New Content From *Current Directions in Psychological Science*

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[The Structure of Systematicity in the Brain]
Randall C. O'Reilly, Charan Ranganath, and Jacob L. Russin

A hallmark of human intelligence is the ability to adapt to new situations by applying learned rules to new content (systematicity). O'Reilly and colleagues propose that the human brain accomplishes systematicity through pathways in the parietal cortex, which encode the abstract structure of space, events, and tasks, as well as through pathways in the temporal cortex, which encode information about specific people, places, and things. This separation of structure and content might emerge through architectural biases and learning. O'Reilly and colleagues also consider how the hippocampal formation may create integrative memories, enabling rapid learning of new structure and content representations.

[Insights Into Human and Nonhuman Primate Handedness From Measuring Both Hands]
Eliza L. Nelson

Where does handedness—having one hand that is "better" than the other—come from? Nelson reframes the question by shifting away from thinking about genes and development "to" the adult pattern and instead thinking about development "from." This approach is based on a comparative synthesis of theories from the literature on nonhuman primates and children, and it takes into account the constant interaction that exists between individuals and their environment. Nelson discusses the challenges of measuring handedness and suggests that studies use tasks in which both hands must work together (as in role-differentiated bimanual manipulation) to effectively measure hand preference.

[Cognitive Modeling With Representations From Large-Scale Digital Data]
Sudeep Bhatia and Ada Aka

By using large-scale digital sets, deep-learning methods can extract feature vectors describing the mental representations of objects, concepts, images, and texts that people use in everyday cognition and behavior. These vectors can serve as inputs into computational models of cognition that can process and

respond to naturalistic prompts. Researchers have applied this approach to topics such as similarity judgment, memory search, categorization, decision making, and conceptual knowledge. Bhatia and Aka summarize these applications, identify underlying trends, and outline directions for future research on the computational modeling of everyday cognition and behavior.

How Language Learning and Language Use Create Linguistic Structure
Kenny Smith

Smith proposes that languages persist through cycles of learning and use: People learn a language through immersion in their linguistic community, and in using language, they produce further linguistic data that other people learn from. Smith reviews experimental and computational methods developed to test whether those processes, with their innovations and errors, are responsible for creating the structural properties that all human languages share. In past research, these methods provided evidence that at least some of the fundamental design features of natural language appear to result from biases in the processes.

Cognitive Blame Is Socially Shaped
Bertram F. Malle, Steve Guglielmo, John Voiklis, and Andrew E. Monroe

To limit the costs of moral criticism, Malle and colleagues propose that communities set standards of evidence for blame. The researchers describe the path model of blame, which captures the cognitive processes underlying blame judgments and specifies the kind of evidence necessary for assigning blame. They show how the varying costs of blaming create social incentives for the moral critic to be accurate and fair. They also identify conditions that weaken these pressures, such as when the alleged transgressor has low status, when the critic has high status or is anonymous, or when interactions occur online.

Credibility Beyond Replicability: Improving the Four Validities in Psychological Science
Simine Vazire, Sarah R. Schiavone and Julia G. Bottesini

Psychological science's "credibility revolution" has produced an explosion of metascientific work on improving research practices. Vazire and colleagues propose addressing a wide range of problems afflicting psychological science, beyond simply making its results more replicable. The researchers focus on the "four validities" (construct, internal, external, and statistical conclusion) and highlight recent developments—many of which have been led by early-career researchers—aimed at improving these validities in psychology research. They propose that the credibility revolution in psychology, which has its roots in replicability, can be harnessed to improve psychology's validity more broadly.

Are We in Time? How Predictive Coding and Dynamical Systems Explain Musical Synchrony
Caroline Palmer and Alexander P. Demos

Humans tend to anticipate events when they synchronize their actions with sound (such as when they clap to music). Palmer and Demos review two theoretical mechanisms for synchrony: predictive coding (PC) and dynamical systems (DS). Both theories rely on interconnection between excitatory and inhibitory neurons, but they differ in their organizational architecture and the role of time. Palmer and Demos contrast the assumptions, computations, and musical applications to anticipatory synchronization

in PC and DS models.

Formal Innovations in Clinical Cognitive Science and Assessment
Richard W. J. Neufeld and Matthew J. Shanahan

Neufeld and Shanahan describe the innovations that mathematical modeling can bring to clinical cognitive science. They argue that mathematical modeling is essential for detecting certain effects of psychopathology through understanding cognitive variables (e.g., workload capacity) and the differences among these variables. The authors use the example of a cognitive abnormality in schizophrenia—taking longer to cognitively represent encountered stimuli—to illustrate a general quantitative framework for studying intricate phenomena that impair mental health. They also suggest that developments in mathematical modeling will improve symptom description and prediction and help to develop new methods of clinical assessment.

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