

Engaging Students in Cognitive Psychology

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There are several challenges in teaching a course in cognitive psychology. First, the material typically covered in a cognition class is fairly abstract. For example, concepts such as phonological buffers, semantic networks, and schemata may seem less tangible to students than the concepts from many other psychology classes. Thus, there is a challenge to make abstract material more accessible.

Second, cognition presents a challenge due to the scientific, quantitative nature of the field. A deep understanding of the field requires students to have learned and be able to apply concepts from research methodology, including how experiments differ from other methods that psychologists employ, how instructions may influence data sets, and the use of statistical tests. Students who are not adequately prepared in these and related concepts may find the cognition course to be a significant challenge, which may reduce their level of engagement with course material.

Third, it is a challenge to convey the place of cognition in the history of psychology. Students often will not have taken a course in the history of psychology prior to taking the cognition course, and hence will be unaware of the cognitive revolution and the tensions between cognitive and behaviorist paradigms. Discussing the beginnings of modern cognitive psychology may convey the vitality of the field, but many instructors prefer to leave coverage of historical issues to the history course. Finding a way to convey the place of cognition within the history of psychology without losing excessive class time needed for other topics thus represents a challenge for cognition instructors.

Finally, cognition instructors face the challenge of developing a unified theme for the course. Typically, cognition courses include a wide variety of material, such as attention, memory, visual imagery, language, problem solving, and decision-making. Although such diversity may prove stimulating for some students, instructors are aware that retention of material is facilitated when the material is effectively organized. Thus, cognition instructors are challenged to present integrative themes that apply to several topics within the course.

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While these several challenges are daunting to cognitive psychology instructors, addressing them effectively promises to engage students in the cognition course at deep levels. In the next section of this chapter, we present an activity that may be used on the first day of class. This activity intends to provide opportunities to make abstract constructs real, to demonstrate the quantitative nature of course material, and to establish several unifying course themes. The activity can also be used to develop an historical perspective if you choose to use the topic (levels of processing) in an account of cognitive psychology's history during the past 50 years. The annotated bibliography of activities that we present in the final section promotes engagement in cognitive psychology precisely by offering activities that address the challenges.

New Activity

The first day of class is an important time to engage students in their study of cognitive psychology. Rather than outlining course topics, requirements, and policies (the standard script), an instructor may find that the following activity engages students and creates an experience she may cite throughout the academic term.

After welcoming students to your course, announce that you are going to demonstrate what cognitive psychology is about by doing an experiment on the relationship between personality and human perception. In fact, what you will demonstrate is the effect of levels of processing (Craik & Lockhart, 1972; Craik & Tulving, 1975) on memory for a list of words.

For the experiment you will need copies of the Need for Cognition Scale (NCS; Cacciopo & Petty, 1982; scale items are available in the publication), a scoring key for the scale, and a PowerPoint file available from Tom Pusateri for display of the words. The PowerPoint file also contains two sets of instructions serving also as response sheets that define the levels of processing. *Shallow* processing entails determining whether each word on the list contains an e; *deep* processing requires students to decide whether each word sounds pleasant (see Hyde

& Jenkins, 1969). In both cases students respond by circling “Yes” or “No” on a response sheet numbered for each word. Make copies of the NCS and its scoring key for each student. For half of the students make copies of one set of instructions, and copies of the other set for the rest of the students. Also, make a data sheet with spaces for an identification number, condition code, NCS score, and recall score. Add entries for any other variables that you like.

Begin by handing out the NCS. Tell your students that the scale measures the personality trait of interest. Instruct students to respond to scale items, then hand out the scoring key and have students score their answers. Next, initiate the experiment. Hand out one set of instructions to half of the class and the other set to the other half. Do this any way you like; “assignment to conditions” might be something you want to discuss. Violating the “random assignment rule” provides good grist for discussion.

