel in conjunction with creative problem-solving used in consumer co-creation. It offers potential for early identification of successful flavor pairings, resulting in the ability to create innovative products, while significantly shortening the development process.

(19) Effect of soil fertility on flavor attributes of *Vidalia* sweet onion (*Allium cepa* L.) and their relationship with consumer preference and onion chemical compounds

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The objective of this study was to evaluate the differences in flavor of *Vidalia* onions cultivated under different soil fertility levels. The most relevant flavor characteristic of *Vidalia* onion is sweetness, along with lachrymatory sensation and pungent aftertaste. The intensity of these attributes in *Vidalia* onion represents an important quality parameter, which influences consumer preference and decision. For a descriptive flavor profile, a trained panel evaluated four *Vidalia* samples: Nunhems1006 (Sw, sweet variety) and Sapelo (H, hot variety) cultivated under two fertility soil levels of sulfur (S) and nitrogen (N): low (L, S = 27; N = 106 Kg/ha) and high (H, S = 137; N = 179 Kg/ha). For consumer testing, overall liking (OL), intensity of sharp/pungent/burning sensation (SPB), and willingness to buy (WB) for the same onion varieties cultivated in three soil fertility levels (L = 37.5 kg/ha, M = medium, S = 59.4; N = 134.5 kg/ha, H = high, S = 118.8; and Ni = 190 kg/ha) were tested. The concentration of sugars, lachrymatory factor (LF, propanethial S-oxide) and methyl thiosulfinates were determined by HPLC and GC-FID/FPD,

and correlated to sensory evaluation data. Quantitative descriptive analyses showed that lachrymatory sensation, and pungency/aftertaste were positively correlated ($P < 0.0001$) with the LF ($r = 0.78$) and methyl thiosulfinate ($r = 0.61$) content and that flavor was affected by the fertility levels of sulfur and nitrogen. Consumers showed that onions with low content of LF and methyl thiosulfinates were most preferred. No tendency in consumer preference was related to the content of sugars. The mean OL score showed that onions cultivated under low fertility level were preferred regardless of their variety, sweet (7.17) or hot (6.75). WB ratings showed similar tendency in consumer preference with OL ratings. In summary, the composition of nitrogen and sulfur in fertility soil levels can influence flavor intensity and consumer preference in *Vidalia* onion.

(20) A practical approach to determine the “unique” contribution of correlated attributes to the consumer’s overall impression of a product

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When consumers provide an overall reaction to a product, such as an overall liking rating, their overall impression can differ in terms of how they weight different sensory components of the stimulus, such as appearance, flavor, texture or other. The fact that liking of component sensory aspects can often be correlated can make it difficult to isolate the individual contribution of any single attribute to overall liking. It can be useful to determine the individual contribution of a single attribute toward an overall impression as this can be an indicator of a priority of sensory dimension(s) to focus attention on from a product innovation or renovation aspect. A practical calculation approach to determine the unique contribution of correlated attributes toward a response such as overall liking is described. The approach uses regression and a stepwise approach to calculate the unique contribution of each attribute and all possible interactions with the attribute, e.g., 2-way, 3-way, etc. This approach allows us to look at the data holistically. In the spirit of data before doing, an example is presented to show how this approach is applied at a product segment level to determine sensory dimensions with largest unique contribution to overall liking.

(21) Peach lexicon and a look into deeper quality analyses

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Fruit quality has generally been measured by either sensory evaluation or instrumental methods. The objective of this study was to develop a lexicon that allows standardization of sensory descriptive testing for peach quality, so that comparisons can be made with instrumental methods. By comparing descriptive testing referenced from the developed lexicon to physical and chemical characteristics and consumer acceptance, a full quality index can be developed. Six trained panelists with at least 120 hours of general descriptive analysis training and a minimum of 1,200 hours of descriptive sensory training were selected for descriptive lexicon development. Fifty-two commercially grown peach varieties were evaluated individually, with verbal consensus for attributes of appearance, aromas, textures, flavors, and basic tastes. Development took place during peach harvest season from May to August 2015. Peaches selected were representative of the variability of peach cultivars available in the southeastern U.S. Attributes were collectively defined and referenced on a 0- to 150-point scale for no presence to highly present. Panelists met for 3 hours for 9 weeks to develop terms, followed by rating presence and absence of attributes and fine-tuning terms, definitions, and references. Forty-five attributes

were developed, with 12 aromas, 13 textures and feeling factors, and 12 flavor attributes. Additional attributes include three basic tastes, four aftertastes, and blush of flesh for appearance. Major terms within peach texture included crispness, juiciness, melting, and fibrousness, representing the main classes of peaches in melting and non-melting varieties. Unique attributes, such as aromas of apple, citrus, and fruity, were found in 2, 3, and 4 of 25 cultivars, respectively. Lexicons provide a standardized vocabulary with references and have the potential for use in more in-depth quality evaluation. Validation of this lexicon will be presented.

(22) Shelf-life study: Lactose and sugar-free chocolate

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A sensory study based on sucrose and milk substitution in chocolate was conducted based on the current demand. The soymilk used to replace milk to obtain production of food that is lactose-free and sweeteners used to replace sucrose to obtain sugar-free chocolates can be successful alternatives for use in several food products. These ingredients can provide new formulations with acceptance similar to traditional ones. Eight different samples of soymilk chocolate with three different sweeteners (sucralose, neotame and rebaudioside) in their formulations were developed. The shelf life of the samples was determined by acceptance tests in relation to appearance, brightness, aroma, flavor, mouth melting, hardness to break up the chocolate, and overall liking using the unstructured scale 9cm. The chocolate samples were stored at 20°C for 12 months. A group of 112 consumers of chocolate analyzed the samples in a block complete balanced design in a sequential monadic way. The acceptance tests were performed each period of 3 months, until the rejection of the sample, established by an average lower than 5. The obtained data were analyzed by ANOVA and cluster analysis, considering the time of storage as a variable. From the sixth month of storage a decrease in the acceptance of chocolates with soymilk was noticed; therefore, this was determined as the shelf life for the samples of lactose-free chocolate. The shelf life for the sugar-free chocolate was 12 months, which was the total time of analysis. In conclusion, the soy benefits combined with the advantages of lactose-free and sugar-free products can provide new alternatives for consumers of chocolate, without loss of sensory acceptance.

(23) Open frontiers of innovation and development with consumer research: A case with chewing gum mint flavor

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Information about preferences and consumer acceptance can be valuable keys to companies focused on opening frontiers of innovation and development. Consumers appreciate the product as a confection, also currently, as a product to oral care or vehicle to specific compounds like prebiotic agents. The objective of this study was determining the segmentation of consumers of different commercial international chewing gum mint flavor. Eight samples of commercial brands of chewing gum mint flavor were analyzed by 150 consumers. Four samples were sweetened with sucrose and four (sugar-free) sweetened with an aspartame/acesulfame-K/sucralose mix. The samples were analyzed by affective tests: I) acceptance analysis with hedonic non-structured scales (9cm) in relation to appearance, flavor, texture and overall impression; II) ideal analysis of mint flavor, time of duration of mint flavor and sweetness using a just-about-right scale. The data from acceptance tests were analyzed by ANOVA, Tukey's test, internal preference map, and

agglomerative hierarchical clustering (AHC). The data from the just-about-right scale were analyzed by histogram of frequency of distribution (percent) in relation to scale. The samples less preferred by the consumers presented intensity and total time of duration of mint flavor lower than ideal compared with the others samples in this study. The contribution to overall impression and preference of consumers and consequently to segmentation of target people of chewing gum mint flavor are the appearance (color and shape), the intensity and duration time of mint flavor and the softness during mastication. The results show tree segmentation of preferences, revealing a well-defined differentiation of consumer preferences to three distinct types of commercial international brands of chewing gum mint flavor, each one with different sensory characteristics.

(24) Comparison of sensory testing between different panels on flavor characteristics of coffee

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The ability to conduct the same descriptive test using two panelist groups in different countries is critical when lexicons are developed by one group with the intent to have that lexicon used by other panels. A coffee flavor lexicon was developed and tested by the descriptive panelists at the Sensory Analysis Center at Kansas State University. The objectives of this study were to compare coffee samples using the lexicon with the originating trained panel and a trained panel for whom the lexicon was new. Methods: For descriptive testing, five coffee samples (Natural Ethiopia, Kenya, Sumatra, Washed Ethiopia, and Columbia) were provided by a coffee roaster. The five coffee samples varied in flavor characteristics and general overall quality. Panels at two testing sites, the Sensory Analysis Center, Kansas State University, Manhattan, KS, U.S.A., and an affiliate, the Kasetsart University Sensory and Consumer Research Center, Bangkok, Thailand, both tested all samples. The samples were prepared and brewed under similar testing conditions, used similar or identical attribute references, and scored the coffee on 0–15 scales with 0.5 increments. Overall Results: Both panelist groups were able to distinguish between coffee samples and able to find similar scores among the coffee samples. For example, at both of the testing sites Natural Ethiopia scored a 5 for burnt, Sumatra scored an 8 for coffee ID, and Kenya scored an 11 for bitterness, which were higher than for all other samples. Although there were many similarities observed, some attribute differences were observed between the two testing locations. For example, the SAC panelists found no fruitiness in any samples, whereas the KUSCR panelists scored coffee samples as 0.5 to 1.0 for fruitiness.

(25) Documenting the relationship between scent character, rest time, and fatigue in descriptive analysis panelists

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Often when dealing with descriptive or consumer panelists, we are concerned about overexposing them to too much stimuli which could induce fatigue and affect the results. While some sources have discussed the optimal amount of exposure to scent for a panelist, there have not been studies that relate expert panelist fatigue to different scent characters (which typically have different threshold and intensity levels). This study will look at different characters and rest times between exposures and reveal how much scent type and frequency of exposure may drive fatigue.

(26) Comparative study on practicability of 9-point hedonic scale and 5-point hedonic scale for beverages

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The 9-point hedonic scale has been widely used in sensory affective testing for more than 50 years. Nonetheless, hedonic scales with fewer points, such as the 5-point scale, may be applied to collect internal and/or external consumer data in some food/supplement industries because of their simplicity and ease-of-use for individuals with limited education and technical background. This study was designed to investigate whether the 9-point hedonic scale and 5-point scale were interchangeable while comparing the performance and potential limitations for both scales. The first set of trials, including monadic tests, evaluated four flavored protein shakes, one flavored tea drink, and one flavored aloe drink with a Herbalife employee consumer panel ($N = \sim 100$) using both 9-point and 5-point hedonic scales, respectively. High correlations were observed between the two scales, while the 9-point scale demonstrated a higher sensitivity than the 5-point scale. During the second trial, subjects with different exposure levels or prior experience with the 9-point scale and the 5-point scale were recruited to participate in a focus group study. The comparative study showed that most subjects could utilize both scales to score the test samples with appropriate guidance with similar conclusions or observations.

(27) Fragrance needs

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Background: The home fragrance industry encompasses many methods and profiles, including electric room fragrances, sprays, cleaners, candles and even personal fragrances. Trends are indicating that these carriers and profiles are evolving exponentially. In order to determine the fragrance and carriers that meet the needs of consumers, we need to identify what consumers are using home fragrances for and what profiles meet the expectations for these needs. Research was conducted with the use of a smartphone application to help understand consumer behavior by allowing consumers to share their experiences by capturing contextual pictures and videos to convey their feelings and allowing researchers to get ethnographic-type data without the intrusion of researchers in consumer experiences. This gave us the ability to identify needs and gaps in products meeting these needs. Research Plan: 36 consumers were asked to take pictures using their smartphones of items in their home that impart a fragrance and asked the purpose of using a fragrance and why that particular one was chosen. Findings: 5 distinct themes of needs that are met by fragrances were explored, including comfort, efficacy, cover up of malodor, freshening and makes me feel good. Different methods of imparting the fragrance and different profiles are associated with each of these themes.

