2019 Meeting of the Society of Experimental Psychologists

March 22-23, 2019, Rutgers University

https://ruccs.rutgers.edu/talks/list-of-upcoming-events/icalrepeat.detail/2019/03/22/634/-/2019-meeting-of-the-society-of-experimental-psychologists

RECEPTION AND DINNER: THURSDAY MARCH 21. 6 – 9 PM

4 Meredith Place East, Piscataway. 2 miles from the Hyatt.

HOW TO GET THERE: (1) be in front of the Hyatt at 6 pm. Rutgers volunteers will be on hand to drive you there. OR (2) take a cab or uber from the Hyatt. 5 to 10 minute drive. Rob Nosofsky has volunteered to be in front of the Hyatt by 545 PM to help with getting over to 4 Meredith Place East.

PLEASE ATTEND THE RECEPTION/dinner! EVEN IF YOU ARRIVE AFTER 6 PM WE'LL STILL BE THERE AND ITS A SHORT CAB RIDE OVER!!

QUESTIONS? PROBLEMS?

(a) The Hyatt will help with getting cabs, or with local information.
(b) Email eileen.kowler@rutgers.edu OR phone 732-247-5568 (home) or 732-668-3380 (cell)

****PLEASE HAVE YOUR TALK READY ON A THUMB DRIVE!** We will load all talks in advance onto the display computer in the conference room. This will expedite the transitions!

CONFERENCE INFORMATION

Academic Building, room 1180 (East Wing). 15 Seminary Place; New Brunswick, NJ 08903 (~15 min walk from Hyatt Hotel, New Brunswick and 10 min walk from NJ Transit train station, New Brusnwick). If you're driving, contact eileen.kowler@rutgers.edu for parking information.

DIRECTIONS FROM THE HYATT HOTEL TO THE CONFERENCE ROOM:

Leave the Hyatt main entrance and turn right. Walk to and across Albany Street and turn left. Walk one block to George Street and turn right. Continue under the train tracks, cross Somerset Street, and enter campus (slight left) through the Class of 1883 Memorial Gate. Continue on the path, passing the Alexander Hamilton historical plaque (on your right) and the Kirkpatrick Chapel (1873) (on your left). Take the path behind the chapel, walking along a slight downgrade and exiting through the Class of 1902 Memorial gate. Cross Hamilton Street. Continue walking straight, through the Vorhees Mall, ending at the statue of William the Silent. Cross Seminary Place to the Rutgers Academic Building west wing. Turn right to get to the East Wing of the RAB, and the conference room 1180

SCHEDULE FOR FRIDAY MARCH 22, 2019

7:30-8:30: Registration and continental breakfast outside conference room. Coffee, tea, water and snacks, available all day. **Bring thumb drive with your talk to the podium!**

8:30-8:45: *Introduction and logistics*

Session 1

8:45 Randy Gallistel. *Contingency in conditioning*
9:05 Sharon Thompson-Schill. *The dynamic nature of semantic memory: Using concepts can change them*
9:25 Kenneth Norman. *Nonmonotonic plasticity: How memory retrieval drives learning*

9:45-10:00 Break

Session 2

10:00 Wilson Geisler. *Local reliability weighting explains identification of partially-masked objects in natural images*
10:20 Mary Peterson. *Two varieties of semantic influences on object detection*
10:40 George Sperling *Theory of the perceived motion direction of equal-spatial-frequency plaid stimuli*

11:00-11:15 Break

11:15-Noon: *Warren Medal Address*

Noon – 1:30 Lunch. LUNCH FOR REGISTERED PARTICIPANTS AT THE RED LION ROOM IN THE LOWER LEVEL OF THE COLLEGE AVENUE STUDENT CENTER. 126 COLLEGE AVENUE. (Exit the Academic Building and walk toward College Avenue, the direction away from the river. Turn right on College Avenue. The student center is the large red brick building across College Avenue).

Session 3

1:30 Reconvene
1:40 Tom Griffiths. *Rational process models*
2:00 Jessica Andrews-Hanna. *The dynamics of thought: A window into wandering and sticky minds*
2:20 Michael Kahana. *A retrieved-context theory of mood and affective disorders.*
2:40 Stephen Link. *Fact, context and judgment*

3:00-3:15 Break

Session 4

3:15 Michael Kubovy. *Strands and the structure of lives*
3:35 Barbara Knowlton. *The effect of contextual interference on implicit sequence learning*
3:55 David Huber. *Testing the primary and convergent retrieval model of recall: Recall practice produces faster recall success but also faster recall failure*

4:15-5 *Lifetime Achievement Award*

5-5:15 Business meeting

Dinner on your own (many options; details to be presented at the meeting)

SCHEDULE FOR SATURDAY, MARCH 23, 2019

7:30-8:30: Registration and continental breakfast outside conference room. Coffee, tea, water and snacks, available during breaks.

