

Social Learning in Skill Transmission



Social Cognition at BME-TTK

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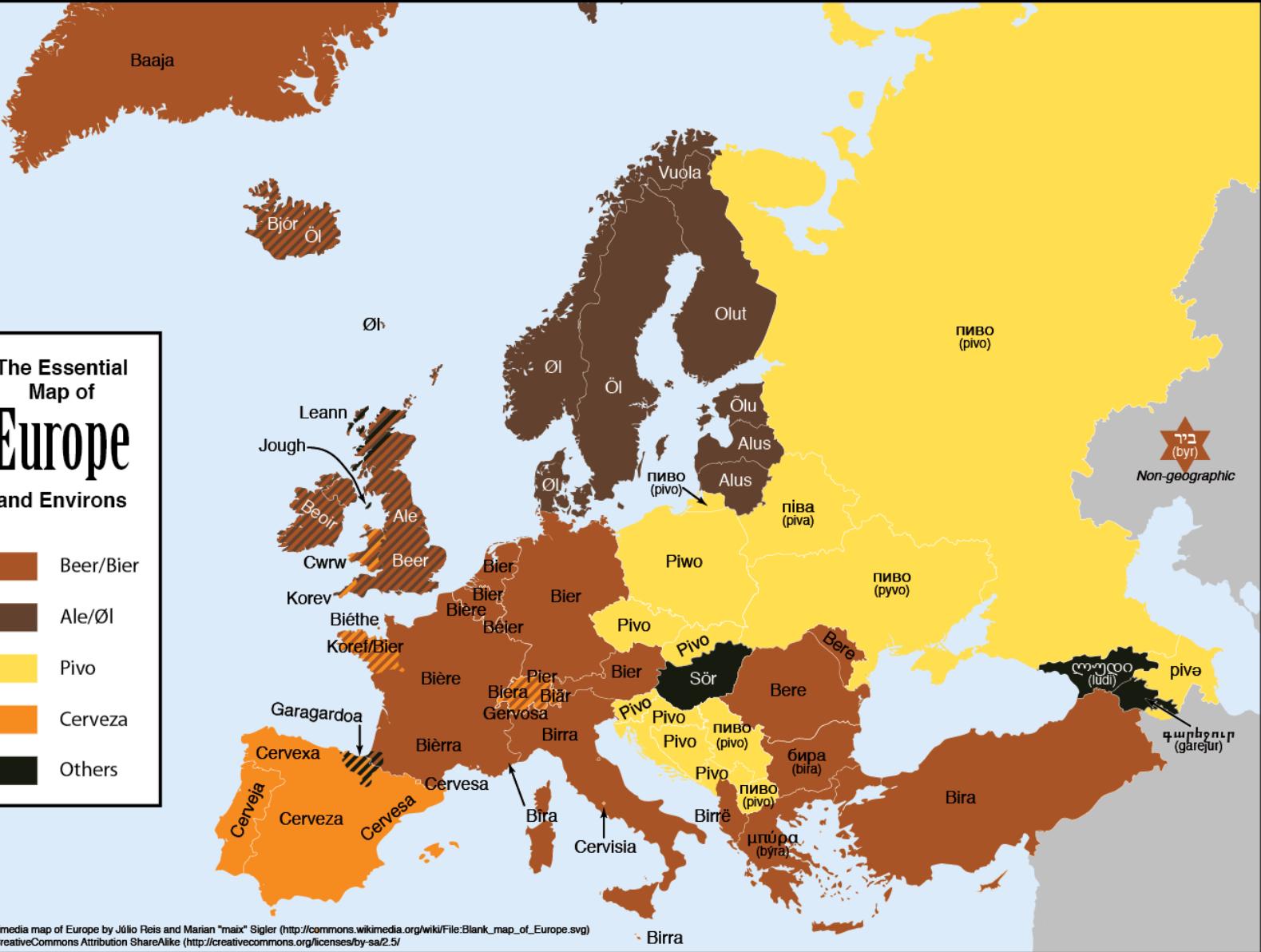
CEU: Social Mind and Body Lab

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The Essential Map of **Europe** and Environs

- A vertical legend consisting of five colored squares with corresponding labels: a brown square for Beer/Bier, a dark brown square for Ale/Øl, a yellow square for Pivo, an orange square for Cerveza, and a black square for Others.



Based on the Wikimedia map of Europe by Júlio Reis and Marian "maix" Sigler (http://commons.wikimedia.org/wiki/File:Blank_map_of_Europe.svg)
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How do cultural differences emerge?