(28) Application of automated facial expression analysis and qualitative analysis to assess emotional and descriptive responses to off-flavors in milk beverages

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Off-flavor development readily overwhelms fresh milk flavor and influences product acceptability. Automated facial expression analysis (AFEA) is a prospective tool to supplement product acceptability methodology. The purpose of our study was to characterize

implicit emotions using AFEA, as related to product acceptability, and self-reported descriptors associated with milk off-flavors. Participants ($n = 49$) evaluated three intensified off-flavors in milk beverages (sour, malty, and salty) and an unflavored milk control (2% milk) for product acceptability. Sessions were video recorded and analyzed using AFEA software that translates facial muscle motion to neutral, happy, disgusted, sad, angry, surprised, and scared (scale: 0 = not expressed; 1 = fully expressed) for each emotion. For AFEA time series analysis, sequential paired nonparametric Wilcoxon tests were performed between unflavored milk and treatments for 10 sec post-consumption ($\alpha = 0.05$). Separately, participants rated acceptability on a 9-point scale (9 = like extremely; 1 = dislike extremely) and self-reported product descriptive terms. Product acceptability and self-reported descriptors revealed that unflavored milk was rated as acceptable ($\chi^2 = 6.7 \pm 1.7$; <liked moderately) compared to other treatments ($P < 0.05$). Malty ($\chi^2 = 4.4 \pm 2.0$) and sour ($\chi^2 = 4.2 \pm 1.9$) were rated as disliked slightly, but were not different ($P > 0.05$) from each other. Appropriate self-reported product descriptive terms were applied by only about 20% ($n = 10-12$) of participants for these flavors. Salty ($\chi^2 = 2.2 \pm 1.4$) was disliked moderately compared to other treatments ($P < 0.05$). Over 50% of the participants ($n = 26$) used "salty" as the descriptor. AFEA time series identified more intense sad for malty in contrast to unflavored milk ($P < 0.025$). Sour generated more disgust than unflavored milk ($P < 0.025$). Salty-flavored milk generated more intense sad, disgust, surprised, happy, and scared expressions of emotion than did unflavored milk ($P < 0.025$). Self-reported descriptive terms and emotions expressed through AFEA time series trends may assist in describing the impact of off-flavored milk products on milk acceptability. The methodology may aid in implicit and explicit consumer acceptability responses to provide further product insight and estimation of shelf-life quality.

(29) Association between CATA and hedonic data: A study on the visual characteristics of dry dog food by consumers in the U.S.

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Background and Purpose: In the pet food industry, the pet owner's visual perception of the product is of great importance at the time of making the purchase decision. Previous research has shown that appearance is more important than aroma in driving the consumer's liking of dry dog food products. Further study is needed to understand what kind of visual characteristics are liked most by consumers and which descriptors consumers associate with them. The objective of this study is to understand which hedonic attributes consumers associate with different descriptors for the visual characteristics of dry dog food products and what associations exist between the two types of data. Method: 122 dog owners in the U.S. evaluated the appearance of 30 samples of kibbles from commercially available dry dog foods with varying visual characteristics. Consumers rated the overall liking, size liking, shape liking and color liking of the samples using a 9-point hedonic scale and selected appropriate descriptors they associated with each of the products from a list of 13 positive and negative terms on a CATA question. Principal coordinates analysis of the correlation coefficients between CATA and hedonic data was used to study the association between hedonic attributes and descriptors. Results and Conclusions: The results indicate that the overall liking and color liking attributes show the strongest association with positive terms, suggesting consumer liking is more driven by the degree of liking of the color characteristics. The results from the correlation matrix

indicate that the term “dog will like it” presents the highest correlation with the hedonic attributes for single- and multiple-kibble samples. These results illustrate an approach to studying consumer perceptions of dry dog food visual characteristics by linking CATA and hedonic data.

(30) Using temporal check-all-that-apply (TCATA) to investigate dynamic perceptions of sensory attributes and food-evoked emotions during yogurt consumption

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The eating experience for food products is dynamic and needs to be effectively captured during sensory evaluation. Moreover, measuring emotional responses during consumption may facilitate better alignment of sensorial attributes to a specific product type or consumer demographic. In this study, TCATA was used to investigate dynamic characterization of four yogurt products with different vanilla flavor profiles. Specific objectives were (i) to use trained panelists to develop a list of emotions appropriate for vanilla yogurt; and (ii) to investigate relationships between dynamic emotional and dynamic sensory perceptions of untrained panelists during consumption of vanilla yogurt. Sensory attributes to describe the products were obtained from a previous consumer study. The cluster diagram of the 39-item EsSense Profile (Nestrud et al., 2016) was used to select emotions with frequency counts >14, and synonyms within the same subcluster were combined. A final list of 15 emotions was developed after the four yogurt products were evaluated by seven trained panelists using TCATA over multiple sessions. The four products were subsequently evaluated by 59 untrained panelists using TCATA. Panelists tracked their emotions while eating the first set of products, rested, then tracked sensory perceptions while eating a second set of the products. For each TCATA test, one spoon of yogurt was eaten per sequential monadic sample, attribute order was kept constant per participant, and data were collected over 30 seconds by Compusense. Graphs of perceptions over time showed the untrained panelists’ ability to differentiate between the products and illustrated the dynamic interplay between their emotion and sensory perceptions as the yogurt was eaten. Correspondence analysis provided additional insights on emotions evoked by sensory attributes, e.g., sweet and vanilla—good natured and energetic; citrus—adventurous; butter-milk—bored. Results indicate the potential of TCATA to reveal the dynamic and multidimensional nature of consumer perceptions.

(31) Determination of the sensory flavor attributes of smoked food products

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A highly trained descriptive sensory panel identified, defined and determined references for 14 attributes that are related to the flavor imparted to smoky products. The panel evaluated 54 in-market sauces, meats, fish, cheeses and vegetables in addition to 24 samples that were smoked in-house. Attributes that were part of the smoke flavor in each sample were written down and compiled into a long list of terms. Base flavor notes from the products initially were included that were related to the smoky flavor but then were removed if they were not part of the specific smoky character. The list was further narrowed to combine similar attributes that described the same phenomenon. The lexicon includes: smoky (overall), ashy, woody, musty/dusty, musty/earthy, burnt, acrid, pungent, petroleum-like, creosote/tar, cedar, bitter, metallic and sour. Definitions of these attributes were determined and references were used to anchor a 0–15 scale with 0.5 incre-

ments. The references include market products, chemical solutions, and commonly found non-food products. This lexicon can be used to evaluate the smoke flavor of many types of products.

(32) Alternatives to just about right scales for obtaining feedback on product diagnostics

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The objective of this study was to identify alternatives to the just about right (JAR) scale that provide more information on product diagnostics by 1) expanding product terminology and 2) using priming to increase differentiation among samples. Diagnostic questions were developed that allowed consumers to rate attributes with the option to indicate that certain terms did not apply to the samples, differing from traditional JARs, which force ratings for each attribute. These alternatives to JARs allow consumers to select attributes they associate with each sample, allowing for more attribute options within a ballot. Priming also was investigated to determine if eliciting memories of previous experiences with the products assisted in differentiating sample ratings. Six ballots were evaluated in central location tests on two gravy samples. Ballot diagnostics included the following: 5-point JAR (6 attributes), 3-point JAR with an option to indicate that attributes did not apply (23 attributes), and 2-point ratings presented as rate all that apply (RATA) to identify attributes too low or too high in intensity (23 attributes). Each ballot was presented with and without priming. Results showed that broader attribute selections in the alternative diagnostic questions led to more significant differences ($P \leq 0.05$) between samples in diagnostic feedback (5, 15, and 16 significant differences between samples were found using the following, respectively: 5-point JAR, rating with “does not apply” option, RATA). Results showed similar percentage of respondents selecting terms as too low or too high in intensity among terms presented in all ballots. Priming tended to show less differentiation between samples based on diagnostic attribute ratings. Results suggest that the alternative diagnostic questions without priming provide the most information about diagnostic attributes and the most differentiation between samples. These alternative questions, which allow for expanded attribute terminology, can increase feedback available for formula optimization.

(33) Maximizing candle fragrance evaluation

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Background: Historically candle fragrance testing for a core assortment of fragrances involved testing multiple fragrances in cold mode, replicating an initial “at shelf” buying experience. In addition, repeat purchase requires understanding the fragrance appeal in the burn mode. Research Objectives: The objectives of this research were 1) to understand how sensory differences between a diffused candle fragrance in burn mode vs. cold mode may impact consumer appeal and purchase decisions; and 2) to validate that multiple candles can be tested in burn mode in one room safely without cross-contamination with the use of a portable olfactive device. Statistical Findings: Consumers liked the more complex, full-bodied fragrances dramatically more in burn mode and in this phase, they receive more key “definite” intent to buy. Four different candles in burn mode were evaluated, in the same room, each in separate devices, without any cross-contamination.

(34) Understanding challenging flavor profiles through a unique approach of decoupling the sensorial experience

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Unique flavor profiles continue to emerge as U.S. consumers increasingly look for authentic taste and culinary traditions from around the world. In a recent online survey, it was found that two-thirds of consumers use chili peppers for eating or cooking. In addition, this flavor category is more visible in product labeling and menu mentions across various foods and drinks. With consumer interest high in this flavor category, it is essential to understand the detailed sensorial characteristics of the chili pepper experience. This study utilized a unique multi-step approach to successfully evaluate chili pepper varieties and flavored products. The challenge with chili peppers is to understand the nuances of the flavor profile among strong heat and other non-volatile components. To decouple these multiple sensorial perceptions, Givaudan utilized the miniVASTM (Virtual Aroma Synthesizer) to characterize aromas of fresh chili peppers. This tool allowed the 11 descriptive panelists to experience the head-space of peppers and characterize perceptions distinguishing small differences among the varieties through smell. First, they used free description and then aligned descriptive terms to reference standards from Givaudan's Sense It language and expanded beyond the current library. Then, panelists were able to focus on the basic taste and mouthfeel components inherent to chili peppers through tasting. From there, the program shifted to flavored market products and learnings were applied to ensure capturing of complete hot/spicy flavor profiles. During tasting, granulated sugar and full-fat plain yogurt were utilized as palate cleansers, and sampling was limited to six products within 3 hours. In addition, all samples were pre-screened by sensory staff and presented monadically in order from mild to hot intensity. This approach successfully enabled the sensorial market mapping and understanding of over 80 market products and 16 fresh chili pepper varieties. Insights led to the creation of differentiating flavor profiles relevant to consumers.

(35) Perception of sparkling wines of varying carbonation levels using quantitative descriptive analysis (QDA) and temporal check-all-that-apply (TCATA)

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Carbonation is an important temporal sensory property of sparkling wine. In this study, sparkling wines of different carbonation (CO_2) levels ($n = 11$) were prepared through the addition of varying concentrations of dextrose during the winemaking process. Sparkling wines, ranging in CO_2 concentration from 0.0 to 7.5 g of CO_2/L ($P \leq 0.05$), were evaluated by a trained panel ($n = 11$) using quantitative descriptive analysis (QDA) for mouthfeel attributes associated with carbonation, as well as taste, aroma, and flavor attributes. Canonical variates analysis (CVA) showed that mouthfeel attributes explained the majority of variation among the wine treatments. Increased CO_2 concentrations in the wine treatments resulted in increased intensity of mouthfeel attributes, with the attributes of burn, bite, carbonation/bubble pain, and foamy showing the greatest differences among treatments and after-numbing and tingling showing the least. The sparkling wines also were evaluated by a trained panel ($n = 13$) using temporal check-all-that-apply (TCATA) methodology to describe temporal changes in mouthfeel perceptions. From the TCATA results, the smoothed curves suggested a relative grouping of attributes; attributes that were perceived earlier in the evaluation time (peak citation 15 sec

into evaluation). Furthermore, temporal data were standardized to calculate an average proportion of citations. Results indicated that attribute citation plateaued at ≥ 4.0 g of CO_2/L for the attributes of bite/burn, prickly/pressure, and tingly. Using correspondence analysis (CA), the summation of wine treatment trajectories enabled the visualization of attribute perception over time. Additionally, multiple factor analysis (MFA) showed all the mouthfeel attributes evaluated by both TCATA and QDA were highly correlated ($R^2 = 0.97$), suggesting that both methods were similar in their ability to distinguish a carbonated product. The results of this study highlight the application of TCATA methodology to capture CO_2 perception, which is a complex temporal modality.