Session 5

8:30 Jeremy Wolfe. *We underestimated your capacity: Introducing multiple object awareness*
8:50 William Warren. *The cognitive graph meets the impossible heptagon*
9:10 Irving Biederman. *Why is it so difficult to recognize faces differing only moderately in orientation?*

9:30-9:45 Break

Session 6

9:45 Saul Sternberg. *Shapes of reaction-time distributions and the ex-Gaussian straitjacket*
10:05 Randall Engle. *Measurement of attention control*
10:25 Jerome Busemeyer. *Markov versus quantum dynamic models of belief change during evidence monitoring*

10:45-11:00 Break

Session 7

11:00 Caren Rotello. *Validity of researcher inference in recognition memory: A blinded validation study*
11:20 Stephen Grossberg. *Neural dynamics of autistic repetitive behaviors and fragile X syndrome.*
11:40 Janet Metcalfe. *Is the 'Learning from Errors' benefit due to episodic recollection or semantic mediation?*

Noon – 2 PM Lunch. Many options are available within easy walking distance of the conference room. Details will be available at the meeting.

Session 8

2:00 Robert Sekuler. *Audiovisual combination with temporal correlation and time pressure*

2:20 James T. Townsend. *Assay of mean shift integrality using GRT and SFT and the Hering illusion*
2:40 Moshe Bar. *Overarching states of mind*

3:00-3:15 Break

Session 9

3:15 Herbert Terrace. *Why only us?*
3:35 Richard Shiffrin. *Sequential decision making by two selfish but rational agents, with or without communication*
3:55 Richard Aslin. *The importance of prediction in learning and development*
4:15 Robert Nosofsky. *Building a feature-space representation for a natural-science category domain*

Conference talks end 4:35

6:00 – 9:00 SEP Banquet at the Zimmerli Art Museum, 71 Hamilton Street, New Brunswick. 10 minute walk from hotel and 5 minutes from NJ Transit Station. Galleries will be open before and during the banquet. http://www.zimmerlimuseum.rutgers.edu/

SCHEDULE WITH ABSTRACTS

FRIDAY MARCH 22, 2019

7:30-8:30: Registration and continental breakfast outside conference room. Coffee, tea, water and snacks, available during all breaks.

8:30-8:45: Introduction and logistics

Session 1

8:45-9:05
Randy Gallistel (galliste@ruccs.rutgers.edu)
Department of Psychology and Rutgers Center for Cognitive Science, Rutgers University

Contingency in conditioning

Contingency is a critical concept for theories of associative learning and for the assignment of credit problem in reinforcement learning. Measuring and manipulating it has, however, been problematic, because commonly used measures require discretizing time in an arbitrary way. The information-theoretic definition of contingency—normalized mutual information—makes it an easily computed property of the relation between reinforcing events, the stimuli that predict them and the responses that produce them. In many applications, no temporal discretization is required. When it is required, a psychologically realistic discretization of probability

distributions is achieved by considering the dynamic range of the required temporal representation together with the Weber fraction. This measure of contingency provides novel insights into the governance of operant behavior: There is no measurable prospective contingency between pecks and reinforcement and only a small an inconsistent contingency between pecking rate and rate of reinforcement. The retrospective contingency between reinforcement and a peck is perfect. Degrading it by gratis reinforcement reveals a critical value of 0.25. Delay of reinforcement leads to a decline in response rate to a level that restores retrospective contingency to above this value. Contingency explains a wide range of basic results in associative learning.

9:05-9:25
Sharon Thompson-Schill (sschill@psych.upenn.edu)
Department of Psychology, University of Pennsylvania

The dynamic nature of semantic memory: Using concepts can change them

The generative capacity of language enables us to flexibly combine concepts. Concepts can be combined either by using an attribute of one concept to describe another (attributive) or by forming some relation between two concepts (relational). However, whether these different combination processes are similar or distinct remains an open issue. We turn the question around and ask whether the consequences of these combination types on our conceptual system might differ, via network science methodologies. Using a free association task, participants' semantic networks were estimated before and after they underwent either a relational combinations, attributive combinations, or a baseline condition. We find that relational manipulation increased the flexibility of the semantic network while the attributive manipulation led to a "focusing effect" on prototypical properties of concepts with no effect on the semantic network. We argue that these results lend support to the dynamic nature of concepts.