How has culture been transmitted over
generations?

Outline

1. Skill Transmission

- How does culture evolve?

2. Learning by Others

- How do we learn from others?

3. Social Learning

- What are special/unique mechanisms to human beings?

Skill Transmission

Cognitive innovations (Dukas, 2017)

1. the nerve system
2. learning and memory
3. social learning
4. language

Passing on knowledge/skills

- Learning from previous generations gives opportunities for further refinement, improvement and innovation.
- Social learning (and language) may enable cumulative culture.

Skill Transmission

Cultural Evolution (Mesoudi, 2016)

- the adaptations of technology, knowledge, social customs via social learning
- analogue to the Dawin's theory of evolution
 - variation
 - competition
 - inheritance
- the iterative process of social learning enables cultural evolution
 - the generation and accumulation of adaptive knowledge, technology and social institutions

Skill Transmission

Contributions from Cognitive Science (Heyes, 2018)

Are human thought and behaviour made adaptive in the cultural sense?

- empirical research provides evidence at the implementation level
- the distinction between replication and reconstruction
 - High fidelity vs. low fidelity?
 - Stimulus driven vs. inferential process?
- metacognitive social strategies (i.e., how an individual knows from whom to learn)

Learning by others

Learning by others

There are several mechanisms that we have not observed in non-human animals (Tomasello, 2016).

- Instructed learning
 - Adults **instruct** children what to learn
 - Ostensive signals
- Faithful imitation (overimitation)
 - Children imitate the actions of adults with a precise manner
 - Conformity (Fidelity)

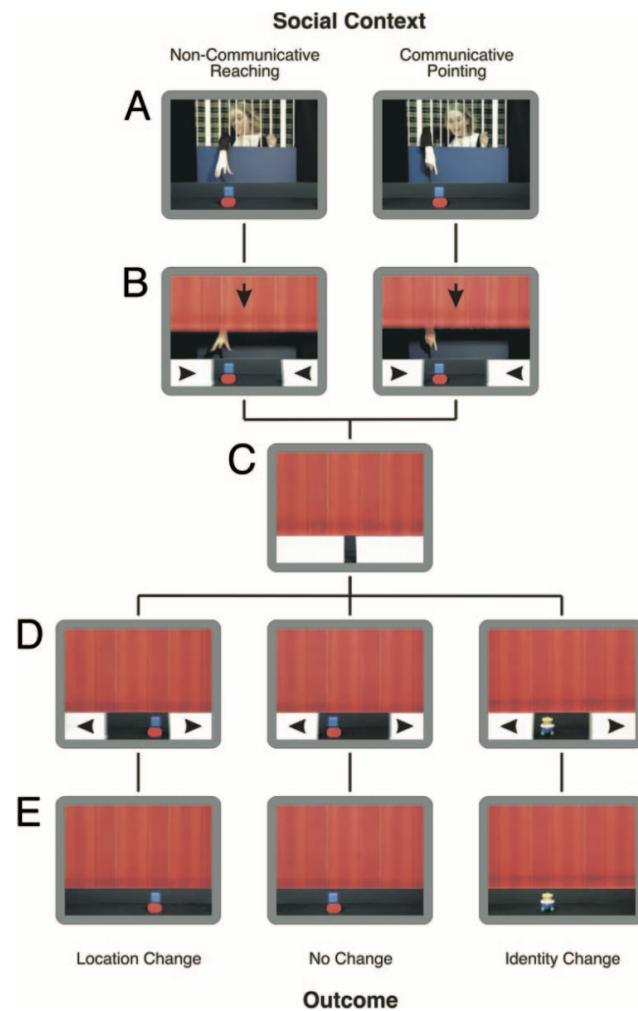
Learning by others

Ostensive communication

- Newborns/infants are already sensitive to social cues (e.g., eye, face, voice)
- Ostensive communication alters what infants learn (e.g., Csibra & Gergely, 2009)
 - 6-month-old infants followed gaze after ostensive signals (i.e., eye-contact, infant-directed speech; Senju et al., 2008)
 - 7-to-8-month-old infants remembered more words spoken by infant-directed speech than adult-directed speech (Singh et al., 2009)
- Adults also can detect a teaching intention from kinematic movements (McEllin et al., 2018)
- Ostension and relevance?