Direct students to read the instructions that you have given them, darken the classroom, and activate the PowerPoint file, which presents 20 words one-by-one. After the last word, we have modified the program by inserting a slide that asks students to sing “Row, Row, Row your Boat” as an interpolated activity prior to a slide that asks students to write down the words they have just seen. They will sing, especially if you sing with them! After 30 seconds the prompt to remember the words will appear. Give students 90 seconds to remember as many as they can.

When the recall period is over, display the words students had seen and ask them to score their recall. When they have done that, ask students to count off (indicate who is number 1), then to enter that number, their NCS scores, their recall score, and any other information you want onto the data sheet you have given them. At this point you may want to look at the results. If you do – say by listing recall scores on a whiteboard or typing them into a spread sheet displayed on a screen in class – you will find that there is almost no overlap between recall scores for the two conditions: Deep processing participants typically recall at least twice as many words as shallow processing participants. Inspecting the data for the influence of NCS is trickier, but however you do it, you will not find a correlation of recall and NCS in either condition.

By this time you will be well into the class period. Use remaining time to discuss the experiment. We first ask them what the NCS measures. After establishing that it measures motivation to think and solve problems, talk about how such a trait might influence performance in a cognitive psychology experiment. We suggest that you steer the conversation toward the view that the trait might

interact with experimental conditions. High NC students might recall as well as low NC students in the shallow processing condition, or perhaps even less well, because the task (counting “e”s in words) is boring; but they might outstrip low NC people because they will think more deeply in the deep processing condition. Aside from those points, have students think about the logic of the experiment, how they should process the data, and about the quality of the procedure you used.

You will find that this activity engages students, introduces a compelling cognitive phenomenon, and provides excellent material for follow-up classes that also will give you information about your student’s preparation for studying cognitive psychology and their ability to work with the material. The activity may initiate a teaching cycle involving a demonstration, student reflection on the experience (e.g., by doing assignments based on the activity between classes), and discussion that becomes a productive pattern of teaching and learning that sustains student involvement in the course and promotes good study habits. There is much more that you may attempt than we have indicated here, which you will discover as you work with the activity to serve your own purposes.

Annotated Bibliography

Using Student Journals to Convey Bloom’s Taxonomy

The authors argue that educators have emphasized cognitive outcomes to the neglect of affective outcomes. Journal writing that encourages students to relate course concepts to their personal experience may be useful in helping integrate the two types of outcomes. Results suggest that students value the affective outcomes of journal writing, and these outcomes predict student evaluations. Student journals may be an effective means of engaging students in cognition.

- Bolin, A. U., Khramtsova, I., & Saarnio, D. (2005). Using student journals to stimulate authentic learning: Balancing Bloom’s cognitive and affective domains. *Teaching of Psychology*, 32, 154-159.

Using Feature Films to Engage Students

Conner describes an activity in which students work in pairs to select a feature film that represented a topic in cognitive psychology. Afterwards, students wrote a 3-5 page paper that identified the cognitive topic, defined it, and gave examples from the film. Films such as *Rain Man*, *Regarding Henry*, and *Monty Python and the Holy Grail* may be particularly good choices for this activity. Having students

connect cognitive concepts to feature films may be an engaging way for students to learn and apply cognitive psychology.

- Conner, D. B. (1996). From Monty Python to *Total Recall*: A feature film activity for the cognitive psychology course. *Teaching of Psychology, 23*, 33-35.

Applying Memory Principles

To help students in a junior level introductory cognitive psychology course understand the application of memory principles, this project engages randomly constructed teams of 4-5 students in making memorable 2-3 minute TV commercials. Teams meet with the instructor twice during the semester to discuss their ideas and to present their commercials to the class at semester's end. Student evaluations indicate that half of the students believe the project enhances their understanding of course materials, a rating that exceeds ratings of other course assignments. Instructor evaluations indicate that students nearly always apply the chunking and primacy/recency effects and typically employ repetition. Other techniques/concepts used include rehearsal, depth of processing, and cue dependence. Students ably apply memory principles to a practical problem creatively.

- Gronlund, S. D., & Lewandowsky, S. (1992). Making TV commercials as a teaching aid for cognitive psychology. *Teaching of Psychology, 19*, 158-160.

