How infants learn social skills

Gedeon O. Deák
Department of Cognitive Science
& Center for Human Development
University of California, San Diego
but first

why study development?
reasons to study development

- disabilities, treatment, education
- to understand adult traits, must know how they emerged
- complex skills emerge as history ↔ biology product
- hardest problem in social or biological sciences...
  - “explaining [quantum physics] is child’s play compared to [explaining] child’s play”

New Hints Into the Biological Basis of Autism

Last month, with the mayor of Sacramento and a crowd of some 500 parents and support-ers looking on, construction crews broke ground on a $44.4-million, 100,000-square-foot facility designed to do something unprecedented: provide a state-of-the-art comprehensive clinic and research center to diagnose, treat, and study children with autism. This $85.8 million facility, funded by the state of California, is a sign of the increas-ing research emphasis on autism, a mysterious disorder that keeps children from interacting socially and emotionally—and the power of parent advocates, who lobbied the state legislature to raise the funds.

Autism was long a poorly understood condi-tion, rarely discussed. But that changed when advocacy groups began promoting research into its causes and possible treat-ments. In Hollywood, a movie mogul with an autistic son set up a tissue exchange bank. A New Hampshire mother of an autistic boy promoted a possible cure for autism (see sidebar on p. 37), triggering a media frenzy that prompted the National Institutes of Health (NIH) to jump-start clin-ical trials at record pace. In numerous congres-sional hearings, Representative Pete Stark, $42 million network of collaborative pro-grams of excellence for autism. Next month, the first large, interdisciplinary meeting of researchers interested in autism will be held in conjunc-tion with the Society for Neuro-science meeting.

The political momentum isn’t flagging either. January marked the formation of a congressional caucus for autism, currently boasting 120 members. “This is a period of mobilization for autism research,” says David Amaral, director of the Medical In-vestigation of Neurodevelopmental Disor-ders (MIND) Institute, whose clinic is being expanded at UC Davis.

And this increased attention is paying off, Amaral says. After years of frustration because of autism’s confusing array of

A world apart

First described in 1943, autism’s primary mani-festation is an impaired ability to relate socially with other people, al-though it almost always comes with other debili-tating symptoms. Autism is associated with lan-guage problems, and those who speak largely do so in a monotone. Peo-ple with autism also seem to have trouble infering what other people think and feel. “These people are very childlike,” says Nancy Minshew, a neu-rologist at the University of Pittsburgh School of
another reason:

rhetoric & folk-beliefs about human development in political/religious/economic discourse:

– sign seen around Poway: “Vote Yes on 8: Protect our children”
  • any scientific evidence that extending civil rights to gay/lesbian couples places children at risk?
  • What assumptions does the QUESTION make about development? learning? how adolescents develop sexual preferences and behaviors?
– an (unsupported) claim about *social development*
how does brain develop knowledge of social behavior?
where social *routines* and *knowledge* come from

- examples?
- when do we see social responses? enjoyment? learning?
a social skill “complex”

attention sharing:
  roots of teaching and learning
  – what is it?
  – who does it?
  – where does it come from?
what is attention-sharing?

- do you see what i see?
- looking where someone is looking

- getting someone to look where you are…

- how do we do it?
Attention-sharing in infants: gaze following (looking where someone is looking)

- why does it matter?
  - use another person to infer what’s important
  - figure out reference & meaning
  - how difficult is this?
What’s important to a lemur? 

→ WHEN, WHY do lemurs watch each other?

→ Left: still looking-times

→ Right: moving looking-times

H = human; L = lemur; F = food; E = environment
Lemur see, lemur...see.
Getting someone else to look: Merv makes his point

¬ Is pointing a special human social skill?
  – No, but how we use it is!
  – Used to show, not to get

(photo by David Leavens)
how attention sharing (AS) emerges

- between 9 and 18 months...
  - product AND engine of learning
- how AS emerges
Modeling the Emergence of Shared Attention

\[ \text{do \ [early abilities] + \ [structured environment] => AS skills?} \]

- early abilities:
  - perception (gaze-shifting; face-perception)
  - emotion (prefer social interaction)
  - learning: (visual “reward”; get tired of looking)

- structured environment:
  - predictable caregiver actions

- how can we test these theories?
early abilities example: infant face perception…

question: do babies more sensitive to an adult’s head angle learn to follow gaze sooner?
the structured social environment

→ from study of 35 infant-parent dyads at home…
VOTE! (it’s not over yet)
Other related evidence...

Chen Yu, Indiana University
simulations to test theories of emergence of shared attention

- why simulations?
- use multiple platforms:
  - ANN, virtual environment, robot head
- what do these tell us?
Triesch & Carlson (2003)

red: frequency of gaze shifts to CG

blue: frequency of gaze shifts following CG’s line of regard
example of simulated result...

Hector Jasso thesis
can we simulate autism?

Triesch, Teuscher, Carlson & Deák (2006)
AS as engine of development: using it to infer word meanings

- when adult says novel word, how could infant infer meaning?

- Baldwin: 18-month-olds* monitor adults’ attention; infer what they are referring to

- Tomasello & Barton: Toddlers map verbs onto intended actions, not accidental ones
current questions

- how does SA “go wrong?” ex: babies with visual deficits
  - how does SA support language, education?
- sources of information in infant’s world?
  - regularities they notice & predict
    - relation to activity & experience?
- neural mechanisms of SA?
getting involved

- research in Cognitive Development lab
- COGS 160 (Deák)
  - involvement w/ research (3 quarters)
  - permission only, 3.3+ GPA, upper-div courses, desire to learn about research
  - deak@cogsci.ucsd.edu