(36) When time is of the essence—Rapid mapping of emotional and sensory characteristics of products

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Sensory characteristics directly influence our emotions. The impact of aroma on emotion is particularly strong, with fragrance often triggering clear and sometimes nostalgic conceptual associations that, in turn, trigger emotional outcomes that determine our behavior. Understanding the influence of fragrance on emotion is particularly important with personal care products because of the key role of emotion in delivering product satisfaction and in augmenting the brand promise. With the world's leading food, drink and personal care businesses demanding faster, more accurate and more cost-effective insights, the pressure is on sensory and emotion research to develop suitably agile research solutions, or get left behind. This presentation describes the development and integration of two agile approaches: taxonomic free sorting (TFS) sensory mapping and check-all-that-apply (CATA) conceptual profiling. Data from the two research processes were integrated to investigate possible relationships between aroma profiles and the conceptual associations that they may trigger. A trained sensory panel ($n = 12$) assessed the aroma of 30 different bubble-bath products, conducting TFS with attribute descriptors to rapidly map the fragrance characteristics of the bubble baths. Subsequently, they described the conceptual associations triggered by the same products using a CATA approach using a conceptual lexicon comprising 25 positive, negative and neutral terms. Mapping of the sensory and conceptual data highlighted which sensory characteristics seem to drive key conceptual associations. For example, sweet, fruity aromas cued youthful and cheeky, while lavender and herbal notes delivered comfort, and stronger perfume and floral notes shifted feminine conceptualizations toward irritating. These findings highlight the impact of aroma on the conceptual delivery of personal care products and identify ways in which product developers can benefit from fast, effective techniques that identify which sensory characteristics cue the conceptualizations that drive higher levels of consumer connection with the brand.

(37) Gamification—What sensory research can learn from engaging consumers

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Gamification is a style of survey questioning involving aspects of play that is used increasingly in market research. Studies have shown that increasing aspects of play in questionnaires increases respondent engagement and the amount of detail obtained. However, gamification has not yet been adopted in consumer sensory research, with most product testing still involving standard

hedonic, just about right (JAR) and intensity scales. This presentation explores the incorporation of gamification into consumer research to determine whether or not it delivers additional insight and understanding of consumer perceptions of products. Consumers ($n = 150$, aged 18–65) tasted two cereal bars and compared the products by completing either a gamified survey with timed questions, scenarios and defined challenges or a typical consumer product survey with hedonic and JAR scales (i.e., without gamified questions). After completing assessments of both products, both sets of consumers rated their level of engagement with the survey and provided feedback on possible improvements. While consumers' affective reactions to the products were similar for both styles of questioning, gamification generated more consumer language and detail, particularly in open-ended responses. Overall, gamification increased engagement in the survey, with consumers providing more detailed responses and positive feedback on the survey design. Examples are provided that illustrate how the inclusion of gamification in sensory-focused consumer research can improve response levels, enhance the detail of output and otherwise complement standard questioning techniques.

(38) The reality of difference testing—A practical appraisal of tetrad, triangle and A not A

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Increasingly, the sensory industry is being challenged to reassess its commonly adopted difference test protocols. Newer methods may involve fewer responses and promise greater accuracy, as well as time and cost savings. Based solely on statistical evidence, the case for these modified difference tests is compelling, but what about the practicalities of running these tests? Difference testing techniques come in many different forms, with each offering various applications and advantages. In this study, a review of the tetrad, triangle and A not A approaches was undertaken with the aim of understanding the practicalities in application, the impact on statistical sensitivity and suitability across a wide range of products and development needs. While difference testing can involve either sensory panelists or consumers, we opted for the sensitivity of an expert sensory panel to assess the performance and applicability of these approaches. This allowed us to obtain articulate user feedback, increased the stringency of testing and allowed us to investigate the validity of replicates. Each test was conducted on a variety of food products (dilutable drink, gravy and custard, each formulated slightly differently to engender small differences among the samples). This allowed us to test suitability across categories and cooking requirements. The order in which the tests were carried out was rotated among the three product types to lessen learning and order effects. We found that each method delivered varying levels of robustness in identifying correctly the differences engineered between the products. In particular, the increasingly used tetrad test was found to be the most difficult method for panelists to perform, resulting in the lowest panel sensitivity. This highlights the difficulty of translating theoretical benefits into quick and efficient solutions for the sensory industry. Our recommendations focus on the optimal applications for each approach.

(39) Olfactory performance can be influenced by background noise, positive concurrent feedback and the presentation order of olfactory tests

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Sniffin' Sticks have become a popular procedure to measure overall olfactory functionality with three subtests: phenyl ethyl alcohol threshold test (T), discrimination (D) and identification (I). However, several procedural components specified by the original paper have not been tested nor has the impact of deviations been measured. The aim of the present work was to measure olfactory performance under modified testing procedures. First, the reverse order of subtests (I@D@T) were compared to more standard practices (T@D@I). Next, the possible impact of background noise and positive concurrent feedback were assessed. A total of 120 individuals participated in the study, where the three conditional experiments, each involving 40 participants, were completed with a counter-balanced measures design. Testing procedures that reversed the presentation order of subtests (I@D@T) scored a significantly lower overall TDI score than standard testing order, with the threshold subtest being the most influenced. Additionally, non-verbal background noise lowered overall olfactory performance, while concurrent feedback modulated threshold performance. These results emphasize the importance of testing parameters where olfactory perception and tasks may be modulated by adaptation and attentional distraction, respectively. Therefore, psychophysical studies using olfactory tests should specify any deviations from standard practices and that not doing so may result in confounded outcomes and studies difficult to reproduce.

(40) Characterizing dynamic sensory properties of nonnutritive sweeteners with temporal check-all-that-apply (TCATA)

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Temporal check-all-that-apply (TCATA) is a novel rapid sensory method that involves checking and unchecking words to track changes in the sample over time, such that at any given moment the words that are checked completely describe the sample. The use of multiple attributes in TCATA allows for tracking of side-tastes that are not the most intense/dominant sensation, potentially making it a useful technique to study the differing temporal profiles of non-nutritive sweeteners. Accordingly, the objective of this study was to characterize dynamic properties of non-nutritive sweeteners using TCATA. In two experiments, 10 non-nutritive sweeteners were tested in water at concentrations that have been shown previously to elicit weak to moderate sweetness intensity ratings on a general labeled magnitude scale (gLMS). Prior to testing, participants ($n = \sim 120$ per experiment) were familiarized with the TCATA protocol by following a guided example using imaginary samples of Kool Aid. Participants then received 10 mL aliquots of each sweetener solution in medicine cups and were instructed to click "start" once he or she finished swallowing the sample. Each evaluation consisted of six attributes from the literature (sweet, bitter, metallic, licorice, cooling, and drying) and lasted for 60 seconds. Results from our studies found that sweeteners with unfamiliar side-tastes, such as NHDC and thaumatin, showed a "smearing bias," wherein some participants checked every attribute in an attempt to characterize those unfamiliar side-tastes. Smearing bias can be seen as the opposite of a dumping bias and can occur when too many response options are provided to participants (e.g., Bennett and Hayes, 2012). Further studies are needed to investigate this smearing phenomenon.

(41) Using complexes to shorten descriptive analysis training time in an industrial setting

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Descriptive analysis uses lexicons developed by panelist consensus to describe and understand differences between products. Lexicons vary in the number of attributes included; some studies use upwards of 35 attributes for certain products. With longer lexicons, attributes tend to be very specific as well in an attempt to capture small nuances in product differences. However, in an industrial setting, it may not be feasible to use longer and highly specific lexicons. Training time increases with a greater number of specific attributes, and sensory analysts who manage industrial descriptive analysis panels using coworkers as panelists may not have the time required to adequately train panelists. Complexes are often used in lexicons to help categorize attributes into similar groups; panelists scale both the complex and individual attributes within it. In an effort to lessen the number of attributes and thus shorten training time, this research examined data from panelists scaling individual attributes and complexes versus solely complexes. For example, instead of scaling guava, mango, and passionfruit impressions separately as well as an overall tropical complex, panelists would only scale the tropical complex. This research demonstrates how a shorter lexicon using only complexes provides data that is equally as discriminating and actionable as that of a longer lexicon. Furthermore, it's possible these findings could be applicable to any descriptive analysis panel based on the product and data use.

(42) Comparing emotion measurements: CATA versus visual stimuli

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Emotion research has been widely explored in the food and beverage industries in recent years. As explained in the SOR paradigm, which was first presented in the 1970s, environment stimuli (S) leads to an emotional reaction (O), which results in a consumer's behavioral response (R) and is either "avoidance" or "approach" behavior (Mehrabian and Russell, 1974). As product researchers, in addition to traditional measurements, we would like to capture consumer's emotion responses to better predict their behaviors and, thus, better predict market success. Among several emotion measurements widely used by the food and beverage industries, the check-all-that-apply (CATA) method has proven to be easy to use and effective for gaining additional insight. CATA is a rapid method that can aid in describing samples without the use of scales and can further contribute to the discrimination of samples. However, there are some limitations, such as translation issues, when we apply CATA to multiple global markets. Visual stimuli, such as pictures, could overcome language barriers. Photos can often describe emotions when words are not enough. They also serve as visual metaphors, which can aid in describing an individual's non-conscious feelings toward products. The objective of the research is to compare the CATA method and the use of pictures to describe emotions. The two methods are applied to both concept and beverage alcohol samples. The relationship between CATA words and pictures, interpretation of the pictures and comparison of insights brought by the two methods are discussed in the research.

(43) Possibility of visually impaired/blind people as descriptive trained panel: The initial stage

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There have been several interesting studies exploring whether people who have lost their sight develop superior capacities in their remaining senses. According to previous research, the average pure-tone hearing threshold and tactile spatial acuity of blind people were higher than that of sighted people. These findings became the origin of this research idea to investigate the capability of visually impaired and blind people in the field of sensory analysis. The aim of the study was to determine the possibility of training visually impaired and blind people to be a descriptive trained panel. This initial stage was divided into two parts. In the first part the industry's and research institutes' demands and opinions on having blind people as their panel was investigated. In the second part a screening test with the blind group was conducted. According to the interview with 10 different organizations that used sensory analysis regularly in their routine work, it was found that most of them were interested in attempting to use a blind trained panel by starting with project-based testing before they made the decision to use such a panel in routine work. The screening procedure included taste recognition, difference test, and ranking test. The samples used in the screening were a taste solution that prepared the recognition threshold concentration (sucrose, citric acid, sodium chloride, and caffeine). Twenty-eight visually impaired and blind people participated in the test. In the taste recognition, 50% of the blind group members were able to give 2 out of 3 replicates the correct answer. The tastes with they confused were sour and bitter. According to the triangle test using different concentrations of the four tastes, blind people can differentiate saltiness the best and sweetness the least. The performance of the blind participants was superior in ranking saltiness and sourness.