The Cognitive Revolution

Doing this project, students learn about the rise of interest in and research on human cognition and the relative decline of neobehavioral research. After introductory lectures on the history of cognitive psychology and scientific paradigms, students receive an assignment to photocopy the table of contents from one issue of each volume of the journal published during the 1950s, 1960s, 1970s, and 1980s. Students then classify every article in each issue as having a behavioral, cognitive or other approach. In a later class, students present and discuss their findings, which typically document a paradigm shift. Doing this activity students become aware of an historical perspective on the development of psychological thought. It exposes what they do not know about both cognitive and learning psychology and prepares students for future lectures.

- Hassebrook, F. (1990). Tracing the cognitive revolution through a literature search. *Teaching of Psychology, 17*, 251-252.

Three Demonstrations on the Ease of Detecting Additions

The authors report three classroom demonstrations of the tendency to notice additions more than deletions. One involves adding or deleting an object from the classroom. The second involves a concept-learning task in which students are given a set of consonants that are examples of concepts and asked to identify the concept. In the addition condition, the concept is the presence of a given letter. In the deletion condition, the concept is the absence of a letter. The third presents students with paragraphs that either omit or repeat the letter "e." Collectively, the demonstrations illustrate the robustness of the effect.

- Horner, D., Stetter, K., & Marquart, M. (2005). Demonstrations of the ease of detecting additions over deletions. *Psychology Learning and Teaching, 4*, 102-107.

Two Collaborative Projects

This article describes and compares two collaborative, semester long projects for a junior-level cognitive psychology course. Aims of the projects are the promotion of learning, group interaction, and student confidence and self-esteem. One project creates displays for a "Museum of the Mind," the other writes chapters for a "Cognition Book." Both projects involve teams of three students who sign up for 1 of 20 topics. "Museum" teams create interactive displays; "Book" teams write 2-page chapters on specific topics. Faculty or students judge both projects for prizes. Students learn the material they studied for their projects well. They believe the work helped them learn the project material and cognitive psychology in general and recommend the projects for future classes, although the "Book" teams enjoyed working together less than the "Museum" teams.

- Millis, K. K. (2001). Comparing two collaborative projects in a cognitive psychology course. *Teaching of Psychology, 28*, 263-265.

Six Computer Experiments

This laboratory describes how a computer cognition laboratory can demonstrate six well-known cognitive experiments in short-term memory (acoustic similarity effect, memory span), long-term memory (semantic similarity effect, elaboration and encoding), and decision-making (framing, heuristics). The laboratory is designed for a classroom setting.

Students complete the experiments at the beginning of the class, followed by a discussion of the procedure and presentation of individual as well as group results. Students identify independent and dependent variables in the experiments as well as null and research hypotheses. The laboratory is a useful tool that permits students to participate in multiple levels of the research process.

- Motes, M. A., & Wiegmann, D. A. (1999). Computerized cognition laboratory. *Teaching of Psychology, 26*, 62-65.

Presentation Software Demonstrations

Instructors may illustrate cognitive phenomena by using presentation software (e.g., PowerPoint). Neuhoff demonstrates how to create successive slides that present stimuli to generate the phenomena. Variations in use or programming of the slides can produce experimental conditions that enable instructors to demonstrate how psychologists do research on the phenomena. Neuhoff gives examples of presentations that demonstrate apparent motion, anorthoscopic perception, illusory conjunctions, and sensory memory. Presentation softwares' advantages over actual laboratory programs or instructional package programs are that they require no programming expertise and are easy to create and modify. In these respects they are superior to traditional teaching methods used to lecture about or simulate research.

- Neuhoff, J. (2000). Classroom demonstrations in perception and cognition using presentation software. *Teaching of Psychology, 27*, 142-144.

Using LEGOs to Teach Creativity

To teach the psychology of creativity, students are exposed to lectures on various aspects of creativity, followed by three sessions in which students interact with LEGO bricks. The first session is unstructured play, followed by sessions in which students are given constraints on process and then constraints on products. Students keep a metacognitive diary throughout the sessions.