9:25-9:45
Kenneth Norman (knorman@gmail.com)
Psychology and Neuroscience, Princeton University

U-turn: How memory retrieval drives learning

I will summarize a long-running line of work in my lab, exploring an unsupervised neural-network learning rule that learns based on spreading activation in a U-shaped way, such that moderate activation of memories causes weakening of synaptic connections, whereas higher levels of activation cause strengthening. I will describe how this principle can potentially account for a wide range of neural and behavioral findings, including the testing effect, retrieval-induced forgetting, and statistical learning, and may provide key functional benefits by reducing competition between memories on subsequent retrieval attempts. I will conclude by discussing open questions and challenges in testing the theory.

9:45-10:00 Break

Session 2

10:00-10:20
Wilson Geisler (w.geisler@utexas.edu)
Department of Psychology, University of Texas at Austin

Local reliability weighting explains identification of partially-masked objects in natural images

One of the most fundamental natural visual tasks is identification of specific target objects in the environments that surround us. In previous studies, we have shown that the background's luminance, contrast, and similarity to the target have highly lawful effects on identification in natural backgrounds. However, there is another important factor that has received little or no attention in the masking literature. Namely, in natural backgrounds the properties of the background often vary under the target, and hence some parts of the target are masked more than others. We began studying this factor, which we call "partial masking," by measuring thresholds in backgrounds of contrast-modulated noise constructed so that the classic template-matching (TM) observer performs equally well whether or not the noise contrast modulates in the target region. When noise contrast is uniform in the target region, the TM observer is ideal. However, when noise contrast can modulate, the ideal is to weight the template at each location by its estimated reliability (local contrast power). We find that human performance for modulated noise backgrounds is predicted by this reliability-weighted template-matching (RWTM) observer. More surprisingly, we find that human performance for natural backgrounds is also predicted by the RWTM observer.

10:20-10:40
Mary Peterson (mapeters@email.arizona.edu)
Cognitive Science Program and Department of Psychology, University of Arizona

Two varieties of semantic influences on object detection

It's well-known that familiar configuration is a prior for figure assignment. And recent evidence shows that object semantics are activated in the course of figure assignment. When figure assignment occurs, one perceives both what an object is and where it lies with respect to scene borders. Consequently, we consider figure reports an excellent assay of object detection. An important question is whether prior activation of object semantics facilitates object detection. Others have addressed this question using tasks that may measure feature detection rather than object detection. I'll report a series of experiments using word primes to activate semantics before test displays requiring a figure-ground judgment that reveal two ways in which the prior activation of object semantics facilitates object detection.

10:40-11:00
George Sperling, Peng Sun, Dantian Liu, and Ling Lin
UC Irvine

Theory of the perceived motion direction of equal-spatial-frequency plaid stimuli

A plaid is the superposition of two sinewave gratings that move independently in different directions, with different speeds, and contrasts. Five themes emerged in our study of same-spatial-frequency plaids

1. The components of velocity, direction and speed, are computed separately in early stages of motion processing. The focus here is exclusively on direction.
2. Procedure: In studying motion, context matters, When most stimuli occur in a restricted range of directions, the representation of directions is distorted, therefore motion stimuli must occur in random directions;
3 (a) First-order theory and data. There are three different early motion computations: When only first-order system is stimulated (e.g., by temporal frequencies >10 Hz), a remarkably simple pattern emerges: Only the contrast ratio of the two plaid components matters in determining perceived direction, direction is completely independent of the absolute contrast over the visible range.

(b) When each component sinewave is represented as a contrast-strength vector (direction perpendicular to stripes of sinewave, length determined by a factor rho representing the relative effectiveness of that temporal frequency) times contrast to a power beta (beta approx 2, varies among subjects), perceived (judged) direction is completely determined by contrast-strength vector summation, velocity is irrelevant.

(c) Once the beta and rho for a subject have been determined for a reference set of plaids that all have the same angle between components which vary only in contrast,
the same beta, rho predict 99% of the variance of new data with plaids composed of a full range of possible angles and different contrasts

4. For 1 & 2 Hz high-equal-contrast plaids, exclusively third-order motion is perceived--movement in the direction of rigid translation (pattern direction, intersection of constraints). At intermediate contrast ratios and temporal frequencies, a combination of 1st & 3rd order motion is perceived. Second-order motion is irrelevant for these plaids.
5. A purely theoretical, zero-estimated-parameter theory that embodies the above principles, captures the essence of the full range of the data for same-spatial-frequency plaids.

11:00-11:15 Break

11:15-Noon: *Warren Medal Address*

Noon – 1:30 PM Lunch. LUNCH FOR REGISTERED PARTICIPANTS AT THE RED LION ROOM IN THE LOWER LEVEL OF THE COLLEGE AVENUE STUDENT CENTER. 126 COLLEGE AVENUE. (Exit the Academic Building and walk toward College Avenue, the direction away from the river. Turn right on College Avenue. The student center is the large red brick building across College Avenue).