(44) Evaluation of aromatic attributes of fragrances with different preparation methods

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The sensory characteristics and aromatic volatile compounds of fragrances have been extensively studied, but there is little research and literature concerning the preparation methods for fragrance evaluation. The purpose of this study was to explore the effect of three different preparation methods on aromatic attributes of fragrances. Six fragrances (almond oil, black cumin oil, lily of the valley, musk, orange blossom, and royal amber) were evaluated using brandy sniffers, perfumer's test strips, and amber vials. The fragrances varied in aromatic attributes such as animalic, nutty, woody, citrus, spicy, and floral and were evaluated by a highly trained descriptive panel. By consensus, each attribute was rated for intensity on a numerical 15-point scale from not intense at all to extremely intense. The attributes also were arranged in the order in which they appeared during the evaluation. The results showed that there were differences in the aromatic attributes of the fragrances among each method except for the orange blossom fragrance. Each method also resulted in a different arrangement of attributes for the order in which the aromatics appeared during evaluation. Of the three methods, the fragrances in the amber vials had the least number of aromatic attributes detected. The results suggest that fragrances evaluated in a snifter and on a perfumer's

test strip are perceived to be more intense and complex than those fragrances evaluated in amber vials. From the results, it is evident that the type of preparation method selected for the evaluation of a fragrance will impact the findings; thus, this should be taken into consideration prior to analysis.

(45) A new indirect approach for capturing emotion in product research

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Most new products and almost all new brands are commercial failures, even though many will have been developed via research-guided innovation processes and market potential will have been predicted using research-driven volumetric tools. This apparent lack of predictive validity is due partly to incongruences between key metrics (e.g., hedonic and purchase intent ratings) and longer-term consumption behavior and partly to the inability of qualitative research to access what motivates behavior. Consequently, there is a growing loss of faith in research administered via direct questioning. According to Freud, mental activity may be classified as conscious (accessible), preconscious (potentially accessible) and unconscious (fundamentally inaccessible). Direct questioning accesses the conscious but little of the preconscious and nothing of the unconscious. Yet, most of what influences us exists within the unconscious—hence the problem! By way of illustration, consider peoples' reactions to the color purple. Most people will recognize it instantly. On closer scrutiny some might deconstruct it spontaneously into blueness, redness, darkness/lightness and glossiness/matt-ness, etc. (all apparent to the conscious mind). However, it is unlikely that conceptual associations such as powerful, classy and sophisticated would come to mind readily yet it is these that trigger the emotional outcomes associated with purpleness (in the unconscious mind) that finally determine our reactions. Since conceptual associations can be captured and quantified using best-worst scaling, it would be possible to predict consequent emotional outcomes if linkages between conceptual associations and emotional outcomes could be established. This presentation describes how such linkages were established and how, from knowing the conceptual profile of objects (e.g., brands, packs and products), it is possible to access the key (but largely 'invisible') behavior-triggering emotional outcomes that motivate consumption behavior. These additional insights facilitate better brand, pack and product design, thereby increasing the probability that new products will deliver longer-term consumer satisfaction.

(46) Integrating implicit and explicit emotional assessment of pleasurable meal experiences

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Creating pleasurable experiences with food is essential for the success of food service and restaurant institutions in establishing loyal customers, as well as for food companies to establish brand allegiance. However, the workings of what constitutes a purely positive and approachable food experience is not fully understood. With new technology and consideration of established research in psychology, food science researchers are looking for more advanced evaluative techniques for measuring implicit (unconscious) responses of emotions and motivational behavior tendencies. Automatic facial expression analysis (AFEA), electroencephalography (EEG) and electrocardiography (ECG) may provide further information for better understanding consumer response

to food. Participants (age: 18–29 years; $n = 40$, female = 31) watched eight different videos (5 videos intended to elicit positive approach responses; average 40 sec) of breakfast meals and were concurrently measured for implicit responses (AFEA, EEG and ECG) and expressed explicit emotional responses. AFEA analyzed facial expressions for the six basic emotions (0 = not expressed; 1 = expressed), EEG (10/20 system; 32 channels, 512 Hz) measured frontal cortex asymmetry to provide motivational tendency (right hemisphere activation = withdrawal, scared, sad and disgust; left hemisphere activation = approach, happy, surprised and angry), while ECG measured heart rate (bpm) for changes in arousal. Explicit emotions were assessed using a check-all-that-apply list of emotional terms ($n = 43$), an emotion intensity questionnaire (6 basic emotions; 7-point scale); acceptability was rated on a 7-point hedonic scale (1 = dislike extremely; 7 = like extremely). Acceptability scores were significantly different ($P < 0.05$) across meal types. The withdrawal emotion, disgust, was significantly chosen more for less-liked breakfast videos, while approach emotions, good and happy, were significantly chosen for videos liked more ($P < 0.05$). Implicit measures, EEG, ECG and AFEA, provided some additional supportive interpretation to more traditional explicit measures for understanding pleasurable meal experiences. Defining appropriate controls for AFEA interpretation of pleasurable food experiences is needed.

(47) Sensitivity and usefulness of tetrad testing compared to triangle testing on beverages containing high-potency sweeteners

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The triangle test is the most widely used discrimination test due to the simplicity of the task, relative ease of preparation, and analysis. The relative power of the triangle test, however, has been under scrutiny for some time. Although the unspecified tetrad test has equal guessing probability to that of the triangle test, the theoretical power under the Thurstonian model is greater for the tetrad test. Therefore, the tetrad will theoretically have greater power and sensitivity with the same number of panelists. Conversely, fewer panelists would be needed for a tetrad test to achieve equal power and sensitivity to a triangle test. This research compared the efficacy of the triangle test versus the tetrad test in finding differences between products containing high potency sweeteners, using equal numbers of panelists for each method. Research consisted of 36 sets of tests, each comprised of one tetrad and one triangle test in balanced order with at least 4 hours between the tests. For the first 26 sets, the same panelists completed both tests within a set. For the last 10 sets, participation in both tests was not required, in other words different panelists served in the triangle tests and the tetrad tests, which introduced realistic panelist noise. The outcome of the tests were compared within like samples. In addition to the standard question for each test, panelists' perception of the tasks, including confidence in the answer, difficulty of the task, and the number of samples, was also measured.

(48) Utilizing mobile olfactive technology with ASTM standards to evaluate product performance on odor elimination

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Background: Consumers confront stinky situations throughout their daily lives and will often make purchase choices about personal and home care hygiene products based on their ability to reduce or eliminate odors. Testing the malodor counteractive performance of consumer products against difficult malodors often creates a

lot of stink in a facility and can potentially contaminate a facility's HVAC system. For some product categories, there isn't a method to evaluate performance with consistency and without cross-contamination. Research Objectives: Obtain product performance information for a disinfectant and fabric refresher spray on the ability to reduce or eliminate the perception of cigarette smoke-contaminated fabric using a portable olfactive tool to consistently contain the malodor without cross-contamination of the test site. Statistical Findings: 1) Product A displayed odor reduction for smoke malodor by showing a significant difference between product and malodor and malodor only. Odor elimination was not shown as there was a significant difference between product and malodor and product only. 2) Product B displayed odor elimination for smoke malodor by showing a significant difference between product and malodor and malodor only and showing no significant difference between product and malodor and product only. 3) Test performed without any contamination of the test site.

(49) What really went wrong? A comparison of two approaches to penalty analysis

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Penalty analysis, at its core, is an analysis strategy that guides the prioritization of product attributes developers might correct when optimizing future iterations of their product design. This is done utilizing the relationship between liking data and JAR (just about right) data. In this research, two approaches to penalty analysis are compared to understand their relative strengths and weaknesses as a guidance method for product development. The first approach is arithmetical with graphical representation. On a per attribute ("one-at-a-time") basis, mean liking is compared between consumers scoring the product "just right" and those scoring it "not just right." The second approach is regression based. Multiple linear regression is conducted on the raw consumer data set to produce a simultaneous solution ("all attributes") to the penalty question. In this research, 62 attributes from 144 sequential monadic test cells were analyzed using both penalty analysis approaches. To aid in comparison, a characterization strategy was developed to indicate "importance of penalty" for both approaches. Observations after cross-tabulation of "primary," "secondary," and "insignificant" penalties for both methods: 1) approaches disagreed for 30% of attributes considered; 2) regression approach did not consistently result in a reduction of significant attributes via its consideration of multicollinearity; 3) regression approach was helpful to identify redundant attributes; 4) arithmetical results were more consistent with qualitative feedback. To increase the depth of these comparisons, this presentation will also include an assessment of the repeatability of both methods, where consumers saw the same product experience multiple times. The implication of these findings is that the selection of a penalty technique can impact the product guidance communicated to our clients. We are best served when we select the approach that meets our research needs best. If product development guidance is the primary goal, this research guides us toward the arithmetical approach.

(50) Descriptive aroma volatiles of four commercial coffees prepared using four brew methods

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This study compared flavor and aroma volatile differences in commercial coffees (Folgers[®] Breakfast Blend, Classic Roast, 100% Columbian, and Black Silk) representing different roast levels of mild, medium, medium-dark, and dark, respectively. Each coffee was prepared with four different brew methods (pour over, drip, French

press, and cold brew) in a four by four factorial arrangement. After brewing (cold brew was warmed to serving temperature in a water bath), 100 mL of each brewed coffee was placed in a glass jar with a Teflon lid and was then collected on an SPME (solid-phase micro-extraction) fiber for 2 hours in a pre-heated water bath. Each SPME was then injected in an Agilent Technologies GC-MS with an olfactory port. A technician smelled the volatiles simultaneously with the MS to indicate when odors were detected. Only those volatiles present during an aroma event were retained for analyses. Volatiles were measured as total ion count areas under the curve of each peak and then log-transformed to normalize variance and analyzed using analysis of variance with coffee and brew method and their interaction as fixed effects. More than 670 aroma compounds were detected across all treatments. The 100% Columbian coffee was highest ($P < 0.05$) in 2,5-dimethyl-3-ethylfuran (earthy, roasted aroma), 2,3-hexanedione (buttery), 2,5-dimethyl pyrazine (earthy, roasted), and acetic acid (vinegar) and was lowest ($P < 0.05$) in hexanal (green aroma, an indicator of oxidation) and 5-methyl furfural (sweet, spicy, caramel aroma). The drip brew method was the highest ($P < 0.05$) in 3-ethyl phenol (medicinal), 2,3-dimethyl pyrazine (nutty, cocoa), 2-ethyl-5-methyl pyrazine (nutty, roasted), and dimethyl trisulfide (onion) and lowest ($P < 0.05$) in 2,5-dimethyl furan (spicy, smoky). Brew method and degree of end roast significantly impacted volatile aroma compounds.

(51) Descriptive aroma and flavor attributes of four commercial coffees prepared using four brew methods

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This study was conducted to validate the World Coffee Research (WCR) coffee flavor lexicon developed by Kansas State University and Texas A&M. Four standard commercial coffees representing mild, medium, medium-dark, and dark roasts (Folgers[®] Breakfast Blend, Classic Roast, 100% Columbian, and Black Silk, respectively) from three commercial lots were evaluated. Each coffee was prepared using four brewing methods (pour over, drip, French press, and cold brew). Main aroma ($n = 25$) and flavor attributes ($n = 35$; 0 = none and 15 = extremely intense) were evaluated by a trained descriptive attribute sensory panel. Panelists ($n = 5$) evaluated five randomized, three-digit coded coffee samples each day for 31 days. Columbia coffee was higher in berry/fruit aroma ($P = 0.04$) and had the highest mouth drying ($P < 0.001$). Breakfast Blend had more blended ($P = 0.002$) and less bitter ($P = 0.02$), sour ($P = 0.007$) and burnt ($P = 0.004$) attributes. Black Silk coffee was higher in roasted ($P = 0.001$) and acrid ($P = 0.01$) flavor aromatics and bitter aftertastes ($P = 0.01$). Cold brew coffee was lower in roasted ($P < 0.001$) and burnt ($P < 0.001$) aromas; and higher in sweet ($P < 0.001$) and ashy ($P < 0.0001$) flavor aromatics, and berry/fruit aromas ($P < 0.0001$). Coffee prepared using the French press and pour over methods were similar in aroma and flavor attributes. Drip coffee was higher in mouth drying ($P < 0.0001$), bitter basic taste ($P < 0.001$), burnt ($P < 0.0001$) and acrid ($P < 0.0001$) flavor aromatics and bitter aftertaste ($P < 0.0001$). Coffee source and brew methods impacted aroma and flavor attributes, and coffee aroma and flavor attributes can be determined using the WCR coffee flavor lexicon.