- Pike, C. (2002). Exploring the conceptual space of LEGO: Teaching and learning the psychology of creativity. *Psychology Learning and Teaching, 2*, 87-94.

Cognitive Links to Helping Professions

An effective way of engaging students is to connect course material with student interests. Since many psychology students are interested in helping professions such as clinical and counseling psychology, linkages between these fields and cognition should be fruitful. Sternberg and Dennis demonstrate how cognitive concepts may help

students understand abnormal behavior, stereotyping and prejudice, psychotherapy, and persuasion. For example, cognitive therapists attempt to identify and change maladaptive patterns of thinking in their clients. By using examples from the helping professions, teachers of the cognition course can provide links that will make the course relevant to students on a personal level.

- Sternberg, R. J., & Dennis, M. J. (1997). Elaborating cognitive psychology through linkages to psychology as a helping profession. *Teaching of Psychology, 24*, 246-249.

Teaching Cognitive Heuristics

Students learn about the representativeness, availability, simulation, and anchoring/adjustment heuristics for making social judgments in this class activity. In the last five minutes of the class preceding the class in which students will learn about these heuristics, the instructor has students make social judgments typically driven by them. The scenarios describe situations relevant to college students, thus demonstrating that they use heuristics in their own social perceptions. Discussion in the next class meeting robustly demonstrates that students rely on the representativeness, simulation, and anchoring/adjustment heuristics. The scenario involving the availability heuristic sometimes produces chance choices between the heuristic-versus logic-driven judgment. Data from introductory and social psychology classes demonstrate that it enables students to identify which heuristics apply to definitions of social behavior.

- Swinkels, A. (2003). An effective exercise for teaching cognitive heuristics. *Teaching of Psychology, 30*, 120-122.

Ten Cooperative Learning Activities

Cooperative learning compares well with lecturing for teaching college students. To begin this activity, randomly assign three students to mixed sex groups. Giving groups extra credit for high test scores encourages all group members to participate. Groups remain constant or change during a semester. Group activities focus on answering questions or performing tasks. Activities require 5 to 10 minutes and illuminate the same material as a lecture would. The authors sketch 10 activities, designated as "problem solving and analysis" or "synthesis and construction" activities, designed to enhance learning about the history of psychology, perception, memory, mental imagery, problem solving, decision-making, and reasoning. Students report they work as a unit, share ideas, encourage each other, and help each other learn.

- Thompson, W. B., Vermette, P. J., & Wisniewski, S. A. (2004). Ten cooperative learning strategies for the cognitive psychology course. *Teaching of Psychology, 31*, 134-136.

The Cognitive Revolution

This class activity for beginning and advanced courses illustrates the rise of cognitive psychology in the 1960s. Using the bibliographies from Neisser's 1967 *Cognitive Psychology* and Hilgard and Bower's 1966 *Theories of Learning*, students work in groups of six to count the texts' citations from each decade between the 1890s to the 1960s. The course instructor tabulates results and compares them to the correct number of citations from each decade. The result demonstrates the spurt of cognitive research in the 1960s compared to behavioral research. The activity also provides an early semester "ice breaker," teaches students the danger of careless data tabulation, provides memorable results, fosters discussion of the interpretation of the data, and impresses students with Neisser's achievement.

- Weaver, K. A. (1998). Capturing the fervor of cognitive psychology's emergence. *Teaching of Psychology, 25*, 136-138.

References

- Cacioppo, J. P., & Petty, R. E. (1982). The need for cognition scale. *Journal of Personality and Social Psychology, 42*, 116-131.
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- Craik, F. I. M., & Tulving, E. (1975) Depth of processing and retention of words in episodic memory. *Journal of Experimental Psychology: General, 104*, 268-294.
- Hyde, T. S., & Jenkins, J. J. (1969). The differential effects of incidental tasks on the organization of recall of a list of highly associated words. *Journal of Experimental Psychology, 82*, 472-481.