Session 3

1:40-2:00
Tom Griffiths (tomg@princeton.edu)

Departments of Psychology and Computer Science, Princeton University

Rational process models

Psychologists typically construct models of human cognitive processes by hand, using a repertoire of elementary components that are assembled into process models through a combination of intuition and empirical data. I will present a different method for modeling cognitive processes, based on the idea that people are making efficient use of their cognitive resources. This approach, which we call resource rationality, provides a way to automatically derive cognitive process models by identifying an abstract computational problem that people are solving and characterizing the cognitive resources that people are able to deploy. This results in optimization problem: given the problem to be solved, what is the most efficient use of those cognitive resources? I will present some case studies of applying this method in the context of human decision-making, allowing us to revaluate some classic heuristics that people use and to discover some new strategies not previously identified by psychologists.

2:00-2:20
Jessica Andrews-Hanna (jandrewshanna@gmail.com)
Department of Psychology; Cognitive Science, University of Arizona

The dynamics of thought: A window into wandering and sticky minds

A remarkable characteristic of the human mind is its propensity to wander away from the here-and-now. Along the "stream of consciousness", our thoughts meander through time and space, constructing mental models of possible futures and providing narrative to our lives. Despite the significance of spontaneous mental activity, methodological challenges and historical biases in psychology and neuroscience have thwarted its scientific study. Recent years have brought a growing interest and understanding of "mind-wandering," yet little is known about the content, correlates and consequences of mind-wandering in daily life, nor how such thoughts unfold and transition over time. In this talk, I will introduce a line of research seeking insight into these questions using naturalistic assessment methods and novel behavioral paradigms. More specifically, I will 1) describe results from a daily experience sampling study seeking insight into the costs and benefits of off-task thought, 2) introduce a neuroscientific framework for understanding mind-wandering by its dynamic properties, and 3) describe preliminary studies highlighting the potential for language and conceptual processing to illuminate dynamic trajectories of thought, with important clinical implications.

2:20-2:40
Michael Kahana (kahana@psych.upenn.edu)
Department of Psychology, University of Pennsylvania

A retrieved-context theory of mood and affective disorders.

Learning and memory have long been implicated as a driving force in depression and posttraumatic stress disorder. We introduce a context-maintenance and retrieval model of memory and mood that characterizes the role of memory in persistent emotional states. The

proposed model accounts for the mutual interactions of emotion with the memory system, as well as the major qualitative patterns of mood in clinical depression. Further, the model generates novel predictions for the role of emotional- context insensitivity in depression. We demonstrate the model's ability to account for a wide range of clinical phenomena, including persistent low mood after chronic or severe stressors, overgeneral memory, and intrusive recollection of painful events. The model also characterizes the effects of rumination and emotional context sensitivity. All of these predictions arise from the recursive nature of contextual dynamics in the model.

2:40-3:00
Stephen Link (slink@ucsd.edu)
Department of Psychology, McMaster University

Fact, context and judgment

What is a fact often depends on Context. In Psychophysics we often try to maintain a fixed Context in order to reduce response variability. Measuring variability itself is largely forgotten. This presentation shows how to measure the effects on facts of context.

3:00-3:15 Break

Session 4

3:15-3:35
Michael Kubovy (kubovy@virginia.edu)
Department of Psychology, University of Virginia

Strands and the structure of lives

The history of psychology is littered with unsuccessful attempts to create a descriptive psychology. Contemporary psychology, contrary to other biological sciences, still lacks such a foundation. This is an attempt to provide such a foundation. Psychology has always treated behavior and experience as embedded in a unidimensional flow in time, the "stream of behavior". This means that events and actions occupy non-overlapping time-intervals in this stream. Nevertheless a phenomenological analysis reveals that the structure of lives is richer and far more interesting. Using Herbert Simon's notion of near-decomposability, I describe the structure of lives as a composite of nearly independent continuous strands that run concurrently, and are asynchronous. This is a "deep structure" of lives in contrast to the current default conception, which conceives of lives as "flat".

3:35-3:55
Barbara Knowlton (knowlton@psych.ucla.edu)
Department of Psychology, UCLA

The effect of contextual interference on implicit sequence learning

Interleaving practice trials of different variations of a skill has been shown to benefit retention. We have shown that interleaving practice of different sequences in a serial reaction time task leads to better retention of those sequences. One unresolved issue is whether the benefit of interleaving occurs for both implicitly and explicitly learned material. One potential mechanism for this effect is more effortful retrieval practice in the interleaved condition. It is unclear if this benefit would also occur via implicit retrieval. Here, we used longer sequences and assessed subjects' explicit knowledge of the sequences after either interleaved or blocked practice of different sequences. Each sequence was practiced 80 times on Day 1, with a test of retention on Day 2. For both explicit and implicit learners, retention of sequences on Day 2 was better in the interleaved group. This effect interacted with test type. For testing with blocked sequences, the practice groups showed similar levels of retention. When the test sequences were interleaved, there was substantially worse retention for the blocked practice group compared to the interleaved practice group. The results indicate that interleaving is beneficial for learning, even when it is not accompanied by explicit retrieval.

