

Lecture 9: SOCIAL LEARNING**Ontogeny** –Primates & cetaceans characterized by **prolonged immaturity** and **long life**

- Indicates significant dependence on learning: a lot to learn to become competent (complex!) adults
 - e.g. Apes sexually mature at ~12 years vs. Tigers (also large-bodied), sexually mature at only 3 years
- Young face diff. rules at diff. ages for acceptable behavior & variety of age-class models to learn from
 - e.g. What is tolerated from infants is no longer when older; disruptive adolescents can be marginalized
 - e.g. Peers – Calves most likely to imitate most innovative peer (Kuczaj & Eskelinen 2014)
 - e.g. **Menopause** = Females survive beyond their reproductive age – Human is *only* menopausal primate
 - Also seen in a few cetaceans (Pilot whales, Orca) provide long-lived matrons w/knowledge, customs
 - *Anecdote*: Old ladies in NW straits die, Orca pod finally takes more reasonable route
- Even the most fundamental, reproductive skills require LEARNING
 - e.g. **Harlow** (1950s): Primates raised in isolation do not develop approp social, sexual, parenting skills
 - Depending on species, if access to social others before adulthood, may recover some abilities

Cultural Traditions (see Readings Whiten et al. 1999 and Rendell & Whitehead 2001)

- *Controversial!* Some argue “culture” requires human-specific cognition (e.g. intentional imitation, teaching)-?
 - Best cases when population differences **cannot** be attributed to ecological differences **alone**
 - e.g. Nuts and stones available in 2 chimp habitats, but only one population uses stones to crack nuts
 - Otherwise hard to tell if acquired via individual trial-and-error learning (vs. social influence)
 - Note that many documented traditions outlive their inventors! (i.e. still practiced generations later)

Nonhuman Primates

- e.g. Chimps in Tai Forest use stones to crack nuts, in Gombe use logs, in Mahale don't
- e.g. Chimps in Bossou termite fish, in Gombe do it differently, in Mahale ant fish tho termites available
- e.g. Japanese macaques wash sweet potatoes, float seeds from sand (after adolescent female **Imo**)
 - Spread laterally to her friends, then to their mothers, then to others, except oldest adult males
- e.g. Coop Hunting Tai Chimps' specific roles (silent flankers, noisy driver, catcher), share only w/participants;
 - In Kibale loosely organized mob, share with those whose favor they're courting; In Gombe don't
 - Note, **ecology may also play a role**, since Tai forest dense, many ways for monkey to go
- See Readings for more; Plus, probably many others in other species that we do not yet know about!

Cetaceans

- Feeding strategies practiced differently by the same species in diff areas (e.g. spongers, crater fishing etc)
 - Recent research (Mann et al 2009): Shark Bay sponging, practiced by a few, passed to next generation
 - In collaborations, can have specific roles (such as driver, barrier); Most efficient in practiced teams
- Social Organization same species can show differences in different regions (e.g. 2 v. 3 coalition partners) –
- **Occasional distinctive** behaviors of a given group
 - Orca “fads” (carry fish bits), short-lived (e.g. 2 days), practiced by large subset of animals
 - Orca greeting ceremony, rarely seen tho in commonly-observed group
 - Neighboring groups line up head to head, silent, till all in line, then sudden noisy interaction

Basic social repertoire may also be “cultural” – i.e. largely learned through observation & co-participation!

- e.g. Rhesus (typically despotic) raised with Stumptails, acts in keeping with egalitarian society
 - Show temperament diffs more suitable to own social structure, but learn to adapt

Mechanisms of Social Learning**Social Reinforcement**

- Effective engagement is reinforcing, even if not deliberate, planned
 - “This is how *we* do it” can include arbitrary practices –like arm-clasp grooming in certain chimp pop.
- **“Ontogenetic Ritualization”** (Tomasello et al, 1989; 1994)
 - Portion of shared practice becomes a signal for such engagement, among only those participants
 - e.g. Element of group-specific play behavior can come to work to solicit play in that group
 - Common gestures/postures afford next step: Pout>>Suckle, Laugh>>Play bite, Bare teeth>>Real bite
 - e.g. “Present for groom” = position yourself towards other so minimal effort by them is required
 - Increases likelihood that grooming will happen, & if it does occur, reinforcing!
 - **Vervet Alarm Learning** begin calling @ ~1year, at first right category/wrong instance (e.g. *Eagle* to Vulture)
 - Eventually, probably thru feedback from others' response (& use) learn only alarm to threat species
- Can also learn by observing reinforcement gained by others! (Anderson et al, 2013; 2017)
 - e.g. Cebus see human helping/not other human, more likely to solicit from helpful than non
- Some behavior is selectively punished by others
 - e.g. Coalition building disrupted by dominants, females mating with errant males harassed by dom
 - e.g. Orcas hold infants out of water, or temporarily pin them (or trainer) to bottom, as reprimand
 - e.g. Spotted dolphins sanction (or just gang up on?) rule breakers?