(52) Sensory evaluation of a teff- and dairy-enriched flatbread

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Calcium and iron enrichment are not commonly practiced in the food industry in the Middle East and North Africa (MENA). Bread, especially flatbread, is known as a staple food in MENA. Teff, a calcium and iron-rich grain, and dairy products can be used to

subtly incorporate calcium and iron into flatbread. The objective of this study was to analyze consumer acceptance of Ivory teff and *labneh* (Greek yogurt)-enriched flatbread. Vitamin D was added in the form of vitamin D-enriched ghee. Informal experiments included bread treatments ($N = 3$) with 15% teff, milk, and either *kashk* (a local dairy product) or *labneh* and were informally tested for acceptability using a 9-point hedonic scale. Tasters ($N = 20$) were randomly selected from Department of Nutrition students at West Chester University of Pennsylvania. The formal testing will be conducted in mid-April at the university level and after Institutional Review Board approval. Among other attributes tested, the overall acceptability revealed that panelists preferred the bread that contained milk, *labneh*, and teff (acceptability = 6.8) over milk and teff only (acceptability = 6.25). The *kashk* acceptability was very poor, therefore, the results are not included here. Overall acceptance for flatbread was higher for those tasters who regularly eat flatbread. To build upon our informal sensory data we plan to conduct more comprehensive sensory evaluation with improved bread products. We will gather a greater number and variety of subjects to taste and evaluate our new flatbreads for levels of acceptability in April 2016. It is anticipated that the eventual use of this flatbread by pregnant women in the food-insecure areas of MENA will increase calcium, iron, and vitamin D intake and, thereby, help reduce the resulting complications for the mother and child.

(53) Preference testing of novel fortified blended foods with infants and young children in Tanzania

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Fortified blended foods (FBFs) have been used as supplementary foods for vulnerable populations such as infants and young children in developing countries around the world. Corn soy blend plus (CSB+) currently is the most widely used FBF; however, indications are that it does not meet the nutritional requirement for infants and young children. Novel FBFs have been developed in order to deliver sufficient nutrient density for children's growth and development. The preference of porridge made from novel FBFs compared to CSB+ among infants and young children was studied in the Mwanza Region of Tanzania. Five extruded, fortified blends were chosen as novel FBFs in this study: i) corn soy blend 14 (CSB14); ii) white sorghum Fontanelle 4525 soy blend (SSB); iii) white sorghum Fontanelle 4525 cowpea blend (SCB1); iv) white sorghum 738Y cowpea blend (SCB2); and v) red sorghum Burgundy 217X cowpea blend (SCB3). Paired preference testing between CSB+ and each novel FBF was conducted, using approximately 600 children for each pair. Results showed that infants and young children preferred CSB14 and SSB over CSB+. However, children tended not to have a preference for the three sorghum cowpea blends (SCB1, SCB2 and SCB3) versus CSB+, probably because of a distinct beany flavor from cowpea that they were not familiar with. This study indicated that novel FBFs have potential to be used successfully as supplementary food with higher preference or comparable in preference to FBF currently used in food aid programs. Preference testing, during and after 5 month feeding trials, will be used to determine if more exposure to novel FBFs can increase the preference of some alternative products that are at parity with the currently used product.

(54) Motivations for food consumption during specific eating occasions in Turkey

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Several studies in different countries have been conducted to investigate factors affecting food choices. The objective of this study was to understand the motivations of specific food and beverage choices for different eating occasions in a typical diet of the Turkish people. A convenience sample of 141 respondents completed an online survey questionnaire that included questions about demographic information and details about their latest eating occasion. Respondents reported all their motivations for choosing each food/beverage item reported for that specific eating occasion. Results indicated that different motivations played different roles in food choices of people in Turkey. Liking was a key characteristic for all eating occasions, but key natural concerns were even more important at breakfast, and need and hunger were more important for a mid-afternoon snack. Lunch involved additional motivations such as sociability, variety seeking, and social norms. In addition to liking, choices of different food groups were also driven by other motivations such as habits, convenience, need and hunger, natural concerns, and health. This study helped better understand the current dietary patterns of Turkish people, as well as the motives underlying their choices of foods and beverages for different meals and snacks. These findings could be useful for dietary campaigns that aim to improve eating behaviors in Turkey.

(55) Sensory profiles, consumer acceptance, and palatability of dry dog food manufactured with sorghum

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Sorghum is a key world grain, and Kansas is the top producer in the United States. To increase the use of sorghum, industries such as pet food have been targeted. However, for success it is important to understand sorghum's characteristics such as its sensory properties, pet owners' acceptance, and pets' acceptance of the final products. The objectives of this study were to 1) develop a sensory profile for dry dog food containing sorghum; 2) assess consumer acceptance of the dog food products; and 3) investigate dogs' acceptance of products fed in their household environment. Three samples containing different sorghum fractions (whole, bran, and flour) and a control sample containing mixed grains were manufactured. A trained human descriptive sensory panel described the sensory characteristics of the samples. A total of 105 pet owners evaluated the samples for appearance, color, aroma, and overall liking. A total of 30 dogs of different size, age, and breed were selected for a one-bowl in-home palatability study to test pet acceptance of samples. Differences among samples from the descriptive analysis were small and related to a few appearance and texture characteristics. The consumer panel found the whole sorghum and the control samples to be most liked overall, in appearance, and color. No difference was found in aroma liking, in accord with the similar aroma profile. The slight difference in liking scores seems to be caused by the different appearance of the samples. The whole sorghum diet was accepted at the same level as the control diet and the results suggest that improvement in appearance of other

samples will improve consumer acceptance to that of the control. Further, the dogs seemed to like the foods manufactured with sorghum and other grains equally. This study indicates the potential for an increased use of sorghum in dry dog food.

(58) Are advertising over-quotas required for comprehensive product understanding?

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Oftentimes, very specific demographics are selected to ensure advertising is relevant and effective with a brand's target consumer. During new product development, the wish to gather the opinion of these very specific advertising targets is lifted and shifted to product research by our marketing and R&D counterparts, even though these consumers may only make up a small percentage of the total expected buyer population. To create data for these segments of interest (e.g., kids, millennials, parents, Hispanics, to name a few), we must boost our recruit or add an over-quota, requiring additional investment beyond the necessity of studying the broadest population of buyers, a standard recruit. This research seeks to evaluate if this increased investment in an over-quota of a segment of interest provides more comprehensive innovation product understanding. Data from 20 snack food studies collected over 5 years, including both a standard recruit and a segment of interest over-quota, were examined to assess when (and if) the added investment of the over-quota resulted in a different or clearer business decision. Key measures of overall liking, post-taste purchase intent, and meets expectations and diagnostic questions such as just right were studied for each segment individually to generate a business-relevant recommendation and refinement direction. Then, the holistic product guidance and recommendations from each were compared and contrasted. This research tests our hypotheses that segments of interest provide the same product guidance as a standard recruit in most cases and are not required for comprehensive product understanding per se. We hypothesize that segments of interest provide a unique perspective in only very specific situations, and they are typically in line with the general population of prospective buyers. Their data, however, may be perceived as most compelling within an organization, and therefore worth the investment in facilitating accelerated decision making.

(59) Are grid questions reliable for mobile surveys?

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Historically, grid questions have been an efficient way to collect opinions in survey research. Key reasons for their popularity: (1) they are an efficient way for researchers to ask the same question on a large number of attributes; (2) they are relatively easy for respondents to understand; and (3) respondents only have to read the scale once and then can simply go row-by-row answering each question on the same page. In December 2014, Quirks reported that grid questions are raising data quality concerns when completed on small-screened devices because respondents have to scroll horizontally and vertically. Quirks found that completing surveys on small-screened/mobile devices resulted in higher abandonment rates, as well as lack of discrimination in responses. L&E Research reported in a recent webinar that >30% of surveys are started on mobile devices, yet only 25% of surveys are mobile suitable. With mobile technology expanding and cost of usage trending down, it can be reasoned that mobile usage for survey research will be increasing. The objective of this research was to understand the impact of grid questions on data quality, specifically exploring abandonment rates, completion times, discrimination of response, and customer satisfaction. Three surveys were fielded of varying

grid size and question length during the same time period. As expected, abandonment rates were highest when completed via a smartphone (16% vs. 4% with computer for longest survey). Regardless of device, the shorter the survey (both in question length and question size) the happier the respondents are with the experience.

(60) Comparison of menu-based or adaptive choice-based conjoint analysis to identify consumer desires for protein bars and beverages

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Menu-based conjoint analysis (MBC) is a new conjoint design that allows for levels within attributes that are not mutually exclusive (an assumption for other conjoint approaches). This study compared MBC to adaptive choice-based conjoint analysis (ACBC) to identify key attributes for protein bars and beverages. The conjoint study was conducted with Kano questions and MaxDiff scaling to identify consumer desires for protein beverages or bars. Attributes evaluated included format (ready to drink, ready to mix, bar), protein type, protein amount, label claim, carbohydrates, and sweetener. Attitudes, emotions, and lifestyle also were investigated. Protein bar/beverage consumers completed one of the two surveys ($n = 400$ each survey). Utility and importance scores were determined and compared. Both surveys revealed similar results for utility scores and similar respondent clusters. The most important attribute across all consumers was protein amount followed by protein type followed by sweetener ($P < 0.05$). Situation had a significant effect on preferred format (beverage vs. bar) ($P < 0.05$). Naturally sweetened, ready-to-mix beverages with whey protein were the most desired beverage, while low-carb, all-natural, and GMO-free bars with whey and soy protein were most desired. Overall, MBC and ACBC revealed similar results, but MBC allowed greater ease of comparison of exclusive attributes and levels.

(61) Flavor, acceptance and antioxidant content of pomegranate juice and green tea blends

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Introduction: Pomegranate juice has increased in popularity due to potential health benefits, mainly for their high polyphenol content. Tea is one of the most consumed beverages in the world, and green tea (GT) is known to have the highest polyphenol content of all varieties. The objectives of this study were to a) explore sensory differences in pomegranate juice (PJ) and GT blends at different ratios; b) determine consumer acceptance; and c) determine polyphenol content. Methods: Wonderful variety pomegranates were used to make pomegranate juice and Lipton Pure Green Tea (Unilever, Englewood Cliffs, NJ, USA) was used to brew iced green tea. A group of six highly trained panelists evaluated six different juice/tea blends (90:10, 80:20, 70:30, 60:40, 50:50, and 40:60) and determined flavor characteristics. A total of 100 consumers evaluated liking of the beverage blends. After the last serving, antioxidant information was provided and overall liking was asked to be reevaluated for the last sample. A spectrophotometric modified Folin-Ciocalteu method was used to determine total phenolic content (TPC) in the samples. Results: Descriptive analysis showed that the blends had higher green and green tea-like flavor for samples with higher tea concentrations, but lower in berry, beet, floral, sweetness, and cherry flavors. The consumers liked the 90:10 blend the most, while the 40:60 juice/tea blend was liked least. Overall liking ratings increased after antioxidant information was provided. TPC content was higher in samples with more pomegranate juice

content. Discussion: Consumers gave higher overall liking scores after reading antioxidant information, so making claims on beverage labels might be a good strategy for encouraging people to purchase and consume these beverages. However, not all beverages that are well known for their healthy properties are necessarily high in antioxidants.