3:55-4:15
David Huber (dehuber@psych.umass.edu) and William J. Hopper
Department of Psychology, University of Massachusetts, Amherst

Testing the primary and convergent retrieval model of recall: Recall practice produces faster recall success but also faster recall failure

The Primary and Convergent Retrieval (PCR) model assumes that the act of successful recall not only boosts associations between the item and retrieval cues, but additionally strengthens associations within the item (i.e., between the features of an item), speeding the rate of information retrieval from memory. The latter effect is termed intra-item learning and is a unique benefit of recall practice (i.e., the 'testing effect'). Prior work confirmed the prediction that recall practice produces faster subsequent recall than restudy practice even if accuracy is higher following restudy. The current study replicated this result, but also examined the down-side of recall practice: that after a failure to recall during practice, participants will be faster in their failure to recall on a subsequent recall test. This prediction was confirmed in a multi-session cued recall experiment that collected accuracy and recall latency measurements for no practice, recall practice, or restudy, with an immediate or delayed final test. A reaction time model was fit to latency distributions and model comparison determined that these effects reflect differences in drift rates, as predicted by the PCR model.

4:15 *Lifetime Achievement Award*

SCHEDULE FOR SATURDAY, MARCH 23, 2019

7:30-8:30: Registration and continental breakfast outside conference room. Coffee, tea, water and snacks, available during breaks.

Session 5

8:30-8:50
Jeremy Wolfe (jwolfe@bwh.harvard.edu)
Brigham & Women's Hospital; Harvard Medical School

We underestimated your capacity: Introducing multiple object awareness

How many things can you monitor in a dynamic scene? The usual answers from multiple object tracking, identity tracking or change detection are in the range of 2-4 items. You may be please to know that this is an underestimate. In classic tracking experiments, you would be asked to track some set of items. You would be tested on your memory for the exact locations of the tracked items. If you are not exactly right, the result is coded as an error, as if you knew nothing about the target's location. In our new Multiple Object Awareness (MOA) task, observers are asked to track 16 animals. Every 7-20 seconds, all items are hidden and the observer is queried about the location of a specific animal. Critically, they are told to keep selecting locations until the target animal is uncovered. Even if the first selection is wrong, observers often discover the target with fewer clicks than predicted by chance. Modeling shows that MOA capacity is, at least, 6 under our conditions; much larger than previous estimates for identity tracking. MOA capacity shows that partial knowledge is still knowledge.

8:50-9:10
William Warren (Bill_Warren@brown.edu)
Cognitive and Linguistic Sciences, Brown University

The cognitive graph meets the impossible heptagon

A familiar picture of human spatial navigation is that as we explore the environment, the path integrator records displacements and orientations and we build up a Euclidean cognitive map. I will suggest a somewhat different picture, in which we learn a network of paths between places, together with local, piecewise information about path lengths and turn angles. This information is not embedded in a geometrically consistent map, but is better characterized as a labeled graph. Novel shortcuts can be generated by vector addition through the graph, but are rough and unreliable.

The cognitive graph hypothesis predicts that shortcuts should be specifically biased by local place-to-place relations experienced during learning. To test this hypothesis, we (Strickrodt, Meilinger, Bulthoff & Warren) created an impossible virtual environment in which participants walked around a zig-zagging loop that visited 7 places (objects), but they were covertly teleported across a large gap. After learning, they were asked to stand at one object and point to other objects in a strict clockwise (or counterclockwise) order. Pointing was biased as predicted by the local place-to-place relations, and violated the metric postulates. The results suggest that spatial knowledge is consistent with a locally labeled graph, rather than a globally consistent Euclidean map

9:10-9:30
Irving Biederman (bieder@usc.edu)

Department of Psychology & Neuroscience, University of Southern California

Why is it so difficult to recognize faces differing only moderately in orientation?

