YAKIMA CHIEF HOPS

INTRODUCTION TO SENSORY TESTS

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AGENDA

- Vocabulary
- Implementing a Sensory Program
  - Strategy
    - Resources
    - Support
- Test Questions
  - *Is this beer true-to-brand?*
  - *What does this beer taste like?*
  - *Do these beers taste different?*
  - *Do consumers like this beer?*

SOME VOCAB

- **Panelist vs Assessor**
  - **Panelist**- Highly trained, regular sensory participant
  - **Assessor**- Anyone assessing a sample, trained or not
- **Lexicon**: Vocabulary of a person, language, or branch of knowledge. A shared descriptive terminology
- **Blind-coded**: Samples are represented by random numbers so that assessors are prevented from knowing information that might lead to conscious or subconscious bias in their assessment, thus invalidating the results.
- **Carryover**: Influence of a previously evaluated sample on the perception of a subsequent sample
- **Sensory Fatigue**: Becoming desensitized to stimuli due to prolonged exposure

Image credit: https://www.greatamericanbeerfestival.com/brewers/competition-information/

WHAT'S YOUR STRATEGY?

Assess Organizational Capacity	Elect a Sensory Champion	Establish Stakeholder Buy-In	Define Goals
• People • Space • Time • Materials	• Passion • Skillset • Job Title	• Management Support • Quality • Marketing	• What questions are you trying to answer with sensory analysis?

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IS THIS BEER TRUE-TO-BRAND?

TTB TEST

TRUE-TO-BRAND

- Answers the questions, “Does this beer taste like the way we usually describe this brand?” “Is this beer out of spec?”
- TTB testing should be used for brands consistently produced in the brewery, not for one-off’s
- Binary scoring: Pass/Fail
- Panelists are very familiar with the brand being tested and should be trained and validated on off-flavors in beer
  - Sometimes spiked samples are included with the test samples to keep panelists on their toes!

Image credit: Jon Page, http://allaboutbeer.com/article/sierra-nevada-pale-ale-a-cascading-effect/

TRUE-TO-BRAND

- What does it look like?
  - Panelists are given a baseline of the brand and then rate each production sample or package release sample according to that baseline and give it a pass or fail rating
- Utilize a P-chart (percent defect chart) to track data/batch-to-batch variation (DraughtLab is a program well-equipped for this)
  - P-chart defines:
    - Center Line/Mean: average percent total defect
    - Upper Control Limit: highest you can go in terms of variability w/in a batch for it to be considered TTB, should be quite low if you're making a consistent beer
    - Lower Control Limit: bottom line/zero (0)