(62) A cross-cultural comparison of purchasing intentions, natural product packaging design and labeling information of naturally developed Moringa-based beverages by Bangladeshi and German consumers

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Purchasing intentions of consumers are influenced by product images, prices, quality, design and labeling information. Nevertheless, natural products are becoming acceptable to all cultural groups of consumers. In this study, four *Moringa oleifera*-based non-alcoholic natural beverages were designed with the enrichment of natural sweetener (302), acerola fruit powder (203), sugar (831) and citronella extracts (674). Two hundred ninety-three respondents were selected from both Bangladeshi and German consumer groups in Germany using the center location test (CLT) method. The purchasing intention of two cultural groups was observed in the same way for both, first purchasing intention before tasting the samples and individual product purchasing intention after tasting the samples using a 5-point purchase intention scale. Respondents were requested to rate their agreement on natural product packaging design and labeling information using a 9-point agreement scale. Data were statistically analyzed using different programs, e.g., SPSS, XLSAT and Microsoft Excel. A cross-cultural study between two groups was demonstrated different results for both first purchasing intention before tasting and after tasting of the samples. Bangladeshi consumers (54.24%) significantly preferred the concept product more than German consumers (35.43%) in terms of purchasing intention before tasting the samples. Moreover, after tasting, the sample 674 was highly preferred by both consumer groups. In pair-wise comparison, purchasing intention before and after tasting the samples and between two cultural groups were different ($P < 0.001$). On the other hand, the concept product packaging design was more highly accepted by Bangladeshi (85.59%) than by German (60.58%) consumers, and the difference was significant ($P < 0.001$). Finally, it has been shown that awareness and the demographic characteristics of the consumers affected the purchasing decision for a product. Nevertheless, with highest purchasing intention scores, being Bangladeshis are advanced in producing *Moringa oleifera* and its applications industrially.

(63) Effects of gender, age, and product usage frequency on the overall acceptance of various foods in central location tests

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Screening of consumer acceptance panelists is common practice in most commercial sensory labs. However, with each additional screening variable, the cost of recruiting increases. In order to allow researchers better insight on the variables they screen for and to assist in designing studies, this study explored the common screening variables of age, gender, and frequency of product use, for 11 different food categories. Mean overall acceptance scores from panels spanning an 11-year period were evaluated for the aforementioned variables for each of the food categories. The effect of age, gender, and product usage on overall acceptance was

product-specific. Furthermore, there were patterns that emerged based on main effects, overall acceptance, and food category.

(64) The role of segmentation in understanding consumers' emotion for coffee

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Segmenting consumers helps provide valid information in understanding product acceptability and other aspects for consumers. Especially when the product space is small, creating consumer segments increases the sample size with respect to the consumer clusters, and thus, multivariate data analysis can be applied. We investigated the emotional aspects of three coffee products with low, medium, and high quality ranks. Our hypothesis was that different qualities trigger different overall acceptability and, thus, different emotions. One hundred, four coffee drinkers participated in the test. The participants tasted all three samples and rated their overall liking on a 9-point hedonic scale and 44 emotions on a 5-point scale (0 = not at all, 4 = extremely). Cluster analysis was performed on consumer acceptability scores to segment them into four homogeneous groups based on coffee liking. Principal components analysis was used to explore the relationships between acceptability and emotions of these 4 clusters toward the 3 coffee samples, which resulted in 12 subsamples to facilitate the analysis. The four consumer clusters identified were "typical coffee drinkers" who prefer low-ranked coffee and feel generally emotionless and indifferent to coffee; "Uninterested coffee drinkers" who prefer mild-flavored coffee with lots of cream and sugar; "coffee lovers" who liked all three coffees and are passionate about drinking coffee; and "coffee snobs" who care strongly about flavor and are picky and discriminative about their coffee. The most important emotional qualities consumers seek in their coffee are related to gratification, calming, focusing, the absence of disgust, and general positive emotions. This suggests that consumer segmentation could provide better insights into consumers' behavior toward and perceptions of products.

(65) Korean consumers' food texture evaluation using lexicons in four different languages

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Texture is an important food quality contributing to the acceptability of foods. Texture terminologies for food evaluation have been developed in various languages. Additionally, there are many cross-cultural studies comparing texture terms in different languages and culture. However, there has been no further study after the Korean texture lexicon developed in the 1980s, which only evaluates three food categories, rice, noodles, and kimchi. Thus, we aimed to compare texture lexicons in four different languages using Korean consumers to determine the needs for texture lexicon development in Korean. Based on the food list from Japanese texture research, 12 foods covering various texture were chosen: apple, beef jerky, quail egg, hardtack, cup noodle, kimchi, Pringles, rice, rice cake, tofu, tuna, and yogurt. Texture terms were translated into Korean and used for consumer tests to evaluate the texture attributes of the 12 food samples. The choose-all-that-apply method was used. Correspondence analysis was conducted, and from all four evaluations, dimension 1 described the degree of the sound emitted during consumption, and dimension 2 differentiated the degree of moistness and chewiness of the samples. At the end of the test, consumers received a compilation of texture terms from four different terms lists and were asked to check all the terms that were adequate when evaluating the textural attribute of

general foods. We categorized the terms into 10 groups: 1) crispy/crunchy; 2) soft; 3) chewy; 4) sticky; 5) viscosity (thick, thin); 6) elastic; 7) moistness (watery, dry); 8) oily; 9) surface (rough, slimy); and 10) hardness. The most chosen terms were from English terms list. For the Korean terms, it was only effective when evaluating food samples included during development, and it showed the limitation when evaluating other foods. As a result, it is necessary to develop Korean texture terms covering the textural attribute of various foods.

(66) The effects of wine components on the sensory perception of wine faults

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Consumer perception can have an influence on repeat purchases, and as a result, initial exposure to a wine should be a positive and memorable experience. The wine industry directly benefits from positive consumer experiences. Wine components such as ethanol, tannic acid, and tartaric acid may affect the sensory perception of the faults in a wine and, therefore, acceptability. If the wine components have the ability to alter the perception of faults, decreasing the amount of the fault detected in the headspace lessens the chance the wine would be rejected aromatically and, thereby, increases the rejection threshold concentration. Conversely, if the components increase the perception of faults, the rejection threshold concentration is lowered and the chance the consumer would reject the wine is greater. In this study, seven common wine faults (2,4,6-trichloroanisole, ethyl acetate, acetic acid, 4-ethylphenol, 4-ethylguaiacol, 2-isopropyl-3-methoxypyrazine, and acetaldehyde) were chosen to determine the effects that wine components (ethanol, tannic acid, and tartaric acid) have on aromatic wine faults. Different levels of concentrations of the individual components were studied using static headspace gas chromatography mass spectrometry and sensory assessment and analysis. Both the instrumental and sensory analysis demonstrated there was a negative correlation between the ethanol concentration and the amount detected in the headspace of the wine fault, while the other wine matrix components had no statistically significant effect ($P \leq 0.05$), except in the case of acetic acid, for which only sensory analysis showed a statistically significant negative correlation, while instrumental analysis showed no statistically significant effect. This demonstrates that wine components can have a significant influence on how an aromatic fault is perceived, and understanding this phenomenon can assist winemakers in ensuring that their product offering and brand integrity is maintained, resulting in consumer acceptability and future sales.

(67) Pre-thickened beverage products for a dysphagia diet: Sensory profiling and external preference mapping

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Dysphagia is a dysfunction of the swallowing system, and thickened beverages are widely prescribed as a treatment. Pre-thickened water products, including two starch-based and two gum-based products, were tested in both nectar and honey thick versions. One product was neutral water, and the others had lemon flavoring added. The sensory characteristics of the products were evaluated by a highly trained descriptive panel; viscosity of the products were evaluated using both the Bostwick consistometer and the line spread test; and consumer acceptance was measured by a consumer panel of 100 consumers who had been told the products were intended for patients with difficulty swallowing. All lemon-flavored products had similar flavor characteristics, except the Thick&Easy

Clear, which had less lemon-related flavor than the others. After excluding the lemon-related flavor characteristics, all pre-thickened products had similar “base flavor” notes, no matter whether the products were starch or gum based. This is in contrast to literature reports of differences in flavor of ready-to-prepare thickening agents for beverages. The texture of the products varied between nectar and honey thickness, but also varied among products that were stated to be at the same level of thickness. External preference mapping showed lemon-related flavor and thinner texture are potential drivers of consumer liking, which was expected based on other studies. In conclusion, pre-thickened beverages are good alternatives for self-mix thickening agents, but a standard for thickness should be agreed on and used by manufacturers.

(68) Investigating the impact of the “all-natural” labeling on perceived food quality and liking using immersive technologies

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Despite the prevalent use of the “all-natural” label, the U.S. FDA has not defined this ambiguous term. Moreover, many point-of-purchase locations employ servers who provide samples and call out specific label information to influence consumers’ purchase decisions. Although these practices are common, it is unclear how the “all-natural” label influences perceived food quality and acceptance. We investigated these questions using a novel approach that incorporated immersive technologies to simulate a virtual grocery store setting in which a confederate invited 120 consumers to sample identical peanut butters (PB). In condition 1, jar labels were removed. In condition 2 (C2), front-of-pack labels were revealed; labels on both jars were identical, except that one displayed the term “all-natural.” Testing in condition 3 (C3) was identical to C2, except the confederate indicated that one sample used “all-natural ingredients.” For each sample evaluated in each condition, subjects rated liking, indicated their willingness-to-pay (WTP), and indicated their level of agreement to 10 statements regarding PB quality and nutritional content. Results indicated that in C2, the “all-natural” label compared to its regular counterpart significantly improved consumers’ perception of PB quality and nutritional content but not liking or WTP. Interestingly, the additional call out of the “all-natural” claim magnified these differences, and the WTP for the natural labeled PB increased significantly by an average of \$0.28 more per jar. In a virtual setting consistent with making food choices and purchases, the “all-natural” front-of-pack label improves consumer perceptions of product quality and nutritional content. The information conveyed to consumers by employed servers further impacts these variables, suggesting that consumers are highly susceptible to social influence at the point of purchase. These findings substantiate efforts to regulate the meaning and use of the “all-natural” label.

(70) Assessing the impact of value perceptions and a product reward option on product evaluations

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In an effort to go “beyond liking,” several research methodologies have been proposed to better understand consumers’ choice behavior, which may be more discriminating and more indicative of consumer behavior in market. Such methodologies include “take away” protocols (e.g., Wichchukit & O’Mahony, 2010) and experimental auctions or other designs that measure willingness to pay (e.g., Grunert et al., 2009). In this research, we investigate a modified version of a method described by Siefferman and Blumenthal

(2012). Two groups of respondents ($N = 120$ each) participated in a central location, sequential monadic fragrance evaluation in which eight body wash fragrances were evaluated one at a time by sniffing from an unbranded, opaque container. In the no-reward condition, respondents rated overall liking, purchase intent, and other diagnostics. In the reward condition, respondents also indicated which product they would choose to take home as a reward. Respondents were offered the option to select a product as their reward immediately after evaluating it and, once selected, continued with the evaluation of the remaining samples. They were not allowed to change their mind regarding their chosen reward product. In order to manipulate the perceived value of the reward, half were told they were evaluating body washes that are available at grocery/drug stores for \$3–5 (low value); the other half were told the products were available at specialty stores for \$10–20 (high value). Results indicated the products differed in overall liking and purchase intent, but received similar scores regardless of reward condition. However, product scores varied by value condition, receiving lower scores in the high-value condition, and this effect was stronger in the no-reward condition. In the reward condition, reward selection offered additional insight above overall liking and other traditional measures.