Synchrony & Imitation - Doing with mom, learn from synchronous activity

- **Dolphins** esp adept at **Synchrony**, developed from birth
 - Infants “slipstream” beside mom to save energy; Synchronized effort req’d for collaborative hunting
 - Synchronous breathing, leaps, coalitional maneuvers, etc play important role in adult social behavior
- **Primates** strong tendency to observe and **do what others are doing**, esp young “monkey see, monkey do”;
 - Includes **newborns** imitating tongue out
- **Imitation** Learn to do a thing by seeing it done; Can be delayed in time
 - In lab, **Primates** better at “**Emulating**” **observed outcome**, than imitating how that is accomplished
 - e.g. “Artificial fruit” (puzzle box), NHPs more likely to mimic outcome vs. **Humans mimic means**
 - Note: Following Whiten et al. 1996, Horowitz 2003 tested humans, got highly variable results
 - Altho, in other “**Do as I do**” experiments, **Apes** were able to **mimic some novel actions**
 - In lab, **Dolphins** can do exceptionally well at imitating behaviors
 - Recall: “**Tandem Novelty**” in lab (do new behavior, together)
 - Bottlenose can be taught a “**mimic**” cue; Imitate behavior modeled by human or other dolphin
 - Best success w/ juv; Existing **social relations may constrain** (e.g. Sub mimic dom, not reverse)
 - Can also be taught cue to “Repeat” = mimic self
 - Also see **spontaneous** behavioral imitation in **Dolphin**
 - Performing animals sometimes learn others’ show behaviors without training
 - Imitate humans: Scrape window w/ tool, release milk like smoke etc. (see Tayler & Saayman, 1973)
 - Imitate other species: e.g. Flap flippers like seal, swim upside-down, attempt to mate, etc.
 - Plus, both primates & dolphins **recognize when being imitated**
 - Apes & dolphins show novelty, repetition (e.g. Haun & Call 2008); Cebus prefer human that mimics
- **Vocal Imitation** – Evident in **cetaceans**, not nonhuman primates; Rare in mammals, more common in birds
 - In the field – Spinners rest in shallow bays, chorus their whistles to coordinate exit to feeding grounds
 - Signature whistle used most often by signatory, but occasionally produced by others
 - Experienced Spotted alliances synchronize their intense burst-pulses directed at target
 - Younger groups much poorer at synchronizing, so **requires group practice**
 - Orca tank mates retained some calls from wild pods, infant learned some, all devel’d some new
 - In the lab - In language study, Bottlenose taught whistle-like signals to refer to objects, actions
 - Spontaneously mimicked some signals (tho extinguished before could test communication)
 - As do when mimic signatures, preserved contour w/ some temporal compression/expansion
 - Bottlenose, belugas can imitate trainer’s “bridge” whistle, other dolphin-like human or env. sounds

Teaching? - Much controversy whether even occurs in nonhumans

- **Scaffolding** = Expert **provides opportunities** for novice to learn, but does **not direct/modify learning process**
 - e.g. Mother cat catches, wounds mouse, then sets it loose near kittens so they can chase
 - So “scaffolding” considered fairly common, but not equal to HUMAN “teaching”
- **Pedagogy** = Expert **actively intervenes** in learning process of novice
 - Corrects errors, demonstrates, slows/orients actions to novice’s perspective, suit to stage of learning, etc.
 - Some argue Pedagogy requires ToM (Expert must model current/changing mental state of Novice)
 - More difficult to find examples in nonhumans, requires showing **costs to teacher & gains to learner**
 - e.g. Chimp nut-cracking observed for hundreds of hours, only 3(?) direct interventions in juv learning
- Scaffolding (Teaching?) in **Primates**:
 - e.g. Orangutan mothers, paired w/ infant, provide thousands of examples of branch & food manipulation
 - e.g. Chimp females are most frequent tool users, so young have much early exposure
 - Infants handle, chew, poke, sticks used for termite-fishing until develop successful technique
 - e.g. Chimp nut-crackers share nuts w/ infants, allow access to materials (hammer/anvil)
 - When infant gets older, stop sharing > motivates it to learn to crack own nuts
- Teaching (Scaffolding ?) in **Cetaceans**: - Note, often a combination of co-action/imitation & scaffolding
 - e.g. Spotted dolphin mom “crater fishing” will change tactic if infant nearby watching
 - Mom’s cost = flush more/eat less: Chase prey 7X longer & orient to it more freq in presence of calves
 - e.g. Orca expert pushes novice onto (& later off of) beach toward seals, and/or shares prey
 - Some data support that such “apprenticeship” leads to earlier solitary success by young