When unfamiliar faces are to be recognized at moderately differing orientations in depth, sizeable costs in the speed and accuracy of performance have been documented attributable to the disparity in orientations. There has been no general quantitative account of these costs. We assessed the effects of orientation disparity in a minimal match-to-sample paradigm of a triangular display of three faces, with one of the two lower test faces physically identical to the sample on top. The test faces had the same orientation in depth at an angle that differed by 0° to 20° from the sample. The dissimilarities of the face images were scaled by a model based on V1 simple cell tuning. The greater the a) dissimilarity of the rotated matching face to the sample and b) the greater the similarity of the foil and matching test faces, the greater the difficulty in matching. An orientation disparity of as little as 13° between images of the identical face rendered the dissimilarity surprisingly large--comparable to faces differing in race, sex, and expression. These two costs were additive and were sufficient to account for all the costs of orientation disparity.

9:30-9:45 Break

Session 6

9:45-10:05
Saul Sternberg (saul@upenn.edu)
Department of Psychology, University of Pennsylvania

Shapes of reaction-time distributions and the ex-Gaussian straitjacket

It has become popular to describe reaction times in terms of the estimated parameters of a fitted ex-Gaussian distribution. This method was introduced by Hohle (1965), evaluated against two other distributions by Ratcliff and Murdock (1976), used in relation to his diffusion model by Ratcliff (1978), advocated as a general method by Heathcote et al. (1991), and applied by many others, often without goodness-of-fit tests. (The term "ex-Gaussian" appears in about two hundred of the papers in PsycInfo, half of them during the past five years.)

I will describe a model-free method for characterizing distributional shape that mitigates difficulties of using the central moments for this purpose, report theoretical results that argue against the ex-Gaussian distribution under some plausible conditions and that reveal constraints on values of its parameters under others, question historically important claims that the ex-Gaussian provides an accurate description of certain reaction-time data, and show findings from several paradigms for which it fails under conditions where the theoretical results suggest that it should.

10:05-10:25
Randall Engle (randall.engle@gatech.edu)
Department of Psychology, Georgia Tech

Measurement of attention control

Many of the most interesting findings and concepts in psychology rely on reaction time (RT) and a difference score between two RT's. Reliability of RT and even RT difference scores are pretty reliable in experimental studies. Tasks such as the Stroop, Attention Network Task, Erickson Flanker Task and others from personality and social areas such as the Implicit Association Test are easily replicated and often used in group settings such as classrooms. However, measuring individual and developmental differences with RT and RT difference scores represents a major problem. First, there are large individual and developmental differences in speed/accuracy tradeoff and very small changes in accuracy can correspond to quite large differences in RT. Second, when subtracting two conditions such as congruent and incongruent in the Stroop task, the higher the reliability of each condition, the less variability remains to distinguish among individual and developmental groups. I report results of an attempt to develop measures of attention control based on threshold accuracy measures and show the impact of those more reliable measures on several latent variables and on predictive validity of the Armed Services Vocational Aptitude Battery.

10:25-10:45
Jerome Busemeyer (jbusemey@indiana.edu)
Department of Psychological and Brain Sciences, Indiana University

Markov versus quantum dynamic models of belief change during evidence monitoring

Two different dynamic models for belief change during evidence monitoring were evaluated: Markov and quantum. They were empirically tested with an experiment in which participants monitored evidence for an initial period of time, made a probability rating, then monitored more evidence, before making a second rating. The models were qualitatively tested by manipulating the time intervals in a manner that provided a test for interference effects of the first rating on the second. The Markov model predicted no interference whereas the quantum model predicted interference. A quantitative comparison of the two models was also carried out using a generalization criterion method: the parameters were fit to data from one set of time intervals, and then these same parameters were used to predict ata from another set of time intervals. The results indicated that some features of both Markov and quantum models are needed to accurately account for the results

10:45-11:00 Break

Session 7

11:00-11:20
Caren Rotello (caren@psych.umass.edu)
Psychological & Brain Sciences, University of Massachusetts

Validity of researcher inference in recognition memory: A blinded validation study

In memory research, theoretical and practical conclusions often hinge on the ability to determine whether an empirical effect is produced by changes in memory acuity, changes in response bias, or both. A wide variety of analysis tools are available to distinguish memory and bias, including measurement models and calculated indices. We report a blinded validation study to 1) determine which of the many available tools researchers use to distinguish memory and bias when they are free to choose and 2) assess whether these tools support valid inferences about the cognitive processes underlying an effect. We collected a large data set from a recognition task and manipulated well-established variables that affect memory and bias. We then sent smaller data sets sampled from the full data set to memory researchers for analysis. Each data set had two unlabeled conditions, and contestants were asked to apply the analysis method of their choice to determine if the conditions varied in terms of memory acuity, response bias, neither, or both. We assessed these inferences in terms of overall accuracy, variability across researchers, and variability across analysis techniques.

11:20-11:40
Stephen Grossberg (steve@bu.edu)
Center for Adaptive Systems, Boston University

Neural dynamics of autistic repetitive behaviors and fragile X syndrome.