(72) Sparkling wine sweetness: Its influence on sensory properties and consumer acceptance

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The dosage liquid, added at the final stage of sparkling wine production, imparts residual sweetness to the wine. No study has yet analyzed the influence of dosage composition on the final wine's sensory profile or consumer acceptance. In this study, dosage composition was altered through the addition of different sugar types (ST: fructose, glucose, or sucrose) to produce sparkling wines ($n = 7$) of varying residual sugar levels (RSL; brut or sec). Sparkling wine treatments were then evaluated by a trained panel ($n = 9$). Results showed that the interaction between ST and RSL influenced the perception of flavor, taste, and mouthfeel attributes ($P \leq 0.05$). Sec wines displayed significantly lower intensities of green and yeasty flavors compared to the brut wine ($P \leq 0.05$). Sec wines were higher in intensities of fruity and caramelized/vanilla/honey (CVH) flavors and creamy mouthfeel, while being lower in sourness and bitterness ($P \leq 0.05$). Consumers ($n = 126$) also evaluated the sparkling wines, and results indicated ST, RSL, and their interaction influenced acceptance and perception of the "refreshing" aspect of the wine ($P \leq 0.05$). Overall consumer acceptance of sparkling wines was highly correlated to CVH ($r^2 = 0.94$), floral ($r^2 = 0.88$), and fruity ($r^2 = 0.99$) flavors, as well as sweet taste ($r^2 = 0.92$) and creamy mouthfeel ($r^2 = 0.93$). Internal preference mapping revealed two different clusters of consumers. Both clusters liked wines sweetened with fructose, but cluster 1 liked the sec sparkling wine sweetened with fructose (containing 32.8 g/L), while cluster 2 preferred the brut wine sweetened with fructose (containing 8.4 g/L). Sucrose and glucose brut wines were the least preferred and were described as having high yeasty aroma and toasted flavor. These results suggest that consumer preference for sparkling wine is segmented based on sweetness preference. The results of this study offer winemakers practical knowledge about the influence of dosage composition on the sensory profile of sparkling wine.

(73) Calibrating panelists at international locations can be challenging, even with similar and identical sensory languages. Cross-cultural differences can contribute to variability

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Calibrating panelists at international locations can be challenging, even with similar and identical sensory languages. Cross-cultural differences can contribute to variability. The objective of the current study was to compare panelist performance in the United States to panelist performance in Belgium following a series of calibration exercises. Trained descriptive analysis panelists ($n = 8$ USA; $n = 10$ Belgium) received 15 hr of training on off-flavor detection and scaling in white wines. The same sensory language was used at both locations with different panel leaders. Following training, leaders at each location spent approximately 6 hr at the other location to cross-calibrate the panels. Six wines with varying intensities of different off-flavors were created and distributed to both locations for profiling before and after panel leader cross-calibration. Results were evaluated by univariate and multivariate analyses. Both panels differentiated the wines. Cross-calibration with panel leaders increased the similarity of results at the two locations. These results demonstrate that the cultural as well as panel leader differences contribute to panel variability at different locations, even when a standardized language is used. Cross-calibration of panel leaders with panels at multiple locations can enhance panel performance.

(74) Tasteful packaging: How health and ethical messaging can affect the consumer experience

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Ethical buzz words like "organic," "sustainable," and "non-GMO" have become increasingly popular for use with consumer products. Consumer demand for such products is rising rapidly. Health and environmentally conscious consumers are driving sales of products, yet it is unknown how much of an impact such claims have on consumer perception. Using a combination of psycho-physiological measures, traditional quantitative questionnaires and conjoint analysis we aimed to understand the consumer's experience when exposed to these claims. Quantitative: Subjects ($n = 302$) were exposed to 12 images of yogurt packaging with varying claim combinations, including control (plain package), environmental (organic, sustainable, non-GMO) and dietary (low fat, low calorie), then given a questionnaire to assess perceived taste, brand perception and cost perception of the stimuli, as well as general health and environmental implications on grocery purchases. Psycho-physiological: Subjects ($n = 18$) were exposed to 12 images of yogurt packaging with varying claim combinations, including a control (plain package), environmental (organic, sustainable, non-GMO) and dietary (low fat, low calorie) for 8 sec each while being measured for HR, GSR and fEMG. Visual attention was also measured using eye tracking. Subjects were then asked to answer a questionnaire. Results/Conclusions: Psycho-physiological data showed that claims helped sustain arousal and engagement with products, but can also have a negative effect on pleasantness and cognitive attention. Environmental and health claims also had an effect on perceived taste and amount consumers were willing to pay for the product, with significant differences between males and females and among different age groups. The results of this study provide much needed insight into the importance of consumer package communications for health and environmental issues.

(75) Does context really matter? Understanding how the application context may affect results when applying personal care products

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In the personal care category, the context in which samples are evaluated is extremely important, whether it is in consumer testing or descriptive analysis. Our hypothesis is that collecting data in the context of the true application behavior (meaning on full face vs. inner arm) and in the context of a consumer's current regimen (face wash with moisturizer vs. face wash only) will lead to more valid and actionable results. To prove our hypothesis we plan to execute the following descriptive analysis and consumer research.

(76) The role of temporality and label on consumer acceptance of natural sweetener blends in protein beverages

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Consumer interest in naturally sweetened protein beverages has increased in recent years. Each sweetener has unique flavor characteristics that can influence beverage sensory properties and consumer acceptability. Previous work established sensory profiles of natural non-nutritive sweeteners in ready-to-mix (RTM) vanilla-flavored whey protein beverages using time intensity (TI), temporal dominance of sensations (TDS), and temporal check-all-that-apply (TCATA). Based on these results, sweetener blends were formulated to more closely match the temporality of sucrose-sweetened protein beverages. The objective of this study was to document the temporal profiles of natural non-nutritive sweetener blends in vanilla RTM protein beverages and consumer response with and without priming. Protein beverages (RTM, 25 g of protein/12 oz serving in water) were sweetened with the following natural sweetener blends: stevia/fructose (50:50 and 25:75), monk fruit/fructose (50:50 and 25:75), monk fruit/stevia (50:50 and 25:75), and monk fruit/stevia/fructose (25:25:50). Sweetener amounts were determined based on previous work that established iso-sweetness with a 7% sucrose reference. The temporal sensory properties of beverages were determined using TI, TDS, and TCATA with a trained panel ($n = 8$). Subsequently, consumer acceptance testing ($n = 125$) was conducted with protein beverages with and without ingredient statements or label claims. Beverages sweetened with a 25:75 monk fruit/fructose blend most closely matched the temporality of sucrose-sweetened beverages. Consumers preferred the reference sucrose-sweetened beverage followed by the fructose-sweetened beverage when ingredient statements or label claims were not included. Overall liking scores increased for all beverages when an "all-natural" label was included. Beverages sweetened with stevia/monk fruit blends were preferred by a segment of consumers when label claims and ingredient statements were provided. Application of these findings to commercially produced RTM protein beverages aids in development of naturally sweetened beverages with reduced calories and desirable sensory properties.

(77) Apple Workshops—Liking of apple and other fruits among children

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(1) Kansas State University, Manhattan, KS, U.S.A.; (2) University of Helsinki, Finland

Consumption of fruit and vegetables (F&V) is encouraged by health and nutrition professionals as being good for your health. How do people get to like F&V products? To study the attitudes and preferences of children towards fruits, a set of Apple Workshops were organized. Children ($n = 86$, 6–10 years old) from four classes of a local primary school in Helsinki, Finland, participated in the study. Their parents filled in a background questionnaire (demographic information and use frequency of fruits and berries) beforehand. Children's favorite fruits were apple, mandarin, pear and banana, while the least liked were banana, pineapple, plum and kiwi. Fruits were most often eaten for a snack after school. Workshops consisted of two parts: sensory evaluation and focus group discussions. Participants evaluated three apple cultivars (facial hedonic scales, 1 = super bad, 7 = super good) before and after tasting them. The intensity of liking rose between 0.4 and 0.8 points after the cultivars were tasted. Girls liked the two red cultivars slightly more than the boys when the evaluation was based on appearance only, while there was no difference in liking between the genders after tasting. The results suggest also that children who prefer sour apples eat more fruits than children who prefer sweeter apples. This finding may be important when reasons behind reluctant consumption of F&V are investigated. Finally, 4–6 children from each class participated in a focus group discussion, while the rest of the class had a parallel drawing session. Topics discussed included fruits the children like to eat, when these are eaten, fruits they have tasted and how fruits and berries are prepared for eating in the family. Based on the experiences from the workshops, a prototype was constructed to be used in group discussions in classes and hobby groups.

(78) Connecting the dots between commodity ingredients and descriptive sensory research

A. SISOPHA (1), A. Cameron (1)
(1) ACCE International, ON, Canada

Commodity ingredients such as all-purpose flour are seldom highlighted in sensory or consumer research. Yet this information is essential for clients to understand the performance of their product(s) and the criteria that impact consumers' purchase decisions. Very often it is difficult for consumers to differentiate between different brands of a commodity product such as flour, and the manufacturer struggles to stand out in the marketplace. Descriptive sensory research can provide these needed insights. As such, this type of research must be conducted in a setting that is as close to "real life" as possible and relevant to the end user, while maintaining the integrity of reliable, valid research. To compare the performance of eight competitive brands of Canadian flour with varying protein levels, ACCE used their trained sensory panel to determine sensory differences, if any, among the eight brands of flour. This, in turn, would determine the appropriate flour samples to select for consumer testing. The trained panel ($n = 10$) developed three testing protocols to evaluate the eight brands of flour based on "neat" flour, muffins (batter and baked) and biscuits (dough and baked). The panel found significant differences between the brands of flours in all three tests. For example, some "neat" flours were significantly darker than the other brands. There were significant differences found between some of the muffin batters for thickness and stickiness. Significant differences between the biscuit doughs were noted for ease of kneading, elasticity and stickiness. Signifi-

cant differences were also noted in the baked muffins and biscuits for chewiness and moistness. This presentation will demonstrate how clients with a commodity product will benefit from descriptive sensory research.

(79) Study on how sweetness perception in milk products influences overall product acceptability among adults and children in Asian countries

L. J. TAN (1)

(1) Abbott Nutrition Asia, Singapore, Singapore

The aim of the study is to understand how the perception of sweetness in milk products influences the overall product acceptability among adults and children in Asian countries. The milk products with three levels of sweetness, high, medium and low, were prepared and tested with adults and children at central location testing in Vietnam, Malaysia and China. The descriptive data of milk products were evaluated and rated by sensory descriptive panel. The products' overall acceptance was compared across Asian countries to understand the similarities and differences of sweetness effect on product acceptability among adults and children. The results also suggested the differences in term of sweetness preference between children and adults in Asian countries.

(80) Healthy versus wholesome snacks: Exploring consumer perceptions and identifying sensory cues

K. ROBESON (1)

(1) Blueberry (a J. Reckner Associates, Inc. company), Chalfont, PA, U.S.A.

Often used in conjunction, "healthy" and "wholesome" are terms regularly utilized by consumers and manufacturers to describe products in the "snacking" space. But do we know what these terms mean to consumers? This research aims to uncover attributes, consumer language, and sensory cues of the terms

"healthy" and "wholesome" within the "snacking" space, while examining each term's independent characteristics and where they overlap. To explore consumer perceptions, Blueberry will conduct quantitative and qualitative research among consumers who consider "wholesome" and "healthy" a top priority when selecting snacks. First, we will conduct a quantitative study of snacking behavior among 100 consumers using an online platform that will track the type of snack they consume, how they feel before and after eating it, and how they classify the snack. Classifications will include "wholesome" and "healthy" as well as other characteristics such as "indulgent," "filling," etc. This information will be analyzed to see what drives the classification of a snack as "wholesome" or "healthy" and will also be utilized to inform the qualitative research. In the second, qualitative phase of the research, consumers will be asked to complete pre-work assignments, one of which includes journaling their snacking behavior on the same online platform. In addition, consumers in each focus group will be assigned to create a collage based on either their ideal "healthy" snack or their ideal "wholesome" snack. During the focus groups, consumers will discuss their pre-work assignments, delve deeper into the meaning behind these terms, and explore the sensory attributes of "wholesome" and "healthy." Using insights gained during the quantitative research, consumers will be asked to place snacks on a 2D map of "not healthy" to "very healthy" vs. "not wholesome" to "very wholesome." They will also be asked to classify a snack as "wholesome" or "healthy" based on ingredient lists via a card sort exercise, as well as explore which ingredients make a snack "wholesome" or "healthy" using visual stimuli. Finally, consumers will be exposed to flights that aim to define the sensory cues of "wholesome" and "healthy," such as texture, flavor, and others. Findings will be used to give clear and practical guidelines that will aid sensory professionals in understanding how to design a snack that accurately conveys the claims of "wholesome" and "healthy."

