This is an excerpt from a report on the Perceptual Learning and Perceptual Recognition II Workshop at the University of Toronto, Mississauga in May of 2012, written by Kevin Connolly, John Donaldson, David M. Gray, Emily McWilliams, Sofia Ortiz-Hinojosa, and David Suarez, and available at http://networksensoryresearch.utoronto.ca/Events_%26_Discussion.html

1. How Should We Demarcate Perceptual Learning from Perceptual Development?

Eleanor Gibson defines perceptual learning as, "any relatively permanent and consistent change in the perception of a stimulus array, following practice or experience with this array" (1963, p. 29). Consider two such examples from William James. James writes, "One man will distinguish by taste between the upper and lower half of a bottle of old Madeira. Another will recognize, by feeling the flour in a barrel, whether the wheat was grown in Iowa or Tennessee" (1890, p. 509). These are examples of perceptual expertise. However, ordinary perceptual development—such as the natural improvement of visual acuity in children—is a relatively permanent change in the perception of a stimulus array, following practice or experience. Does ordinary perceptual development then count as perceptual learning?

During the workshop, Daphne Maurer proposed a way to demarcate perceptual learning from perceptual development. There is, on the one hand, developmental tuning—a kind of change which is primarily due to pruning and is the consequence of maturation. For example, children get worse at discriminating non-native speech sounds as they grow older. Their perceptual systems become tuned to native speech sounds. On the other hand, when we speak of perceptual learning, we are generally talking about adults, or about certain kinds of perceptual training with children. In perceptual learning, one intervenes in the system in order to get better at a certain task. For example, Rob Goldstone's talk outlined how people who have learned enough mathematics attend to mathematical equations in a way that follows the order of operations. So, for instance, if they are given the equation 5 + 3 x 7, they attend to the "x" before the "+" since that's the order in which the problem gets solved. This led him to suggest that one

can train perception and action systems "to do the right mathematical thing."

Maurer admitted that her way of demarcating perceptual learning from perceptual development presupposes that during development a child's brain is plastic and easily changeable, while during adulthood things are less plastic and much harder to change. Michael Rescorla challenged this view, and Maurer granted that if we drop this assumption, perhaps the kinds of perceptual learning we have distinguished begin to blur.

References:

Gibson, E. J. (1963) "Perceptual learning." *Annu. Rev. Psychol*. 14, 29–56.

James, William (1890). *The Principles of Psychology.* New York: Henry Holt and Company.