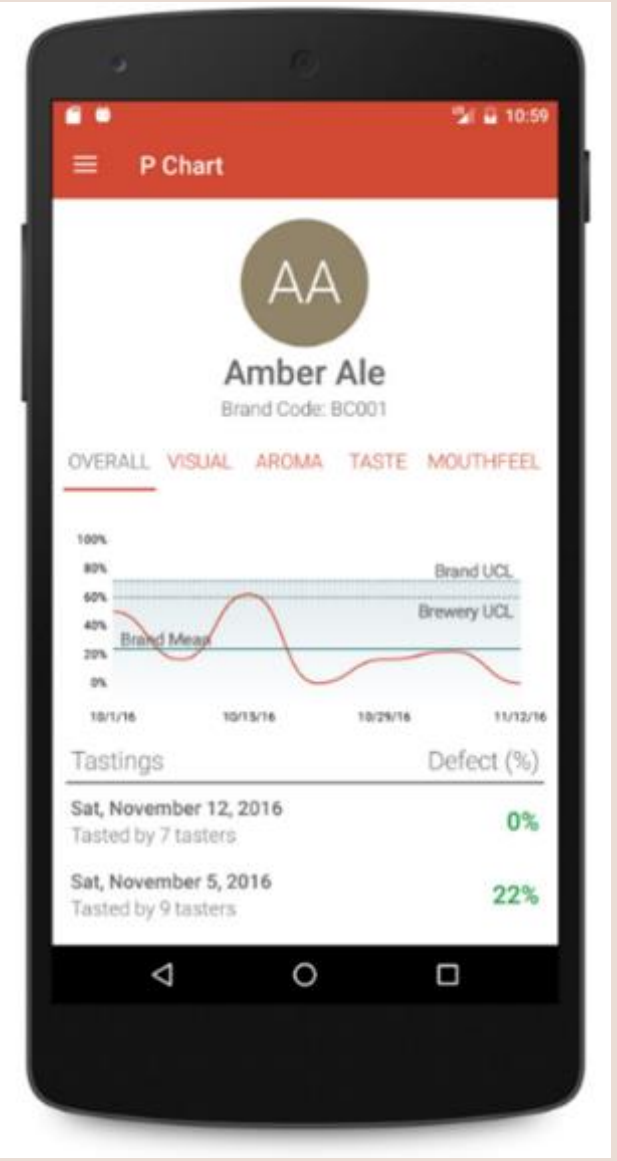


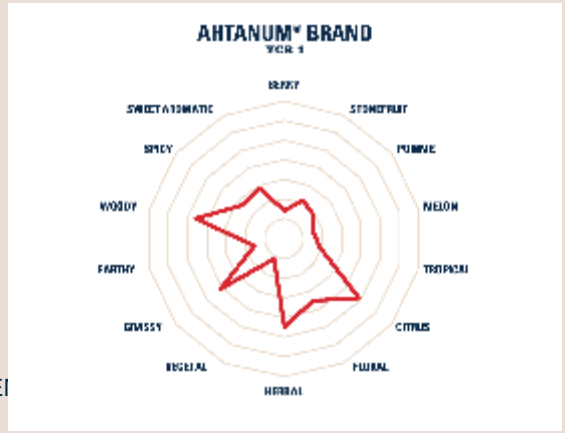
Image credit: https://www.draughtlab.com/blog/pchart

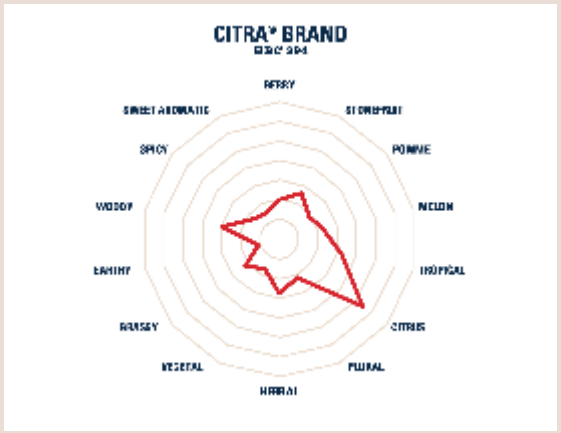
WHAT DOES THIS BEER TASTE LIKE?

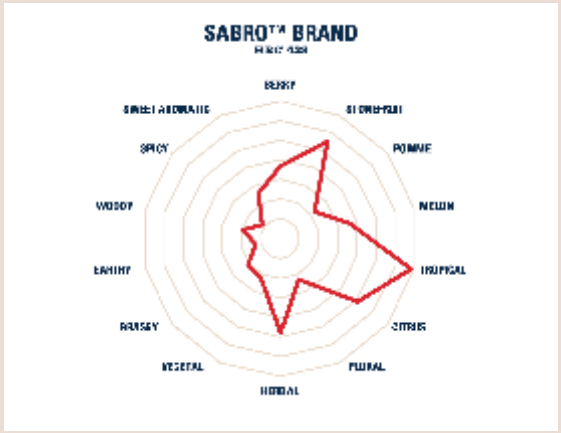
DESCRIPTIVE ANALYSIS

DESCRIPTIVE ANALYSIS

- Answers the very broad question: What does this sample smell or taste like?
- Most useful for:
  - Recipe development
  - Marketing
- What does it look like?
  - It requires highly trained panelists to sit in a booth and fill out long ballots describing every aspect of aroma or flavor of a sample