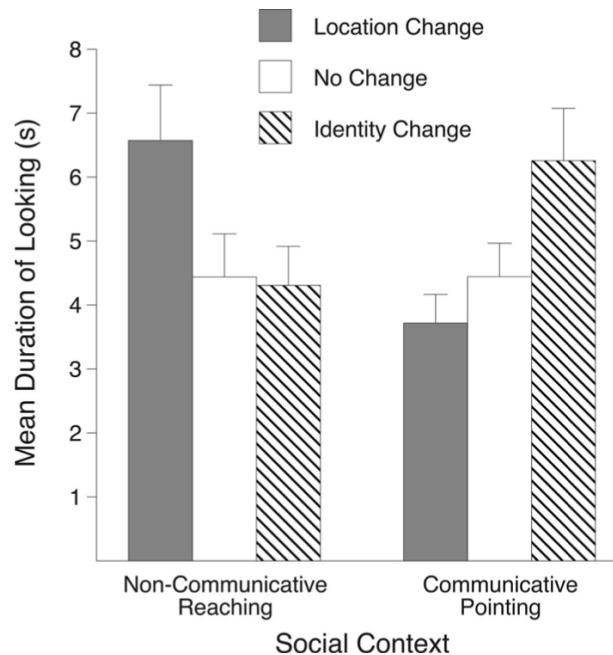
Memory biases (Yoon et al., 2008)

- 9-month-old infants looked at adults reaching an object
- Adults were reaching the object either with/without a communicative cue
- 3 outcomes (i.e., change in the location of the object, the identity of the object or no change)
- What will infants encode? Location or Identity?



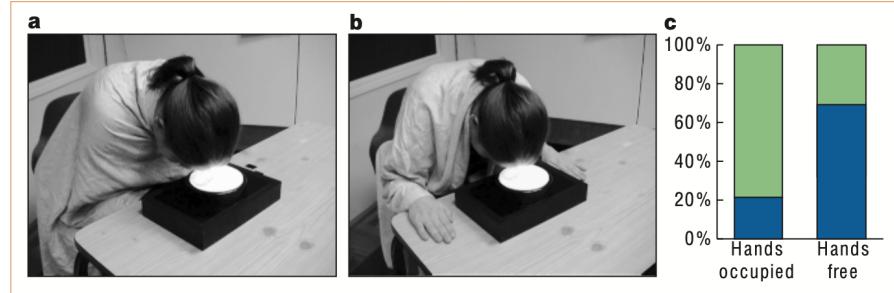
Memory biases (Yoon et al., 2008)

- Looking time (the violation of expectation paradigm)
- 9-month-old infants encoded qualitatively different information about a novel object depending on the non-communicative/communicative condition.



Social learning

Faithful imitation



- imitation: copying the exact actions of others, including arbitrary gestures, conventions, and rituals (Tomasello, 2016)
- emulation: producing the same outcome with a different manner / not copying the exact process of the actions (Tomasello, 2016)
- 14-month-old infants understand causally relevant actions (e.g., Gergely et al., 2002; Figure)
 - Blue: head action
 - Green: manual touch
- However, infants also imitate causally **irrelevant** actions (Lyons et al., 2007).

Overimitate ingroup members (Buttelmann et al., 2013)

- Based on the study of Gergely et al. (2002)
- Group membership: 14-month-old infants looked at and listened to an adult speaking their native language (German) or a foreign language (Russian)
- Participants imitated causally irrelevant action more when the model was the ingroup member compared with when the model was the outgroup member.

a)

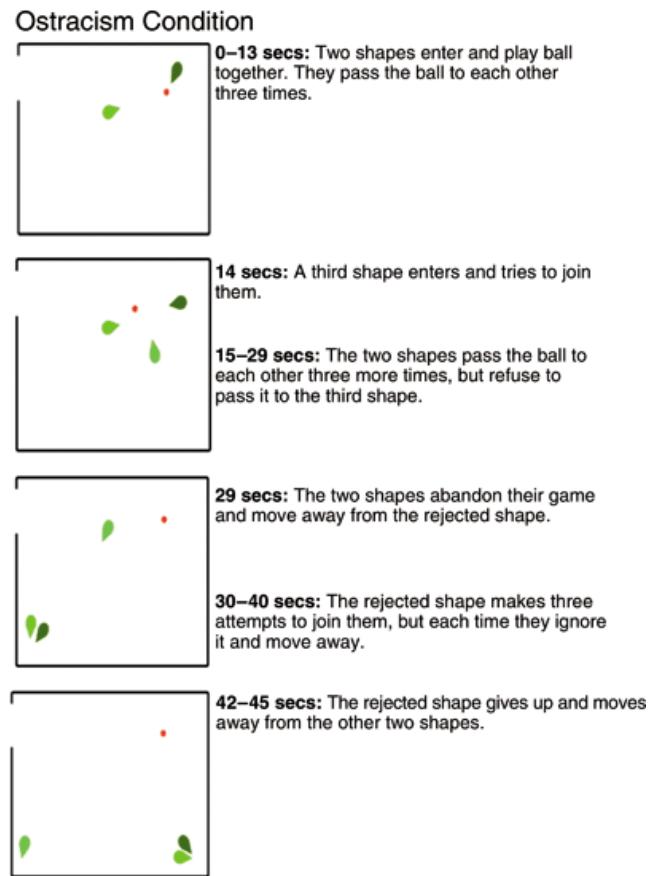


b)