This talk has two expository goals. First, it will propose a neural mechanistic explanation of recent data that links Fragile X syndrome, mGluR, and trace conditioning. This explanation emerges from the iSTART neural model which proposes how specific imbalances in cognitive, emotional, timing, and motor processes that involve brain regions like prefrontal cortex, temporal cortex, amygdala, hypothalamus, hippocampus, and cerebellum may interact together to cause behavioral symptoms of autism. Second, the talk will propose a mechanistic explanation of stereotyped behaviors in individuals with autism. Some of these stereotyped behaviors, such as an insistence on sameness and circumscribed interests, may result from imbalances in the cognitive and emotional circuits that iSTART models. These behaviors may be ameliorated by operant conditioning methods. Other stereotyped behaviors, such as repetitive motor behaviors, may result from imbalances in how the direct and indirect pathways of the basal ganglia open or close movement gates, respectively. These repetitive behaviors may be ameliorated by drugs that augment D2 dopamine receptor responses or reduce D1 dopamine receptor responses.

Reference

Grossberg, S., and Kishnan, D. (2018). Neural dynamics of autistic repetitive behaviors and Fragile X syndrome: Basal ganglia movement gating and mGluR-modulated adaptively timed learning. Frontiers in Psychology, Psychopathology. https://doi.org/10.3389/fpsyg.2018.00269.

11:40-noon
Janet Metcalfe (jm348@columbia.edu)
Department of Psychology, Columbia University

Is the ‘Learning from Errors’ benefit due to episodic recollection or semantic mediation?

Many studies over the last decade have shown that memory for a correct response is enhanced when a semantic-memory error is committed and then corrected, as compared to when there was no error generation. These findings, which are consistent with a semantic mediation hypothesis, seem at odds with the difficulties amnesics, who presumably have intact semantic memory, experience with errors. I will present two experiments investigating whether the often-observed error generation benefit is due to Semantic Mediation (Experiment 1) or Episodic Recollection (Experiment 2). In Experiment 1, participants generated erroneous guesses to Congruent (e.g., wrist-palm) and Incongruent (e.g., tree-palm) cues about a target item (e.g., HAND). In the former condition, the errors were semantically related to the target (e.g., error: finger; target HAND), whereas in the latter condition they were unrelated (e.g., error: coconut; target HAND). According to the semantic mediation hypothesis, the error generation benefit should have been seen only in the Congruent condition. In Experiment 2 the error generation benefit was examined depending on participants' recollection of the original error. These findings allow us to hone in on the locus of the 'learning from errors' benefit and to specify some boundary conditions on the effect.

Noon – 2 PM Lunch. Many options are available within easy walking distance of the conference room. Details will be available at the meeting.

Session 8

2:00-2:20
Robert Sekuler (sekuler@brandeis.edu)
Volen Center, Brandeis University

Audiovisual combination with temporal correlation and time pressure

We built a video game to examine how temporal correlation and increasing time-pressure influenced audiovisual integration. Visually identical fish swam into view one at a time. Each oscillated sinusoidally in size —either at 5 or 8Hz. Fish could be accompanied by an amplitude modulated sound either matched to the frequency of visual oscillation (Congruent) or was mismatched to it (Incongruent). Subjects were instructed to ignore sounds, categorizing fish solely on their frequency of visual oscillation. Audiovisual congruence boosted performance, but incongruence had no discernible behavioral effect. Toward the end of a session, shrinking inter-fish intervals made subjects reduce time spent observing the stimulus, which increased errors. Reduced time between fish induced subjects to needlessly curtail observation times, a self-defeating strategy. Pulse rate decreased systematically with time-pressure, reflecting increased sympathetic nervous system activation.

2:20-2:40
James T. Townsend (jtownsen@indiana.edu)
Psychological and Brain Sciences, Indiana University

Assay of mean shift integrality using GRT and SFT and the Hering illusion

Selective Influence occurs when an experimental factor affects only a single psychological process in a way that makes it faster or slower in a strong stochastic sense. If it is in force, powerful predictions are made regarding mental architecture and decisional stopping rules using Systems Factorial Technology SFT. This study demonstrates that illusory visual dimensions can evoke selective influence and thereby engage SFT. General Recognition Theory permits tests of various important types of perceptual and cognitive dependencies and invariances. However, an incidence of a phenomenon known as Mean Shift Integrality can lead to false conclusions regarding these dependencies. Here, we combine bring together systems factorial technology and general recognition theory in league with the Hering Illusion to both provoke the appearance of Mean Shift Integrality as well as to detect it. In addition, processing was found to be uniformly parallel in nature and capacity was super in the case of the Mean Shift Integrality conditions.

