Psychonomics 2009 Conference: A Debrief

Elizabeth Gire, Adrian Carmichael
N. Sanjay Rebello

PER Seminar
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The Psychonomic Society

1959 - 2009 Fifty Years of Psychological Research

- Promotes communication of scientific research in psychology, particularly cognitive psychology.
- Society membership, including associate members, is around 2,500.
- The main function is to exchange information among scientists.
- Publishes six journals, and annually hosts an international scientific meeting.

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Psychonomics Strands

- Scene Processing
- **Selective Attention**
- **Reasoning & Problem Solving**
- Bilinguals Reveal the Role of Control in Language Processing
- Discourse Processing
- **Associative Learning**
- Automatic Processing
- Decision Making
- **Metamemory**
- **Categories & Concepts**
- Speech Perception
- Picture Processing
- Working Memory
- Faces of Familiarity
- Collaborative Cognition
- **Psycholinguistics**
- Explicit Memory
- Animal Cognition
- Perception
- Attentional Blink

Sessions Attended

Les Loschky

- **Spatial Cognition**
- Cognitive Control
- Word Processing
- Implicit Memory
- **Human Learning & Instruction**
- Memory
- Attention & the Brain
- Metacognition
- Language Acquisition
- Action
- Word Recognition
- Context Memory
- Applications of Decision Making
- Memory Models
- Dual Processing in Memory Development
- Divided Attention
- Motor Control
- Vision
- Priming
- Reading
- Task Switching

Most Related to our Research

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Focus of this Seminar

- What did we learn?
  - Some Interesting Research Ideas
  - Experimental Design Issues
- Why should we care?
- How do we apply?
- What barriers do we face?

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Examples of Interesting Ideas

- Teaching vs. Testing Motivation
- Performance goal vs. Mastery goal
- Testing effect
- Spacing effect
- Aligning instruction to testing
- Guided cognition instruction
- Role of verbal vs. visual memory in categorization
- Classification learning vs. Inference Learning
- Top-down vs. Bottom-up Approaches in Self-Regulated Learning
- Data-driven vs. Goal-driven effects
- Thematic salience and Test-induced false Recognitions
- Effects of Contextual Similarity on Cuing

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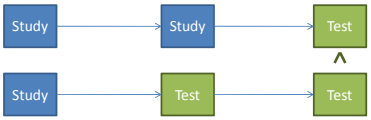
Interesting Ideas

- Testing Effect



Forced guessing on multiple choice items doesn't suppress the Testing Effect on those items

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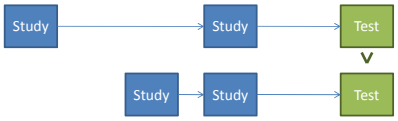
…Interesting Ideas…

- "Teach to someone else" motivation causes better learning than "Test" motivation
- Spacing Effect



Forgetting helps learning.

Forgetting could be induced by time or interference task

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… Interesting Ideas …

- "Performance" goal (rather than "Mastery" goal) inhibits benefit of Invention Task (Schwartz) in Preparation of Future Learning
- Texts that explicitly discuss misconceptions leads to more backtrack eye movements than implicit treatments of misconceptions

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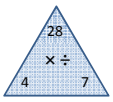
… Interesting Ideas …

- Drill tests lead to better learning of arithmetic than arithmetic triangle



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… Interesting Ideas …

- Guided Cognition : Cognitive events to influence cognitive processes
  - Guided cognition group did better than traditional group.
- Categorization methods
  - Rule-based methods: Use working memory
  - Non-rule based methods: Use visual processing
  - Which methods do experts/novices typically use?

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… Interesting Ideas …

- Classification Learning vs. Inference Learning
  - Classification Lrng: Object + Feature = Category
  - Inference Lrng: Object + Category = Feature
  - Results: Inference learning can occur even without the category label
- Bottom-Up vs. Top-Down approaches
  - Top-Down: Learning agenda based on region of proximal learning
  - Bottom-Up: Stimulus in environment triggers pre-portended habitual response
  - Results: Effective learners choose top-down approaches even when environment cues otherwise.

