10th Pangborn Sensory Science Symposium
Rio de Janeiro, Brazil
August 15th, 2013

The Institute for Perception

It Wouldn't Have Been Possible Without You: The Story of John Ennis' Research

John M. Ennis

The Institute for Perception

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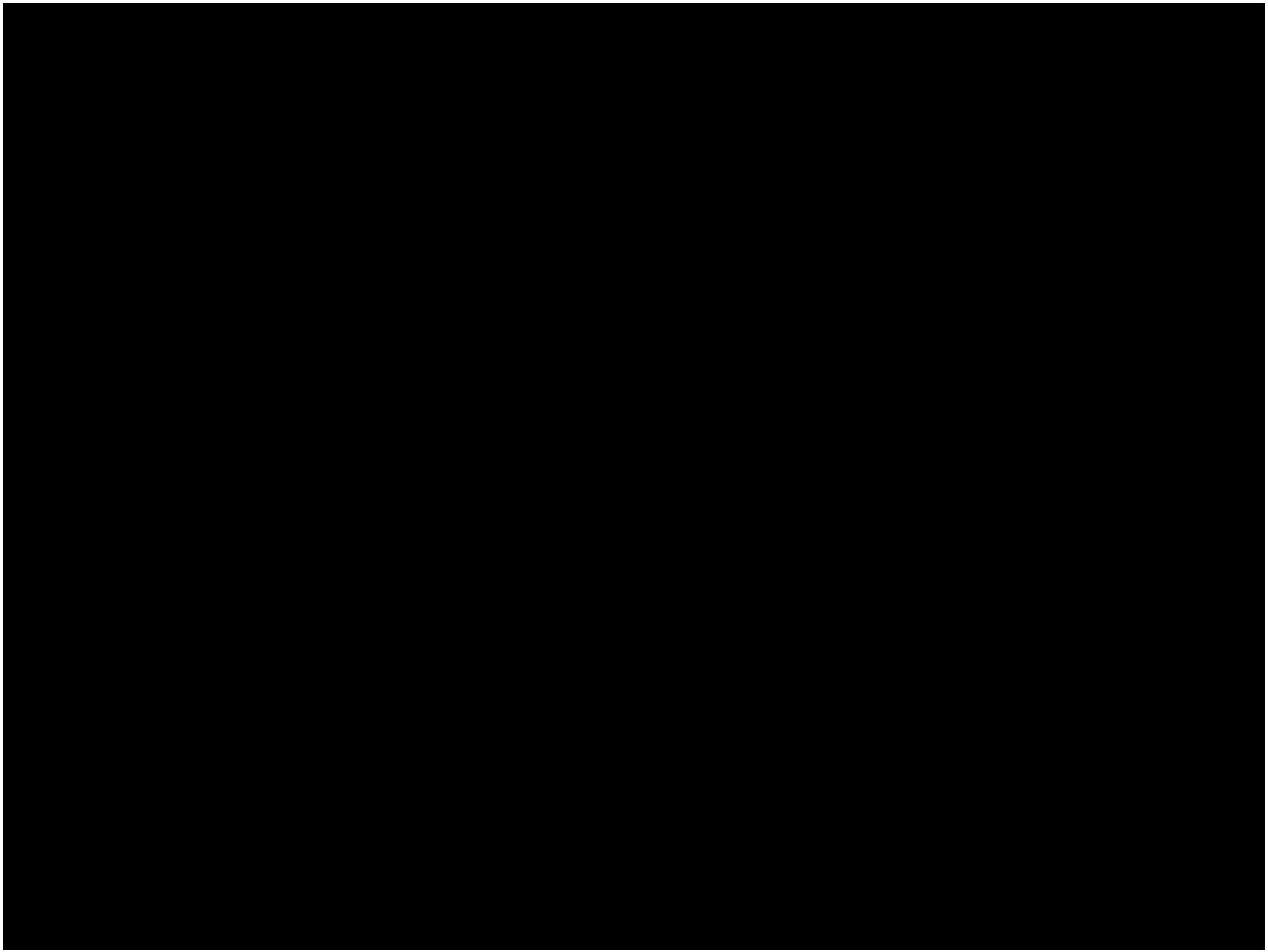
First some lessons from dancing…



Then a few thoughts to begin

"We must find time to stop and thank the people who make a difference in our lives."