Overimitate after ostracism (Over & Carpenter, 2009)

- 5-to-6-year-old children observed either the ostracism video or the control video.
- Ostracism condition: creating social exclusion with animated objects
- Control condition: replacing the rejected object by a butterfly-like object (random-moving)
- After watching one of the two videos, participants were asked to perform an imitation task.
- participants imitated more faithfully in the ostracism condition than in the control condition.



Social learning

Social learning

Is learning by others only unique to human beings (Mesoudi, 2016)?

Social? learning in non-human animals

- honeybees waggle dance
- chimpanzee's nut cracking
- teaching in meerkats (Thornton & McAuliffe, 2006)
 - opportunities for practising

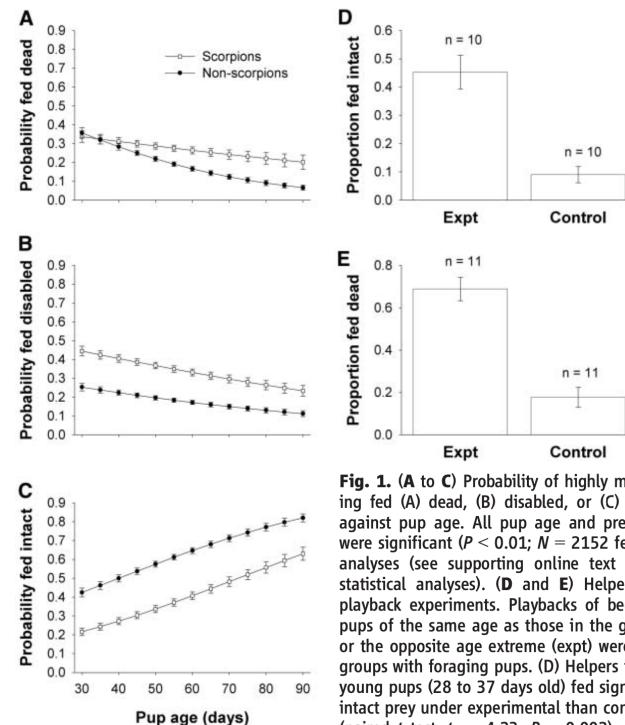


Fig. 1. (A to C) Probability of highly mobile prey being fed (A) dead, (B) disabled, or (C) intact plotted against pup age. All pup age and prey type effects were significant ($P < 0.01$; $N = 2152$ feeds) in GLMM analyses (see supporting online text for details of statistical analyses). (D and E) Helper response to playback experiments. Playbacks of begging calls of pups of the same age as those in the group (control) or the opposite age extreme (expt) were broadcast to groups with foraging pups. (D) Helpers in groups with young pups (28 to 37 days old) fed significantly more intact prey under experimental than control playbacks (paired t test, $t_9 = 4.23$, $P = 0.002$). (E) Helpers in groups with old pups (71 to 86 days old) fed significantly more dead prey under experimental than control playbacks (paired t test, $t_{10} = 4.81$, $P = 0.001$).

Some thoughts...

Observational learning is not enough?

- People including infants can extract relevant information to acquire knowledge/skills through implicit/statistical learning (Perruchet & Pacton, 2006).
- Teaching oriented custom in the WEIRD culture?
- In some apprenticeship, there is no-teaching tradition.
 - Craftsman, musician

They would play especially for me, which was nice, but they played without slowing down their playing or simplifying it very much. They taught me, in effect, that I would have to learn this music, not through a kind of oral informing on their part, **but through observation, trial-and-error, and practice** (Rice, 1995)

- Are there downsides of teaching/learning in a communicative context?

Take home messages

1. Human beings have passed on knowledge/skills and developed expertise over generations.
2. Skill transmission would be a key to cultural evolution.
3. Ostensive cues from an expert alter what a novice learns.
4. Faithful imitation is facilitated by social contexts.
5. What is special/unique about human social learning is still not clear.

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Thank you!