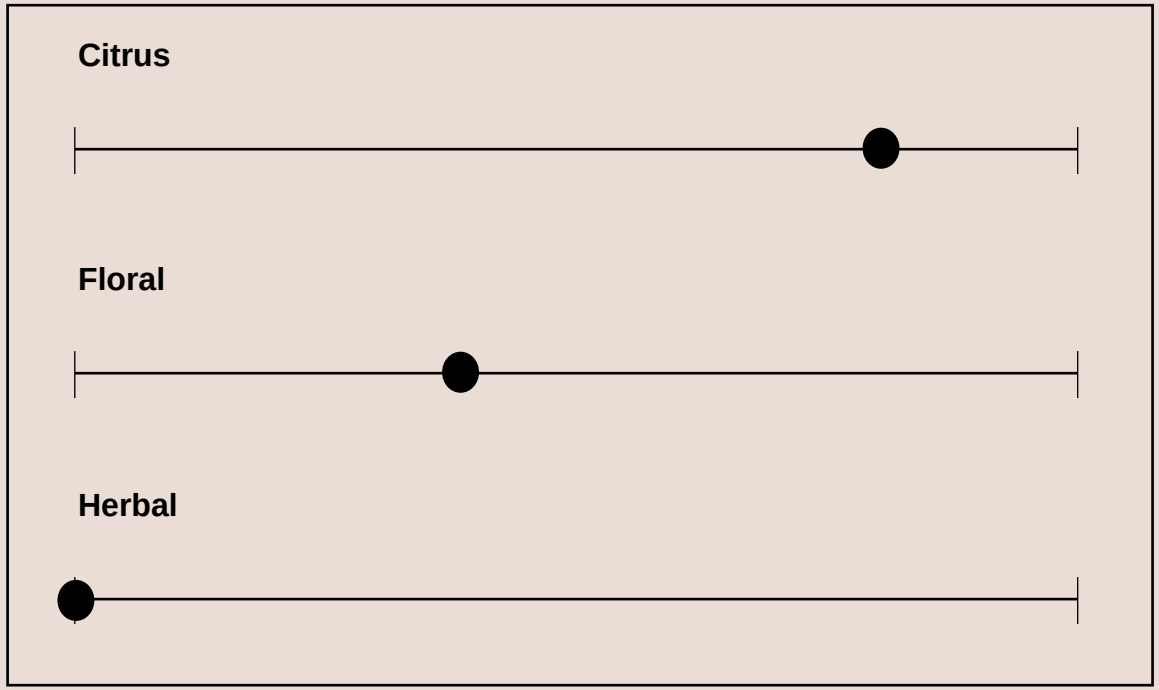






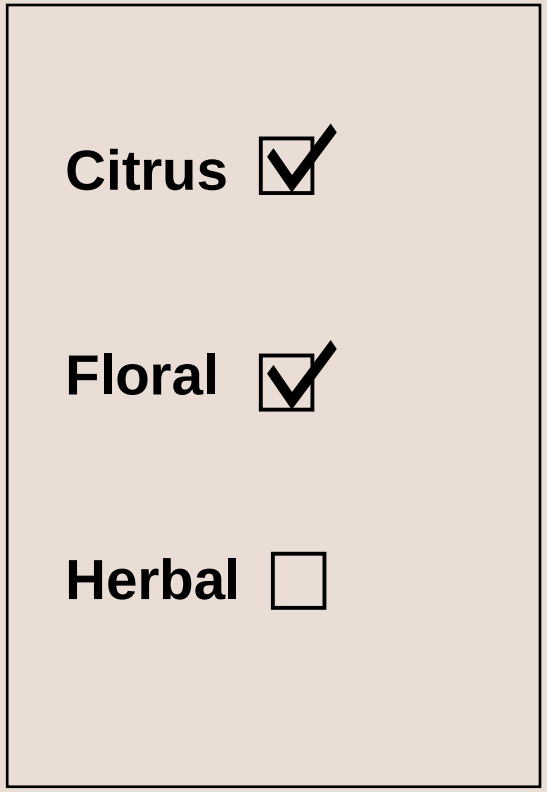
DESCRIPTIVE ANALYSIS: QDA

- Quantitative Descriptive Analysis requires panelists to rank the intensity of each sensory aspect
- The results are then the average of all panelists for each attribute
- Panelist responses can be statistically “normalized” to address the fact that everyone uses the scales a little differently



DESCRIPTIVE ANALYSIS: CATA

- Check All That Apply requires panelists to simply “tick” a box to indicate whether the sample contains any hint at all of each sensory aspect
- In the CATA method, we use the frequency of “ticks” as a proxy for intensity
  - If 9/10 panelists detect citrus, the sample is likely very strong in that character
  - If 3/10 detect citrus, its probably there, but more likely just a hint
- Requires less rigorous training and doesn’t rely on panelists being consistent at reporting intensities, but gives lower-resolution data than QDA



DON’T HAVE THE TIME AND RESOURCES FOR DESCRIPTIVE ANALYSIS?

ROUNDTABLE ASSESSMENT

- Answers the question: “What are people’s general thoughts on this sample?”
  - It can be guided by a moderator to answer more specific questions like “Do people generally like this? What are people’s first impressions? What main flavors pop out?”
- What does it look like?
  - A group of people, sitting around a table, drinking beer
    - Fun fact: the table doesn’t have to be round!
  - Sample is distributed to everyone, and “popcorn style” conversation is guided by a moderator who keeps the conversation flowing in the right direction

ROUNDTABLE ASSESSMENT

- This method is great for getting general feedback, and can act as a solid jumping-off point, but there is little scientific value in the results
  - This test is vulnerable to biases and the impacts of various power dynamics within the group

Image credit: https://nypost.com/2018/12/29/utah/

ARE THESE TWO SAMPLES NOTICEABLY DIFFERENT?

