

Presenter: Alex Kloth

Date: Thursday, June 4, 2009 at 9:00 AM

Location: Guyot 1

WANG LAB TOPICAL REVIEWS – SUMMER 2009

SESSION 1: PERCEPTION AND AUTISM

Autistic persons have notable problems in social interactions, language capacity, and perception. Could perceptual problems underlie the other two deficits?

At autism's core is a profound deficit in "theory of mind," the ability to form a model of the mental states of others. Absence of the theory-of-mind capacity may play a critical role in the ability to empathize with others or to engage in moral reasoning. At the same time, some functions appear to be within normal limits, such as basic sensation and the ability to make plans and act upon them.

Yet other disabilities appear in autistic persons: perceptual deficits. Autistic people often show perceptual deficits such as inappropriate degree of sensitivity to routine sounds and even the sensation of their own clothing. In one report Temple Grandin writes of her own experience as an autistic person: "... loud noises were also a problem, often feeling like a dentist's drill hitting a nerve. They actually caused pain. I was scared to death of balloons popping...Minor noises that most people can tune out drove me to distraction...My roommate's hairdryer sounded like a jet plane taking off..." L. H. Willey, who has Asperger's syndrome, has written: "I found it impossible to even to touch some objects. I hated stiff things, satiny things...Goose bumps and chills and a general sense of unease would follow."

Perception of salient and unusual events may play an integral role in the formation of capacities such as the ability to have a theory of mind. Indeed, perceptual dysfunction and empathetic deficits may share common developmental causes. Klin et al. (2009) report on a perceptual deficit occurring at an early age in autistic children.

Primary reading:

Klin A, Lin DJ, Gorrindo P, Ramsay G, Jones W (2009) Two-year-olds with autism orient to non-social contingencies rather than biological motion. *Nature* 459:257-261.

<http://www.nature.com/nature/journal/v459/n7244/full/nature07868.html>

<http://www.nature.com/nature/journal/v459/n7244/edsumm/e090514-10.html>

<http://www.nature.com/nature/journal/v459/n7244/full/7244138a.html>

Other readings on autism and its neuroanatomical substrates (*=read these first):

*Baron-Cohen S, Belmonte MK (2005) Autism: a window onto the development of the social and the analytic brain. *Annual Review of Neuroscience* 28:109-126.

<http://www.ncbi.nlm.nih.gov/pubmed/16033325>

*Palmen SJMC, van Engeland H, Hof PR, Schmitz C (2004) Neuropathological findings in autism. *Brain* 127:2572-2583. <http://brain.oxfordjournals.org/cgi/content/full/127/12/2572>

Allen G (2006) Cerebellar contributions to autism spectrum disorders. *Clinical Neuroscience Research* 6:195-207. (PDF available by Google Scholar search on article title in quote marks)

Amaral DG, Schumann CM, Nordahl CW (2008) Neuroanatomy of autism. *Trends in Neuroscience* 31:137-145. <http://www.ncbi.nlm.nih.gov/pubmed/18258309>

Brushing up on cerebellum and amygdala:

Bell CC, Han V, Sawtell NB (2008) Cerebellum-like structures and their implications for cerebellar function. *Annual Review of Neuroscience* 31:1-24. <http://www.ncbi.nlm.nih.gov/pubmed/18275284>

Phelps EA, LeDoux JE (2005) Contributions of the amygdala to emotion processing: from animal models to human behavior. *Neuron* 48:175-187. <http://www.ncbi.nlm.nih.gov/pubmed/16242399>