



NIH Toolbox
Assessment of Neurological and Behavioral Function

Taste Perception

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For more information, please visit www.nihtoolbox.org
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Conceptual Definition



For Toolbox, taste perception is defined as sweet, salty, sour, bitter, or umami tastes arising from either whole-mouth stimulation of taste receptors or regional stimulation of the front, sides, and rear of the tongue.

Taste Team Members



- Linda Bartoshuk, University of Florida
- Gary Beauchamp, Monell Chemical Senses Center
- Paul Breslin, Monell Chemical Senses Center
- Susan Coldwell, University of Washington
- Valerie Duffy, University of Connecticut
- James Griffith, Northshore University Health System
- Lloyd Hastings, Osmic Enterprises
- Howard Hoffman, National Institute on Deafness and Other Communication Disorders
- Julie Mennella, Monell Chemical Senses Center
- Michael O'Mahony, University of California at Davis
- Marcia Pelchat, Monell Chemical Senses Center
- Gregory Smutzer, Temple University

Assessment Types Considered



- ◆ Sensitivity
 - Detection threshold
 - Discrimination ability (forced choice, ranking)
 - Intensity ratings
- ◆ Hedonic (liking) evaluation
 - Ranking
 - Two-alternative forced choice
- ◆ Taste identification
- ◆ Anatomic
- ◆ Genetic

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Other Considerations



- ◆ Region to test (whole mouth vs. localized)
- ◆ Quality to assess (bitter, sweet, sour, salty, umami)
- ◆ Delivery mechanism to use
- ◆ Chemicals to use in testing
- ◆ Concentrations to use in testing

Toolbox Considerations



- Assessment of young children will likely need to focus on hedonics
- Population norms, reliability and validity are available for very few measures in taste
- There are none to few widely accepted measures
- Liquid stimulus delivery preferred to dry presentation

Measures Selected



- Taste Intensity Assessments
 - Taste Intensity (whole mouth)
 - Regional Taste Sensitivity (front and rear)
 - PROP Taste Intensity
- Sweet Taste Preference
 - Ranking or a Two-Alternative Forced Choice method

Taste Intensity (Whole Mouth)



- Selected the General Labeled Magnitude Scale (gLMS)
- Sweet (Sucrose)
- Salty (Sodium Chloride)
- Bitter (Quinine HCl)
- Sour (Citric Acid)

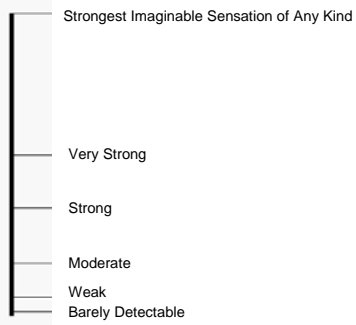
Taste Intensity (Whole Mouth)



Adapting from the protocol developed for the Beaver Dam Offspring Study (Karen Cruickshanks, PI)

- Liquids instead of filter paper
- PROP assessed separately
- Modified instructions
- Development work being conducted by Valerie Duffy

General Labeled Magnitude Scale



Like vs. Dislike for Young Children



Validation of Intensity Test



- Zero, 0.1 M, and 0.32 M NaCl will be presented in testing
- Assess for differential ratings to these three levels of salt solution
- For child testing, sucrose should be liked and quinine disliked

Regional Taste Sensitivity



- Using the gLMS scale
- Rating 1 mM quinine HCl applied to tongue tip
- Rating 1 mM quinine HCl applied to the rear of the tongue
- Method currently used by Valerie Duffy
- Some validity data exist for this type of measure

PROP Taste Intensity Test



- gLMS scale
- Rating of a control taste strip
- Rating of a strip with 400 nmoles PROP

Validation of PROP Test



- Will correlate with filter paper method
- ~70% to 75% of the population should discriminate between control and PROP

Sweet Taste Preference



- Ranking of five solutions considered
- Short version of the two-alternative forced choice tracking method proposed
- Reliability of the short version being assessed with existing data (Julie Mennella)
- Some validity data exist for these types of measures



Summary



- Selected three intensity measures
 - Taste Intensity (Whole Mouth)
 - Regional Taste Sensitivity
 - PROP Taste Intensity
- Sweet Taste Preference
 - Using existing data to make a recommendation on method



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“Building the Toolbox: Taste Perception”

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