TETRAD TEST

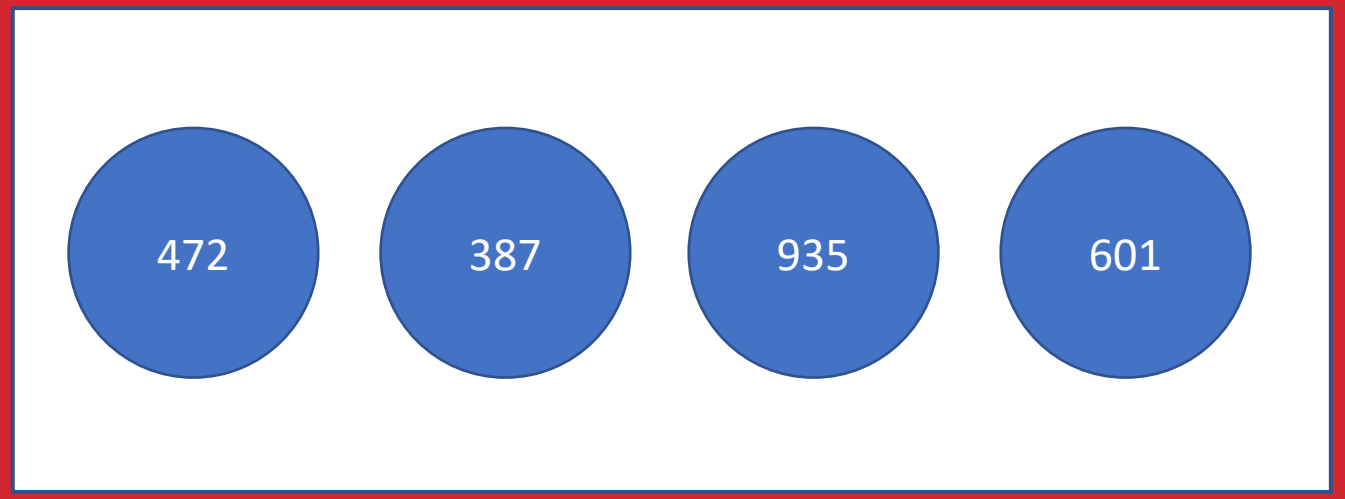
TETRAD TEST

- Answers the question: Are these two samples noticeably different?
- Most useful for
  - Checking a raw material or process change
- This is an example of an “unspecified difference test,” meaning that the nature of the difference is unknown to the assessors.
  - Ex: We are not asking for the assessor to identify the *sweeter* samples, just the samples that are the *same*
- **So what does it look like?**

Image credit: https://sportsguidemag.com/utah-beers-winter/

TETRAD TEST

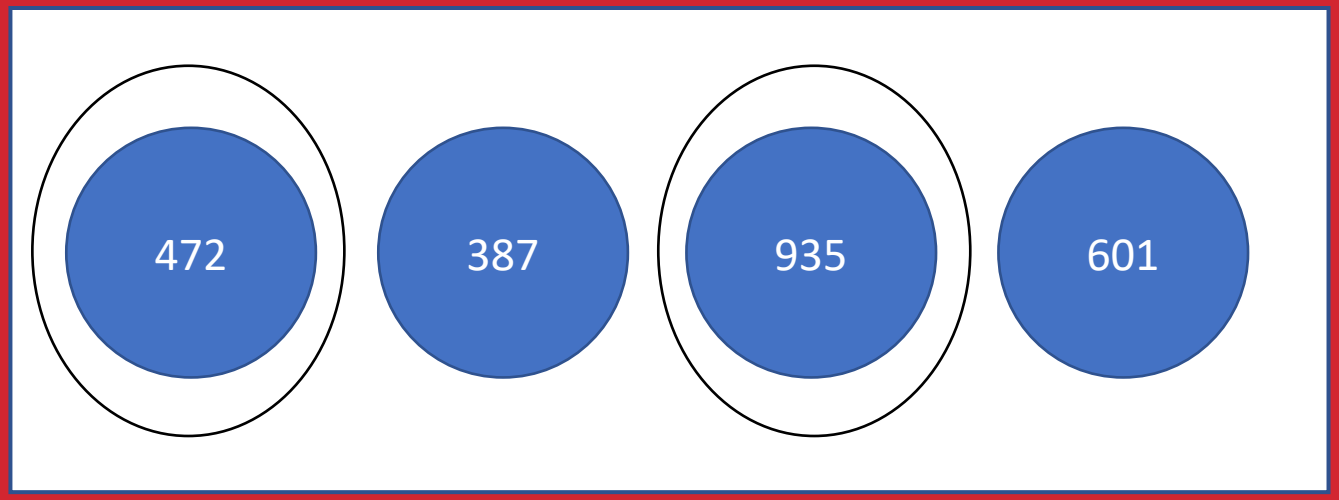
Assessors are presented with 4 samples, each blind coded with a different randomly generated number



The 4 samples are actually 2 sets of 2 pairs.