Exhibits

Exhibit Schedule

Wednesday, October 26

12:00 – 3:00 p.m. Exhibitor Move-in
 4:15 – 5:45 p.m. Cocktail Reception with Exhibits

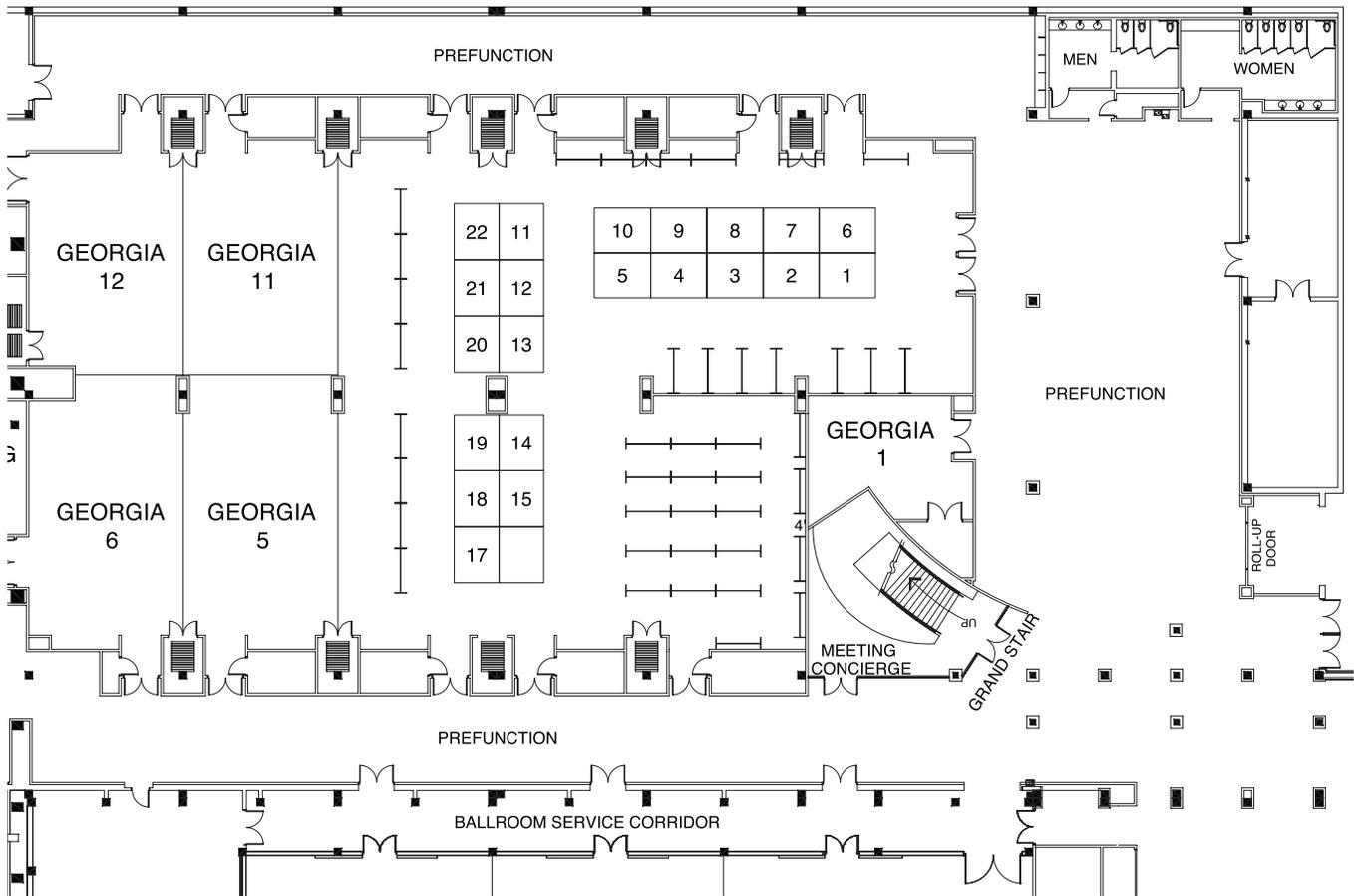
Thursday, October 27

9:50 – 10:20 a.m. Break in Exhibit Hall
 12:20 – 1:50 p.m. Lunch in Exhibit Hall
 3:50 – 4:20 p.m. Break in Exhibit Hall
 4:20 – 6:30 p.m. Exhibitor Move-out

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Exhibit Hall Map



- 17 ASTM International Committee E18 Sensory Evaluation**, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, U.S.A.; Telephone: +1.610.832.9500, Fax: +1.610.832.9555, Web: www.ASTM.org/COMMITTEE/E18, E-mail: service@astm.org. ASTM International meets technical demands of commerce, providing modern guides for research, marketing, and manufacturing. Standards influence R&D, product testing, quality, and commercial transactions globally. ASTM Committee E18 on Sensory Evaluation promotes knowledge, stimulating research and best practices for sensory methods. Professionals from CPG to environmental industries to legal and academic institutions comprise Committee E18.
- 3 Baltimore Research**, 8320 Bellona Ave, Suite 210, Baltimore, MD 21204, U.S.A.; Telephone: +1.410.583.9991, Fax: +1.410.583.9992, Web: www.baltimoreresearch.com, E-mail: info@baltimoreresearch.com, Facebook: www.facebook.com/BaltimoreResearch. Innovation-driven marketing research firm and research facility. Specialization in sensory CLTs. Eight state-of-the-art test rooms, seating up to 65 per room. Four kitchens, observational viewing, ample parking. Onsite call center with highly experienced team backed by proprietary panel management platform. High quality respondents delivered on spec, on budget, on time.
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- 20 HCD Research**, 260 US Highway 202/31, Suite 1000, Flemington, NJ 08822, U.S.A.; Telephone: +1.908.788.9393, Fax: +1.908.788.7179, Web: HCDI.net, E-mail: Allison.Gutkowski@hcdi.net, Facebook: www.facebook.com/HCD-Research-392117767504914, Twitter: @HCDNeuroscience. HCD Research is a marketing and consumer sciences company that provides expert recommendations by employing traditional and applied consumer neuroscience to optimize the design of market research projects for our clients. By employing an applied consumer neuroscience approach in brand and product research, sensory attributes can be optimally investigated.
- 5 Insight Counts LLC**, 180 N Belvedere Dr., Suite 9, Gallatin, TN 37066, U.S.A.; Telephone: +1.615.590.6180, Fax: +1.866.426.8320, Web: www.InsightCounts.com, E-mail: PeterHall@InsightCounts.com. Insight Counts offers a uniquely integrated approach to consumer product testing. Our smart system vigilantly monitors and shepherds you through mechanisms for enriching your database, and it seamlessly manages every project through recruiting, data collection, and analysis. Your team gains productivity and a greater focus on producing outstanding research results.
- 7 The Institute for Sensory Research and Blueberry**, Owned by Reckner, 1600 Manor Drive, Chalfont, PA 18914, U.S.A.; Telephone: +1.914.696.5155, Alt: +1.267.954.0440, Web: www.sensoryguidance.com; www.blueberry.com, E-mail: info@sensoryguidance.com; info@blueberry.com. The Institute for Sensory Research (ISR) and Blueberry Marketing and Sensory Research are sister companies, partnering to provide full-service research solutions for analytical and consumer sensory research. Owned by Reckner, a 25-year market research veteran, ISR and Blueberry combine expertise in marketing research, product testing, and sensory science.
- 22 Jackson Associates Research, Inc.**, 6105 Peachtree Dunwoody Road, Bldg. D, Suite 135, Atlanta, GA 30328, U.S.A.; Telephone: +1.770.394.8700, Fax: +1.770.394.8702, Web: www.jacksonassociates.com, E-mail: mgipson@jacksonassociates.com. Jackson has Atlanta and LA's most flexible facilities with a combined 18 focus suites. With the largest commercial test kitchen in Atlanta, we have over 160 cubic feet of controlled refrigeration. Our 32-seat lab with viewing offers clients a comfortable place to watch our specially trained staff execute their studies.
- 18 Journal of Sensory Studies**, 111 River Street, Hoboken, NJ 07030, U.S.A.; Telephone: +1.201.748.6930, Web: [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1745-459X](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1745-459X). The *Journal of Sensory Studies*, the official journal of the Society of Sensory Professionals, is the only ISI-ranked, multi-disciplinary journal to focus on observational and experimental studies in the application of sensory science to food, nutrition, personal care, cosmetics, textiles/fabrics, winery, and healthcare across the range of consumer products.
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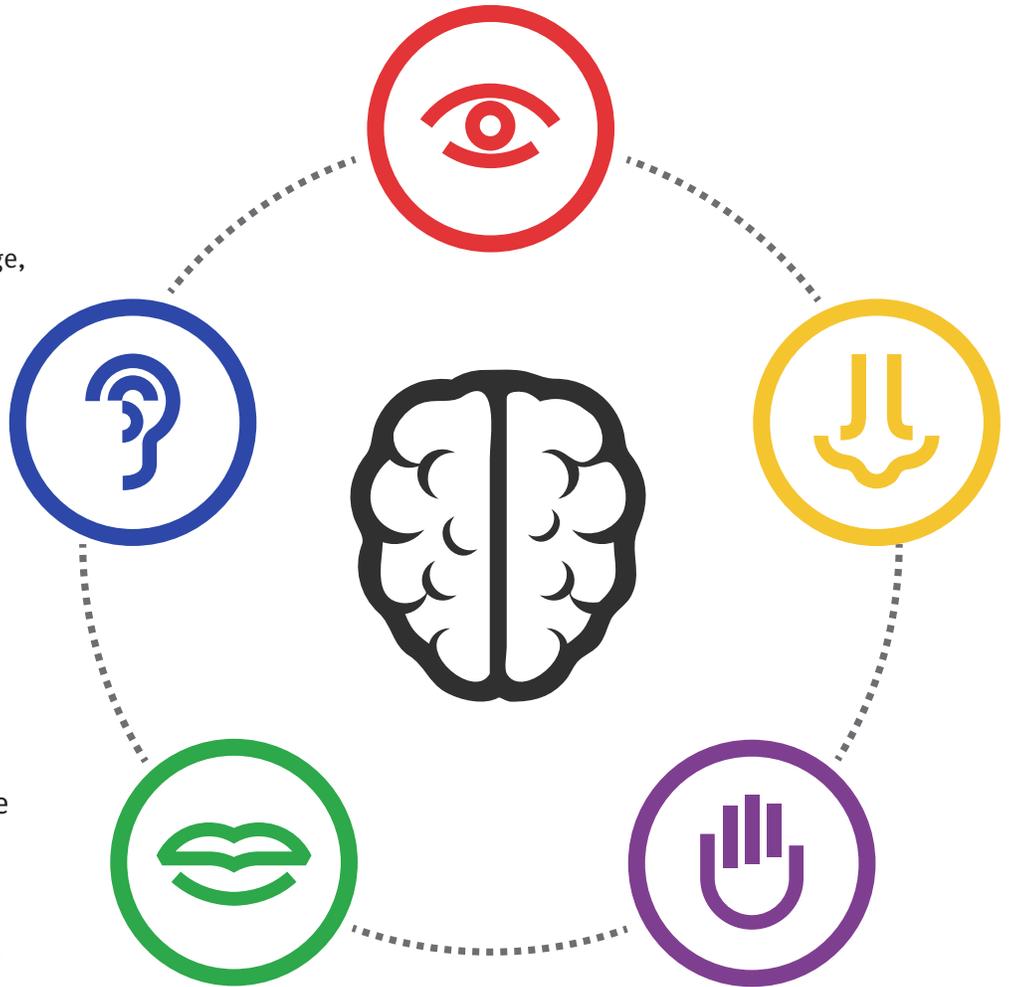
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