HOW DO WE BECOME SOCIALLY SKILLED?

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Why study development?

“explaining [physics] is child’s play compared to [explaining] child’s play”

– Albert Einstein

The rest of the psychological and behavioral sciences are algebra
The study of development is calculus

Modeling the trajectory of complex, multi-factorial phenotypes
Why study development?

Real-world importance
Better treatment for individuals w/ disabilities
Potential to improve education & parenting
Improve lives of infants/children/adolescents at risk

Theoretical importance
To understand any trait, you have to understand how it emerges
Development of social skills

Complex, diverse, multivariate

What sorts of skills?

- Hunting/foraging/feeding
- Playing
- Mating
- Parenting
- Aggression/dominance
- Kin recognition
- Communicating
Kin recognition

Learn that some things are "like you," and some of these will help you survive

How do you know what's a person?
How do you know which of these are caregivers?
What do people look like?

How do they move? Point-light display:

What do these demonstrate?
When do infants recognize human motion?

Bertenthal et al. (1987): 3-month-olds' discrimination of biological motion (walking patterns)

- same lights
- same motion
- scrambled locations
What do *specific* people look like?

Do infants discriminate a parent’s face from a stranger's?
When do infants start responding to face-like shapes? (<1 week)
Smiling "at" people? (3 months)
Stranger anxiety, preferential affection (7-9 months)

Test: *Habituate* to stranger #1;
then *Dishabituate* to stranger #2 or mother
(Layton & Rochat, 2007)

What is *habituation*?
What is *dishabituation*?
4 months: no reliably different response (mom vs. stranger #2)

8 months: more dishabituation to mom's face (still or moving)

So young infants can't recognize parent??

They probably can using multiple cues

Suggests that face representations improve from 4 to 8 months
What does kin recognition buy you?

• Survival

• *Attachment* relationship
  – John Bowlby (1969): 'emotional tether'
  – Facilitates exploration and learning

• How are these emotional states controlled?
Neural control of emotion and regulation of infant-parent behaviors

Important concept: neuromodulation
Some neuromodulatory systems

- Dopamine (Da)
- Norepinephrine (Ne)
- Serotonin (5-HT)
- Acetylcholine (ACh)

Others (neuropeptides; hormones)
- Oxytocin
- (many others – e.g., endogenous opiates; andogens)
Neuromodulation of social reward

How social processes become rewarding

Studies in mice suggest that social behavior in humans occurs because of the connections between oxytocin and the reward-based dopaminergic system, which presumably mediates the ability of humans to notice, seek, remember, and return to rewarding experiences of all types—in this case social contact.

The oxytocin-dopamine link

The PVN synthesizes and releases oxytocin into the dopaminergic VTA, which increases the excitability of VTA dopamine neurons that project into the NAcc. This increases the release of dopamine in the NAcc and, presumably, the motivation to seek social contact.

PVN = Paraventricular nucleus in hypothalamus
VTA = ventral tegmental area in midbrain
Does Oxy correlate with parent-infant interaction?

Oxy neuromodulation is related to the 'tone' (reward, salience) of parenting behaviors

Feldman et al. (2010)
What does kin recognition buy you?

- Survival
- *Attachment* relationship
  
  John Bowlby (1969): 'emotional tether'
  Facilitates exploration and learning
  Shaped by neuromodulation

- Is this enough? No:
  - Interaction lets infants learn to *communicate*
  - Communication skills for: peer interaction, aggression, mating, parenting, skill learning, etc.
Communication requires "common ground"
How is it established?

Attention-sharing

• Look where someone is looking

• Get someone to look where you’re looking

• Important for teaching & learning
Gaze-following: Early attention-sharing skill

Around 8-12 months

Why does it matter?

Learn what’s important to other people

Figure out what they mean
What is attention sharing for?

• Learning skills?
  – Watch what skilled conspecifics (e.g. parents) *do*: safe way to learn how to interact with the world

• Learning language

**Attention-sharing skill ->
Social & non-social skills [language!] ->
Learning more skills (e.g., reading)**
How could this work?

How could attention-sharing help infants learn what an adult is talking about?
How attention-sharing could help infants learn language

- Problem: You say a word. How do I know what you mean?
- "Gavagai" problem...

- Partial solution: What you are looking at...
• 18-month-olds associate word with object only in *shared* attention context (Baldwin, 1991, 1993)
  - Non-shared: ignore word *or* see what adult is looking at
  - 14-month-olds: do not seem to consider adult's attention

• By 18 months expect adults to talk about objects of shared atten.
What we covered

• Infants learn what people look like, and how they move
  – Individuals as well as people in general
  – Important for attachment: explore (learn) & survive

• Infant-adult interactions: necessary for learning and development
  – affected by neuromodulation
    • mechanisms that adjust mood, state, and learning

• Communication requires "common ground"
  – Attention-sharing
    • Learning skills from attending to others
  – Learning language & shared meaning!
Questions?

Visit our lab page: cogdevlab.ucsd.edu