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Cognition, Collectives, and Human Culture

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Overview

Cognitive capacities such as learning, reasoning, and decision-making are often studied in tasks where a single participant acts in isolation. Yet humans don't learn, reason, and make decisions in a vacuum. Human cognition is distinctively social: Much of what we do influences—and is influenced by—other people.

The goal of this workshop is to bring together diverse perspectives on the interplay between human cognition and the dynamic, social environments we inhabit. The workshop is organized around three key themes. Theme 1 lays out the cognitive tools that equip individuals to thrive in social environments, including specialized mechanisms for teaching and learning from others. Theme 2 examines how the social environment is itself shaped by the dynamic interactions between multiple individuals, producing emergent behaviors at the level of the collective. Finally, Theme 3 explores how human cognition responds to the demands of particular social environments, including how cultural variability in social cognition might emerge across development.

Collectively, the research showcased in this workshop enriches this year's conversation on "How to Develop a Mind: Learning in Humans, Animals, and Machines" by highlighting the social and cultural context of learning and development. In addition, our speakers represent a broad cross-section of the conference, spanning multiple disciplines (computer science, anthropology, psychology), perspectives (computational, ecological, developmental), and career stages (from research assistants to full professors). Below, we describe each theme and presenter contributions in detail. To take part in the workshop, visit cognitioncollectivesandculture.github.io for the current schedule.

Theme 1: Cognitive mechanisms of social learning

Social learning differs in important ways from learning through interactions with the environment (Ho, MacGlashan, Littman, & Cushman, 2017). Social information is shaped by the goals, beliefs, and intentions of other people (Shafto, Goodman, & Frank, 2012), requiring specialized mechanisms for understanding whom to learn from, what should be learned, and how to infer the correct value judgments from the behavior of others (Heyes, 2019; Vélez & Gweon, 2019).

Talks in this theme provide a computational and developmental perspective on the cognitive mechanisms underlying how humans teach and learn from others.

Presenters

Mark Ho (Organizer)
Postdoctoral Fellow, Princeton
Topic: Computational models of teaching with evaluative feedback and by demonstration
Patrick Shafto
Professor of Mathematics & Computer Science, Rutgers
Topic: A mathematical theory of cooperative communication
Hyowon Gweon
Assistant Professor of Psychology, Stanford
Topic: Social curiosity and social learning in young children
Charley Wu (Organizer)
Postdoctoral Fellow, Harvard
Topic: Attentional trade-offs between individual and social learning in a virtual foraging environment

Theme 2: Emergent properties of collectives

Social environments allow for the emergence of collective approaches to solving problems, where simple individual behaviors can give rise to collectively complex solutions (Krafft, Hawkins, Pentland, Goodman, & Tenenbaum, 2015). For better or worse, collectives can arrive at solutions that are beyond the control of any one individual—sometimes promoting the wisdom of the crowd (Goldstone, Wisdom, Roberts, & Frey, 2013), while other times amplifying maladaptive behaviors through runaway information cascades (Toyokawa, Whalen, & Laland, 2019; Ransom, Voorspoels, Navarro, & Perfors, 2019). Talks within this theme use behavioral and computational approaches to study the dynamics of collective behavior and social information transmission. The work showcased in this theme is particularly relevant for tackling real-world challenges—such as the formation of echo chambers and structural sources of inequality—through the lens of cognitive science.

Presenters

Robert Goldstone (Organizer)
Professor of Psychological & Brain Sciences, Indiana
Topic: Studying emergent group behavior from a complex systems perspective

Seth Frey

Assistant Professor of Communications, UC Davis

Topic: Using large social datasets from games, sports, and online communities to link macro-scale system outcomes to social reasoning and interaction mechanisms of individuals

Amy Perfors

Associate Professor of Psychological Sciences, Melbourne

Topic: Trust and the emergence of "echo chambers" in populations of Bayesian agents

Sholei Croom

Research Assistant Lab Manager, MIT

Topic: Integrating structural power and historical contingency into computational frameworks of social behavior

Theme 3: Cognition and culture

Human cognition shapes and is shaped by large-scale processes of cultural learning that unfold over multiple generations (Tennie, Call, & Tomasello, 2009). Through the process of cultural accumulation (Dean, Vale, Laland, Flynn, & Kendal, 2014), humans have developed a repertoire of technologies and cultural practices that have enabled us to survive everywhere from the tundra to the Earth's orbit (Henrich, 2017). What's more, this repertoire is easily available to new individuals through social learning; within a few years, even young children can learn skills and rituals that took whole communities centuries to develop (Legare, 2019). Talks within this theme use developmental, computational, and cross-cultural approaches to examine the two-way interaction between cognition and culture. In particular, they will examine how how social cognitive processes give rise to cumulative culture, as well as how differing cultural contexts shape the development of social cognition.

Presenters

Natalia Vélez (Organizer)

PhD Student in Psychology, Stanford

Topic: Multigenerational innovation and division of labor in online communities

Kara Weisman

Postdoctoral Fellow in Anthropology, Stanford

Topic: The development of conceptual representations of mental life in five cultural contexts

Dorsa Amir

Postdoctoral Fellow, Boston College

Topic: The ontogeny of social decision-making across diverse cultural contexts.

Cristine Legare

Associate Professor of Psychology, UT Austin

Topic: Cultural transmission and the development of social cognition in twelve countries

Workshop Structure

We propose a full-day workshop consisting of 20-minute talks given by each of the 12 presenters listed above. We will provide brief breaks during the morning and afternoon session to foster discussions among workshop attendees. At the end of the workshop, we will have a 45-minute panel discussion on bridging insights from laboratory, naturalistic, and simulation studies of social cognition.

The morning session will consist of the following talks:

Theme	Presenters
Social learning	Mark Ho
	Patrick Shafto
	Hyowon Gweon
	Charley Wu
Collectives	Robert Goldstone
	Seth Frey

The afternoon session will consist of the following talks:

Theme	Presenters
Collectives	Amy Perfors
	Sholei Croom
Cognition and culture	Natalia Vélez
	Kara Weisman
	Dorsa Amir
	Cristine Legare
Panel discussion (45 min.)	*All presenters*

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