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… Interesting Ideas …

- Data driven vs. Goal driven Effects
  - Data Driven (Control affects Monitoring):
    - Judgment of Learning Decreases as Effort Increases
  - Goal Driven (Monitoring affects Control):
    - Judgment of Learning Increases as Effort Increases
  - How do we get learners to become more goal driven?

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… Interesting Ideas …

- Thematic Salience and Test Induced False Recognitions
  - Thematic Salience: Existence of a central organizing idea or theme that is clearly obvious to the learner.
  - False Recognition: Falsely recognizing that a word belonged to a particular list.
  - Result: Studying blocks of word lists that have high thematic salience reduces the number of false recognitions in other word lists that do not have such thematic salience.

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… Interesting Ideas …

- Effects of Contextual Similarity on Cuing
  - Context: e.g. A video of a common everyday scene
  - Information: e.g. Word superimposed on the scene at the same time as the video
  - Result: Scenes that were conceptually similar to the original video scene cued recall as well as the original video scene
  - Implication: Learners were not just associating video scene with word, rather they were encoding conceptual structure of video scene with word.

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… Interesting Ideas …

- Myside bias
  - is the tendency for people to confirm their preconceptions or hypotheses, independently of whether or not they are true.
  - People can reinforce existing attitudes by selectively collecting evidence, by interpreting evidence in a biased way or by selectively recalling information from memory.

… Interesting Ideas …

- Hypercorrection Effect
  - with feedback students are better able to correct high confidence errors than low confidence errors.
  - Corrections to previous errors were found to persist when students were retested one week later.

Experimental Design Issues

- Many replication studies
  - Few Expert-Novice comparisons
  - Some 'Pre-test vs. Post-test vs. Transfer Task' designs.
- Emphasis on theory building and hypothesis testing
  - Often discriminating between models
- 'Content free' experiments
  - Use more than one domain to repeat experiments
- Treatments occur on small timescales
  - Seconds to tens of minutes
- "Learning" often means "recall"

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Why should we care?

- Cog. Psychology provides "zero-friction" expts.
  - Needed before we do non-zero friction expts.
- Credibility with Physicists
  - Cog. Psych. is a "real" science
  - Uses careful research designs
  - Fewer confounding variables

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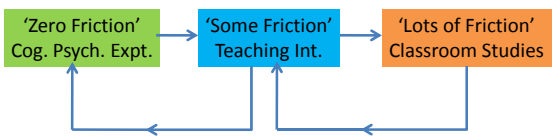
How do we apply ideas of Cog. Psych?

- Redo experiments in Cog. Psych.
  - E.g. Thomas & Lleras experiment with Duncker's tumor problem replicated in a physics content.
- Use a 'Staged' Approach with Feedback



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How do we apply ideas of Cog. Psych? – Three Possible Levels

- Adopt/Adapting Design Paradigms
  - e.g. Control vs. Treatment
  - e.g. Randomization
- Using the Tools of Cog. Psych. e.g.
  - Eye-tracking
  - EEG
- Specific Issues not Typically Considered in PER
  - E.g. Spacing effect, Testing effect

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What are the Barriers?

- Student accessibility for controlled studies
  - Cannot easily form experimental and control groups.
- Interference with classroom learning
  - Students concurrently learning material in class.
- Nature of what we study
  - Deep learning takes time
  - Depends upon several variables

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Discussion Questions – From Jackie

- You mention accessibility of students as a barrier to controlled studies. How have others in this field gotten past this barrier?
- You discuss application of this type of research at three levels. How could the current projects in this group benefit from this application?
- You describe cognitive psychology as a "real" science. Do feel this view is held by all? Are there any possible threats to the way we have done research in the past in moving towards these new methods?
- Much of the research our group (and many in PER) has done is situated in a particular context. Some cognitive science studies attempt to be "context-free". What is the appropriate balance between context-dependent and context-free studies?

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