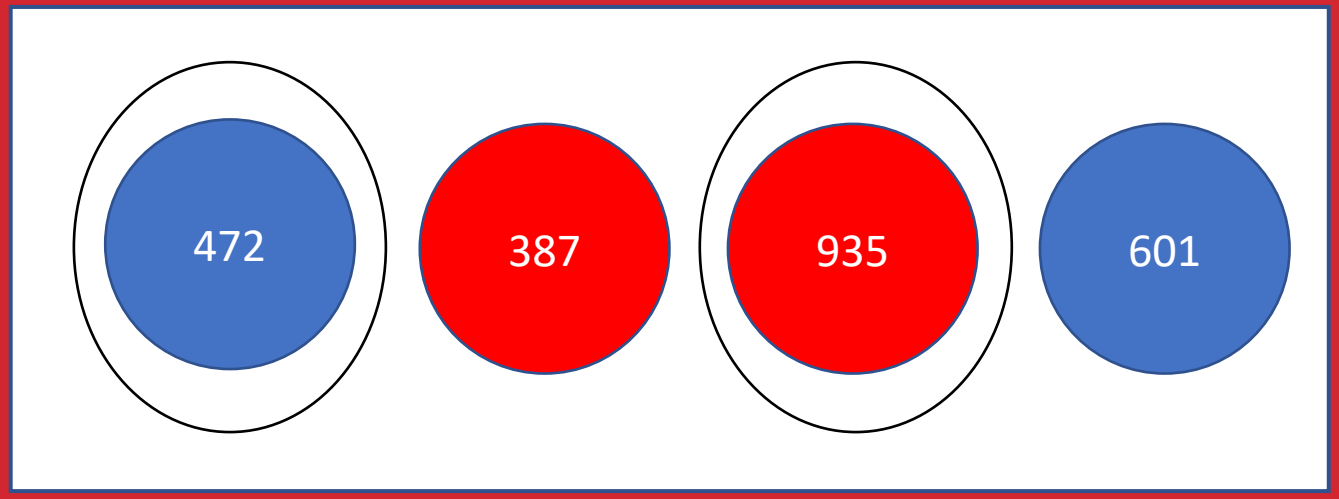
TETRAD TEST

Assessors are asked to smell and/or taste the samples (left to right) and then match the pairs



TETRAD TEST

It is then revealed which samples are actually matching pairs



In this example, the assessor did not successfully match the pairs. But its not a failure! It only means that the samples were too similar for this assessor to distinguish, which still gives us very valuable information.

TETRAD TEST

- With enough people submitting an answer (more assessors = more power), we can determine the statistical probability that the samples are actually different.
- This test type does not require previous training or the use of trained panelists. However, assessors should understand how to conduct the test and complete the ballot and sometimes demographic questions may be asked.
- The tetrad test is a recently published sensory analysis test in the American Society of Brewing Chemists Methods of Analysis (2019)