John F. Kennedy

"You are the average of the five people with whom you spend the most time."

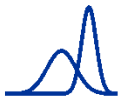
Jim Rohn

"Alone we can do so little; together we can do so much."

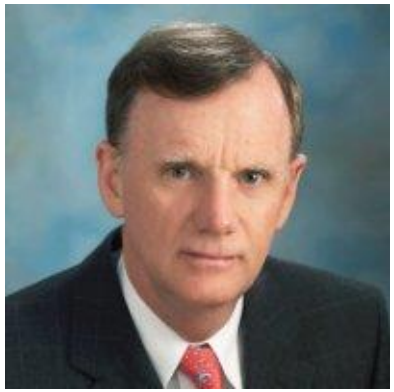
Helen Keller

"Every beginning is weak."

Irish Proverb

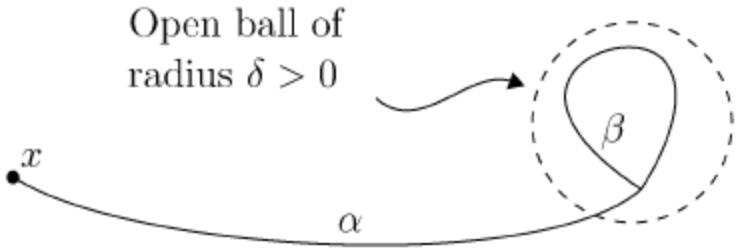


Early work on difference testing



- Ennis, J. M., Ennis, D. M., Yip, D. & O'Mahony, M. (1998). Thurstonian models for variants of the method of tetrads. *British Journal of Mathematical and Statistical Psychology*, 51, 205-215.
- Bi, J., Templeton-Janik, L., Ennis, J. M., & Ennis, D. M. (2000). Replicated difference and preference tests: How to account for inter-trial variation. *Food Quality and Preference*, 11, 269-273.

Graduate school in mathematics



- Ennis, J. M. & Wei, G. (2006). Describing the universal cover of a compact limit. *Differential Geometry and its Applications*, 24(5), 554–562.
- Ennis, J. M. & Wei, G. (2010). Describing the universal cover of a noncompact limit. *Geometry & Topology*, 14, 2479-2496.

Psychology and neuroscience

- Ashby, F. G. & Ennis, J. M. (2006). The role of the basal ganglia in category learning. *The Psychology of Learning and Motivation*, 46, 1-36.
- Ashby, F.G., Ennis, J. M. & Spiering, B. (2007). A neurobiological theory of automaticity in perceptual categorization. *Psychological Review*, 114(3), 632-656.

Transitioning back to sensory through sensometrics

- Ennis, D. M., Ennis, J. M., Palen, J., & Lampe, R. (2008). Confidence bounds for positive ratios of normal random variables. *Communications in Statistics - Theory and Methods*, 37, 307-317.
- Ennis, D. M. & Ennis, J. M. (2009). Hypothesis testing for equivalence based on symmetric open intervals. *Communications in Statistics - Theory and Methods*, 38(11), 1792-1803.
- Ennis, D. M. & Ennis, J. M. (2010). Equivalence hypothesis testing. *Food Quality and Preference*, 21(3), 253-256.

Learning from the best at ASTM

Excellent collaborators

- Nestrud, M. A., Ennis, J. M., Fayle, C. M., Ennis, D. M., & Lawless, H. T. (2011). Validating a graph theoretic screening approach to food item combinations. Journal of Sensory Studies, 26(5), 331-338.
- Ennis, J. M., Fayle, C. M., & Ennis, D. M. (2012) . Assignment-minimum clique coverings. Journal of Experimental Algorithmics (JEA). 17(1), 1.5:1-1.5:17.

