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Improving Concepts in Cognitive Science

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Overview

Please, see the workshop website here.

Like any science, cognitive science rests upon a set of conceptual foundations. Traditionally, cognition has been compartmentalized into distinct processes such as “perception”, “memory”, “attention”, “emotion”, “cognitive control”, “language”, and others. Further, the disciplines studying these different constructs have developed their own conceptual systems. For example, emotion science studies “anger”, “fear”, and “happiness”, whereas memory research has articulated varieties such as “long-term”, “short-term”, “working”, and “episodic” memory. These conceptual systems serve as key scientific tools, influencing processes from the development of new measurement instruments and deciding on which experiments to conduct to developing new theories and communicating results (Feest, 2010; Dubova & Goldstone, 2023). Although critically important for scientific progress, these concepts, often stemming from the folk taxonomies or the perspectives of early visionaries, have not always been subjected to rigorous scrutiny. To address these issues, cognitive scientists are beginning to critically re-evaluate and possibly reframe the conceptual underpinnings of cognitive disciplines (e.g. (Cisek, 2019; Poldrack et al., 2011; Musslick et al., 2020)), yet such efforts often lack strategic direction and widely diverge in their methodological ways of approaching the task.

Goals

The goal of this workshop is to initiate an interdisciplinary conversation about reconceptualizing cognitive science disciplines. This workshop will bring together researchers proposing new conceptualizations in their disciplines, cognitive scientists investigating the mechanisms of concept learning and the role of concepts in human cognition, researchers building infrastructures to study and improve cognitive concepts, and philosophers analyzing scientific conceptualizations. The workshop will include activities which will prompt the audience to think about the conceptual foundations of their respective areas, and about ways to improve these foundations. These activities are designed to maximize audience participation and include panel

discussions, as well as mind-matching and small group brainstorming sessions. One of the outcomes of the workshop is identifying the diversity of approaches for improving cognitive science concepts that could be relevant to both discipline-wide and more specific efforts.

Target Audience

The (re-)evaluation of the concepts we study is a universal problem in cognitive science. Thus, we expect the workshop to be of interest to a wide variety of members of the cognitive science community. This includes, but is not limited to, psychologists, neuroscientists, artificial intelligence researchers, and philosophers.

Approach and Schedule

We propose a full-day workshop consisting of three themes, an interactive mind matching session, and small group discussions. The workshop will cover the following themes:

1. examples of new conceptual frameworks and methods for improving concepts in different cognitive science disciplines
2. insights from the cognitive science that could inform the process of improving scientific conceptualizations
3. philosophical insights on the role of concepts in cognitive science and the methods for their improvement

The discussion of each theme will consist of the short lightning talks (up to 10 minutes each) with each invited speaker presenting an idea/argument on the central question of the theme (see Table 1) and a panel discussion with the lightning talk speakers. Each theme-related panel will be moderated by an invited speaker from another theme to facilitate interdisciplinary discussion. In addition, the workshop will involve an interactive mind-matching activity where participants will be split into several groups to 1) discuss the similarities and differences in how their disciplines conceptualize the key phenomena of interest, 2) identify the roles these concepts play in discipline-specific practices and the potential issues that they might be associated with, and 3) brainstorm solutions to the conceptual problems in their fields.

Time	Event
TBD	Introductory remarks
TBD	THEME 1: lightning talks Q: What concepts are used in your field and how do you think they could be improved?
TBD	THEME 1: panel discussion with the lightning talk speakers
TBD	Coffee break
TBD	THEME 2: lightning talks Q: What knowledge about how humans learn can be relevant for understanding and improving scientific conceptualizations?
TBD	THEME 2: panel discussion with the lightning talk speakers
TBD	Lunch break
TBD	Mind matching session
TBD	Coffee break
TBD	THEME 3: lightning talks Q: What philosophical insights/issues are important when trying to improve cognitive science concepts?
TBD	THEME 3: panel discussion with the lightning talk speakers
TBD	Brainstorming session in small groups
TBD	Wrap-up of the discussion & concluding remarks

Table 1: Preliminary schedule of the workshop

Organizers and Speakers

- **Marina Dubova** (organizer) is a PhD candidate in Cognitive Science at Indiana University Bloomington.
- **Lisa Feldman Barrett** (organizer) is a University Distinguished Professor at Northeastern University with appointments at the Massachusetts General Hospital (MGH).
- **Robert L. Goldstone** (organizer) is a Distinguished Professor and Chancellor’s Professor of Psychological and Brain Sciences at Indiana University Bloomington.
- **Sebastian Musslick** (organizer) is an Assistant Professor for Computational Neuroscience at the Institute of Cognitive Science at the University of Osnabrück.
- **Russell Poldrack** (organizer) is the Albert Ray Lang Professor of Psychology at Stanford University.

References

Cisek, P. (2019). Resynthesizing behavior through phylogenetic refinement. *Attention, Perception, & Psychophysics*, 81, 2265–2287.

THEME 1	Patrick Bissett (Stanford University) Paul Cisek (University of Montreal) Sebastian Musslick (University of Osnabrück) Jordan Thireault (Harvard Medical School) Tor Wager (Dartmouth College)
THEME 2	Rob Goldstone (Indiana University) Asifa Majid (University of Oxford) Justin Sulik (LMU Munich) Ilker Yildirim (Yale University)
THEME 3	Mazviita Chirimuuta (University of Edinburgh) Uljana Feest (Leibniz Universität Hannover) Jolien Francken (Radboud University)

Table 2: List of invited panelists.

- Dubova, M., & Goldstone, R. L. (2023). Carving joints into nature: reengineering scientific concepts in light of concept-laden evidence. *Trends in Cognitive Sciences*.
- Feest, U. (2010). Concepts as tools in the experimental generation of knowledge in cognitive neuropsychology. *Spontaneous Generations: A Journal for the History and Philosophy of Science*, 4(1), 173–190.
- Musslick, S., Wirzberger, M., Grahek, I., Bustamante, L., Shenhav, A., & Cohen, J. D. (2020). Mental effort: One construct, many faces? *Proceedings of the Cognitive Science Society*, 28, 1321–1333.
- Poldrack, R. A., Kittur, A., Kalar, D., Miller, E., Seppa, C., Gil, Y., ... Bilder, R. M. (2011). The cognitive atlas: toward a knowledge foundation for cognitive neuroscience. *Frontiers in neuroinformatics*, 5, 17.