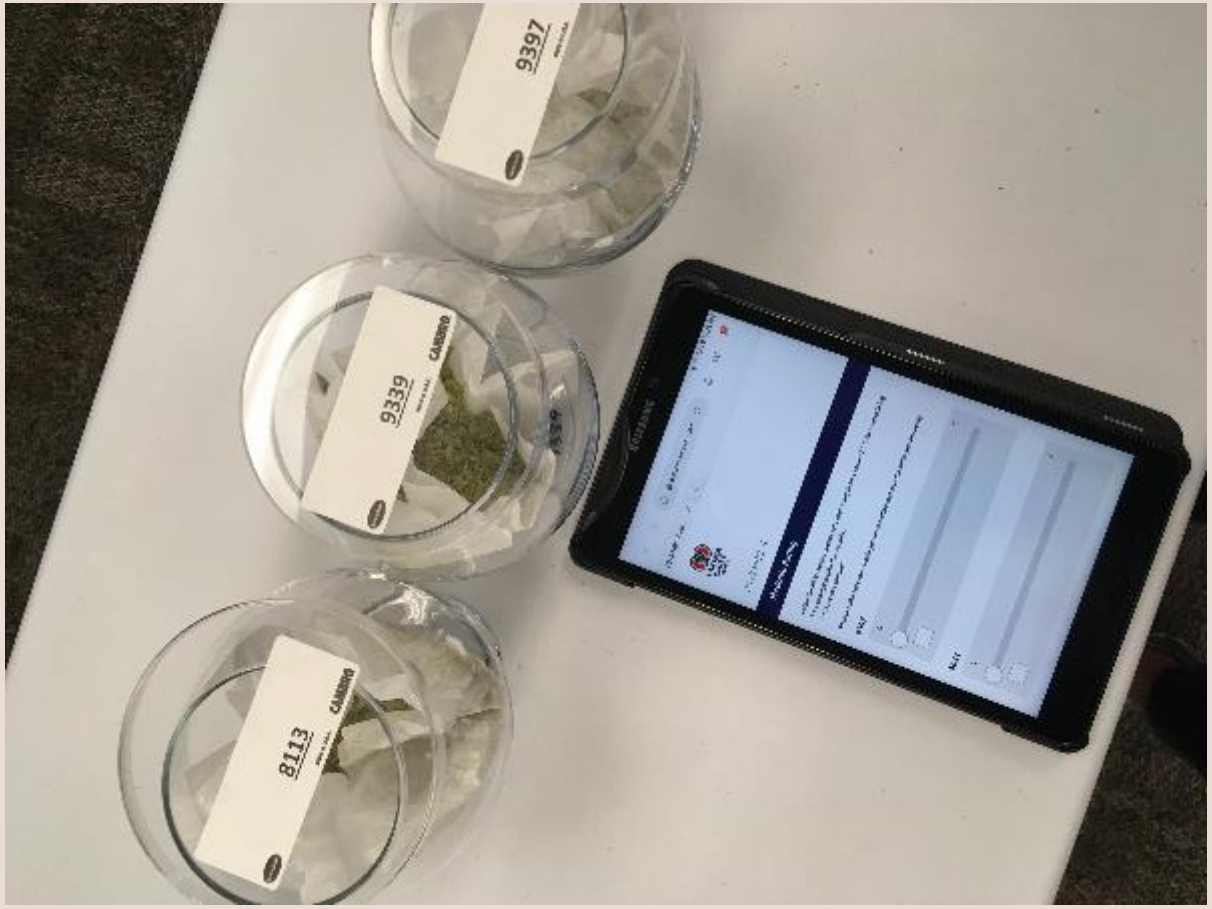
Image credit: http://pinkbootssociety.org/2018

IS THIS BEER GOOD?

PREFERENCE TEST

PREFERENCE TESTING

- Answers the question: Do people *like* this?
  - Or better, *which of these* do people like best?
- Most useful for
  - Choosing between 2 potential versions of a recipe
  - Selecting raw materials (i.e. the hop variety you'd like to feature in your new hazy IPA)
- What does it look like?
  - Present the assessor with two (sometimes more) blind-coded samples
    - Care should be taken that the assessors do not all assess the samples in the same order.
    - Care should also be taken to present an appropriate number of samples for each assessor to reduce the possibility of sensory fatigue.
  - Assessors are asked to either quantify their "liking" or simply to choose which they prefer



CONTACT THE YAKIMA CHIEF SENSORY TEAM!

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RESOURCES AND REFERENCES

- ASBC Sensory Analysis Methods: https://www.asbcnet.org/Methods/SensoryAnalysis/Pages/default.aspx
- Master Brewers Association of the Americas – Good Sensory Techniques for Training a Beer Panel: https://www.mbaa.com/meetings/archive/2012/Proceedings/pages/200.aspx
- Brewer's Association – New Sensory Panel Guide: https://www.brewersassociation.org/association-news/sensory-panel-guide/
- Flavor Reference Standards: https://www.aroxa.com/beer
- Meilgaard, M.C., Civille, G.V., Carr, B.T. (2016). *Sensory Evaluation Techniques* (5th ed.). Boca Raton, FL: CRC Press, Taylor & Francis Group.
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- Beard, J. (2019, August). *Leveraging Sensory Analysis: Best Practices for Consistency & Innovation in Hoppy Beers.* Presentation at Yakima Chief Hops Hop and Brew School, Yakima, WA.
- Barr, Lindsay. (2017, January). Batch-to-Batch Variation in Brewing: Let P-Charts Do the Work. https://www.draughtlab.com/blog/pchart

• AMERICAN HOPS •

FROM THE

PACIFIC NORTHWEST™