Sensometrics in Rotterdam

- Ennis, J. M., Fayle, C. M., & Ennis, D. M. (2012). eTURF: A competitive TURF algorithm for large datasets. *Food Quality and Preference*, 23(1), 44-48.
- Ennis, D. M. & Ennis, J. M. (2012). Accounting for no difference/preference responses or ties in choice experiments. *Food Quality and Preference*, 23(1), 13-17.
- Christensen, R. H. B., Ennis, J. M., Ennis D. M., & Brockhoff, B. (*2013)* Paired preference data with a no-preference option - statistical tests for comparison with placebo data. *Food Quality and Preference*.

Substantiating sensory-based advertising claims

- Ennis, J. M. & Ennis, D. M. (2011). Confidence bounds for multiplicative comparisons. *Communications in Statistics: Theory and Methods*, 40(17), 3049-3054.
- Ennis, J. M., & Ennis, D. M. (2012). A comparison of three commonly used methods for treating no preference voes. J*ournal of Sensory Studies*, 27(2), 123-129.
- Ennis, J. M. & Ennis, D. M. (2012). Justifying count-based comparisons. *Journal of Sensory Studies*, 27(2), 130-136.

A month in Holland

- Ennis, J. M. & Jesionka, V. (2011). The power of sensory discrimination methods revisited. *Journal of Sensory Studies*, 26(5), 371-382.
- Worch, T. & Ennis, J. M. (2013) Investigating the single ideal assumption using Ideal Profile Method. *Food Quality and Preference*, 29, 40-47.
- Jesionka, V., Rousseau, B., & Ennis, J. M. (*in press*) Transitioning from Proportion of Discriminators to a more meaningful measure of sensory difference. *Food Quality and Preference*.

Meeting the world in Toronto

- Nestrud, M. A., Ennis, J. M., & Lawless, H. T. (2012). A group level validation of the supercombinatorality property: Finding high-quality ingredient combinations using pairwise information. *Food Quality and Preference*, 25(1), 23-28.

Building collaborations and friendships

- Jervis, S. M., Ennis, J. M., & Drake, M. A. (2012) A comparison of adaptive choice-based conjoint and choice-based conjoint to determine key choice attributes of sour cream with limited sample size. *Journal of Sensory Studies.* 27(6), 452–462.

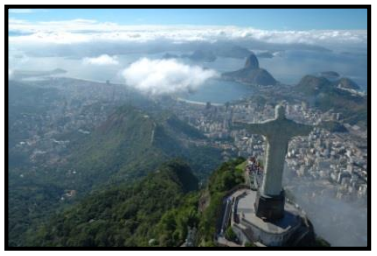
A breakthrough year for Tetrad testing

- Ennis, J. M. (2012) Guiding the switch from triangle testing to tetrad testing. *Journal of Sensory Studies*. 27(4), 223–231.
- Garcia, K., Ennis, J. M., and Prinyawiwatkul, W. (2012) A large-scale experimental comparison of the tetrad and triangle tests in children. *Journal of Sensory Studies*. 27(4), 217–222.
- Ennis, J. M. & Christensen, R. H. B. (*2013*) Precision of measurement in Tetrad testing. Submitted to *Food Quality and Preference*.
- Rousseau, B. & Ennis, J. M. (*in press*) The importance of correct instructions in the Tetrad test. *Journal of Sensory Studies*.

Continued growth

- Ennis, D. M. & Ennis, J. M. (2013) A Thurstonian ranking model with rank-induced dependencies. *Journal of Classification*. 30, 124-147
- Ennis, D. M. & Ennis, J. M. (2013) Analysis and Thurstonian scaling of applicability scores. *Journal of Sensory Studies, 28(3),* 188-193.
- Ennis, J. M. (2013) A Thurstonian analysis of the Two-Out-of-Five test. *Journal of Sensory Studies*, 28(4), 297-310.
- Ennis, D.M., & Ennis, J. M. (*in press*) Multivariate mapping of hedonic data: A process perspective. *Journal of Sensory Studies*.

Parting words



- To the entire sensory community,

Thank you for your love and support…

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