2:40-3:00
Moshe Bar (Moshe.Bar@biu.ac.il)
Bar Ilan University, Israel

Overarching states of mind

Implicitly, we think of our brain and mind as fixed: always with the same inclinations, biases, strengths and weaknesses. But the human mind is adaptive to circumstances, dynamically and seamlessly changing between different states. We propose that these states of mind are holistic in that they exert all-encompassing and coordinated effects simultaneously on our perception, cognition, thought, affect and action. Given the apparent breadth of their reach, being able to explain how states of mind operate is essential. We provide a framework for the concept of state of mind (SoM). From this framework we derive several unique hypotheses, and propose an underlying mechanism whereby SoM is determined by the balance between top-down and bottom-up cortical processing. This novel framework opens new directions for understanding the human mind, and bears widespread implications for mental health.

3:00-3:15 Break

Session 9

3:15-3:35
Herbert Terrace (terrace@columbia.edu)
Department of Psychology, Columbia University

Why only us?

In Why Only Us, subtitled, Language and Evolution, Chomsky simplified his theory of grammar to a single operation for combining words: Merge, and argued that it resulted from a recent mutation (~80,000 years ago). He also regarded the origin of words as "entirely obscure". If the ability to arrange words to create an indefinitely large number of meanings is a hallmark of language, we're left in the dark about its evolution. In contrast to his model of Universal Grammar, which is based on adults, Chomsky has little to say about its phylogenetic and

ontogenetic roots. Recent developments have made the origin of words less obscure and help to explain why language is uniquely human. These include theories about the origin of words in Homo erectus, why apes can't learn language and why an infant's emotional and cognitive relations with her caretakers are crucial antecedents of her first words.

3:35-3:55
Richard Shiffrin (shiffrin@indiana.edu)
Department of Psychological and Brain Sciences, Indiana University

Sequential decision making by two selfish but rational agents, with or without communication

When two agents make simultaneous or sequential decisions, without or even with communication, some lines of reasoning lead both to accept payoffs that are worse for both than other available payoffs—e.g. Nash Equilibria as seen in the Prisoner's Dilemma. Human agents sometimes do better, but perhaps for altruistic or social reasons, or prospects of future rewards and punishments. I ask what decisions ought to be made by two agents, without communication, if they are completely rational, are each aware of the thinking processes of the other agent, are not motivated by future considerations, are completely selfish, and are making sequential decisions in a decision tree with payoffs at the leaves of the tree. The joint rationality assumption produces correlated thinking for the agents, and thereby produces better payoffs for both than Nash Equilibria and other decision methods, even though both agents are selfish. I give a general algorithm that produces an optimal solution for both agents making decisions in an arbitrarily large sequential decision tree.

3:55-4:15
Richard Aslin (richard.aslin@yale.edu)
Haskins Labs and Yale University

The importance of prediction in learning and development

Learning entails making predictions about upcoming events. Those predictions can be guided by task-based feedback or by prior distributional regularities. I will summarize several lines of research on a variety of populations (typical infants, premature infants, children, typical adults, and adults with synesthesia) using both task-based feedback and implicit statistical learning paradigms. I will argue that learning across these different paradigms can, and should, be viewed from a unified perspective that bridges supervised and unsupervised contexts. I will also summarize recent neuroimaging work with infants and adults that supports an architecture of top-down prediction which serves to promote efficiency of information extraction. However, this goal of efficiency meets its match when the computational demands placed on domain-general cognitive processes are too great to support a fully generative model of the task environment.

4:15-4:35
Robert Nosofsky (nosofsky@indiana.edu)
Psychological and Brain Sciences, Indiana University

Building a feature-space representation for a natural-science category domain

An important goal in formal modeling of human category learning is to extend the application of the models to real-world, naturalistic domains. In our recent work we have pursued that goal by testing an exemplar model on its ability to predict learning and generalization of rock categories in the geologic sciences. A prerequisite for conducting rigorous tests is to derive a comprehensive, high-dimensional feature-space representation for the stimuli. Here we report progress in our multi-pronged approach to deriving such a representation. The approach involves a combination of complementary methods based on scaling models of similarity-judgment data, direct ratings of hypothesized dimensions, and deep-learning technology. We iterate over these methods after analyzing deviations between the predictions of the categorization model and empirical findings. When used in concert with the derived high-dimensional feature-space representation, the exemplar model is achieving increasingly precise accounts of learning and generalization in this complex, naturalistic category domain.

6:00 – 9:00 SEP Banquet at the Zimmerli Art Museum, 71 Hamilton Street, New Brunswick. 10 minute walk from hotel and 5 minutes from NJ Transit Station. Galleries will be open before and during the banquet. http://www.zimmerlimuseum.rutgers.edu/

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