Objects: A Case Study

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Introduction
- Face processing deficits in autism related to:
  1. Social aversion
  2. Visual/auditory processing bias to focus on local elements that interfere with holistic/group processing
- Can visual processing expertise training with novels objects induce plasticity in the impaired system of an autistic adult?
- Goal: Back door strategy to boost holistic/global processing of perceptually homogenous visual stimuli and avoid issues of social aversion related to faces.

TDLC Strands
- 2.3 How does experience shape the dynamics involved in perceptual decisions
- 4.1 Integrative Projects – can general principles account for specialization in the visual system

Participant
- 28-year-old high functioning adult with autism
- Graduated from high school with some community college courses
- No identifiable genetic, metabolic, or infectious etiology for his disorder
- Free of birth and traumatic brain injury and sequelae
- VIQ = 123, PIQ = 114, FSIQ = 121
- ADOS: Social = 8, Communication = 5, Total = 13
- Graduated from high school with some community college courses
- No identifiable genetic, metabolic, or infectious etiology for his disorder
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- VIQ = 123, PIQ = 114, FSIQ = 121
- ADOS: Social = 8, Communication = 5, Total = 13
- Can
- Passively viewing blocked
-ADOS scores dropped dramatically 5 years after training
- Graduated from high school with some community college courses
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Expertise Training: Greebles
- 16 sessions of training over the course of 1 month in the lab accompanied by 2nd author
- Learned to recognize 10 individual Greebles by name and to categorize 30 Greebles into 2 different genders
- Expertise training was based on methods described in Gauthier et al. (1999) and Behrmann et al. (2005).
- Temporal dynamics of learning evaluated across 5 timepoints
- Family 1: “Dan” “Bill” “Ken” “Rob” “Jim”

Successful Expertise Training with Greebles
- Mean RT (msec)

Testing Generalization of Learning
- Visual discrimination task
- Different trials contain multiple levels of increasing perceptual similarity
- Expertise indicated by subordinate level shift (no cost in RT to discriminate stimuli at the individual and subordinate levels of categorization)

Generalization of Learning: Long Term Effects for Face Processing
- Corrected p < .005
- Significant changes in related activation
- Selective activation RH-LH

Increasing Localization of Face-Selective Activation
- Localizer 2003 (2 yrs before intervention)
- Localizer 2007 (9 mos after intervention)
- Significant changes in face-related activation

Conclusions
- HFA adult able to acquire some visual processing expertise with novel objects
- Expertise for Greebles most evident immediately following training and was temporally short-lived, decreasing to novice levels by 9 months following the training
- Expertise in face perception increased throughout training and was maintained even 5 years after training
- Common object processing not affected by training
- Dramatic localization of face-related activation 9 months after training, with specific increases in the left FFA and bilaterally in the posterior cingulate
- ADOS scores dropped dramatically 5 years after training
- Pre total = 13, 5 years after total = 8
- Visual/auditory expertise training with novel objects that encourages individuation and holistic processing may help remediate the deficits in face processing in autism that are long-lasting.