

## SESSION 2 PSYCHOLOGICAL THOUGHT

### What Is Critical Thinking?

Although there is little agreement about what it means to think critically in psychology, I like the following broad definition: *The propensity and skills to engage in activity with reflective skepticism focused on deciding what to believe or do*

Students often arrive at their first introductory course with what they believe is a thorough grasp of how life works. After all, they have been alive for at least 18 years, have witnessed their fair shares of crisis, joy, and tragedy, and have successfully navigated their way in to your classroom.

These students have had a lot of time to develop their own personal theories about how the world works and most are quite satisfied with the results. They often pride themselves on how good they are with people as well as how astute they are in understanding and explaining the motives of others. And they think they know what psychology is. Many are surprised- and sometimes disappointed- to discover that psychology is a science, and the rigor of psychological research is a shock. The breadth and depth of psychology feel daunting. Regardless of their sophistication in the discipline, students often are armed with a single strategy to survive the experience: Memorize the book and hope it works out on the exam. In many cases, this strategy will serve them well. Unfortunately, student exposure to critical thinking skill development may be more accidental than planful on the part of most teachers. Collaboration in my department and with other colleagues over the years has persuaded me that we need to approach critical thinking skills in a purposeful, systematic, and developmental manner from the introductory course through the capstone experience, propose that we need to teach critical thinking skills in three domains of psychology: practical (the “jerk avoidance” function), theoretical (developing scientific explanations for behavior), and methodological (testing scientific ideas). I will explore each of these areas and then offer some general suggestions about how psychology teachers can improve their purposeful pursuit of critical thinking objectives.

### Practical Domain

Practical critical thinking is often expressed as a long-term, implicit goal of teachers of psychology, even though they may not spend much academic time teaching how to transfer critical thinking skills to make students wise consumers, more careful judges of character, or more cautious interpreters of behavior. Accurate appraisal of behavior is essential, yet few teachers invest time in helping students understand how vulnerable their own interpretations are to error.

Encourage practice in accurate description and interpretation of behavior by presenting students with ambiguous behavior samples. Ask them to distinguish what they observe (What is the *behavior*?) from the inferences they draw from the behavior (What is the *meaning* of the behavior?). I have found that cartoons, such as Simon Bond’s *Unspeakable Acts*, can be a good resource for refining observation skills. Students quickly recognize that crisp behavioral descriptions are typically consistent from observer to observer, but inferences vary wildly. They recognize that their interpretations are highly personal and sometimes biased by their own values

and preferences. As a result of experiencing such strong individual differences in interpretation, students may learn to be appropriately less confident of their immediate conclusions, more tolerant of ambiguity, and more likely to propose alternative explanations. As they acquire a good understanding of scientific procedures, effective control techniques, and legitimate forms of evidence, they may be less likely to fall victim to the multitude of off-base claims about behavior that confront us all. (How many Elvis sightings can be valid in one year?)

### **Theoretical Domain**

Theoretical critical thinking involves helping the student develop an appreciation for scientific explanations of behavior. This means learning not just the content of psychology but how and why psychology is organized into concepts, principles, laws, and theories. Developing theoretical skills begins in the introductory course where the primary critical thinking objective is *understanding and applying concepts* appropriately. For example, when you introduce students to the principles of reinforcement, you can ask them to find examples of the principles in the news or to make up stories that illustrate the principles.

Mid-level courses in the major require more sophistication, moving students beyond application of concepts and principles to *learning and applying theories*. For instance, you can provide a rich case study in abnormal psychology and ask students to make sense of the case from different perspectives, emphasizing theoretical flexibility or accurate use of existing and accepted frameworks in psychology to explain patterns of behavior. In advanced courses we can justifiably ask students to *evaluate theory*, selecting the most useful or rejecting the least helpful. For example, students can contrast different models to explain drug addiction in physiological psychology. By examining the strengths and weaknesses of existing frameworks, they can select which theories serve best as they learn to justify their criticisms based on evidence and reason.

Capstone, honors, and graduate courses go beyond theory evaluation to encourage students to *create theory*. Students select a complex question about behavior (for example, identifying mechanisms that underlie autism or language acquisition) and develop their own theory-based explanations for the behavior. This challenge requires them to synthesize and integrate existing theory as well as devise new insights into the behavior.

### **Methodological Domain**

Most departments offer many opportunities for students to develop their methodological critical thinking abilities by applying different research methods in psychology. Beginning students must first learn what the scientific method entails. The next step is to apply their understanding of scientific method by identifying design elements in existing research. For example, any detailed description of an experimental design can help students practice distinguishing the independent from the dependent variable and identifying how researchers controlled for alternative explanations. The next methodological critical thinking goals include evaluating the quality of existing research design and challenging the conclusions of research findings. Students may need to feel empowered by the teacher to overcome the reverence they sometimes demonstrate for anything in print, including their textbooks. Asking students to do a critical analysis on a fairly sophisticated design may simply be too big a leap for them to make. They are likely to fare better

if given examples of bad design so they can build their critical abilities and confidence in order to tackle more sophisticated designs. (Examples of bad design can be found in *The Critical Thinking Companion for Introductory Psychology* or they can be easily constructed with a little time and imagination). Students will develop and execute their own research designs in their capstone methodology courses. Asking students to conduct their own independent research, whether a comprehensive survey on parental attitudes, a naturalistic study of museum patrons' behavior, or a well-designed experiment on paired associate learning, prompts students to integrate their critical thinking skills and gives them practice with conventional writing forms in psychology. In evaluating their work I have found it helpful to ask students to identify the strengths and weaknesses of their own work- as an additional opportunity to think critically- before giving them my feedback.

### **Additional Suggestions**

Adopting explicit critical thinking objectives, regardless of the domain of critical thinking, may entail some strategy changes on the part of the teacher.

- **Introduce psychology as an open-ended, growing enterprise.** Students often think that their entry into the discipline represents an end-point where everything good and true has already been discovered. That conclusion encourages passivity rather than criticality. Point out that research is psychology' s way of growing and developing. Each new discovery in psychology represents a potentially elegant act of critical thinking. A lot of room for discovery remains. New ideas will be developed and old conceptions discarded.
- **Require student performance that goes beyond memorization.** Group work, essays, debates, themes, letters to famous psychologists, journals, current event examples- all of these and more can be used as a means of developing the higher skills involved in critical thinking in psychology. Find faulty cause-effect conclusions in the tabloids (e.g., "Eating broccoli increases your IQ!") and have students design studies to confirm or discredit the headline's claims. Ask students to identify what kinds of evidence would warrant belief in commercial claims. Although it is difficult, even well designed objective test items can capture critical thinking skills so that students are challenged beyond mere repetition and recall.
- **Clarify your expectations about performance with explicit, public criteria.** Devising clear performance criteria for psychology projects will enhance student success. Students often complain that they don't understand "what you want" when you assign work. Performance criteria specify the standards that you will use to evaluate their work. For example, performance criteria for the observation exercise described earlier might include the following: *The student describes behavior accurately; offers inference that is reasonable for the context; and identifies personal factors that might influence inference.* Performance criteria facilitate giving detailed feedback easily and can also promote student self-assessment.
- **Label good examples of critical thinking when these occur spontaneously.** Students may not recognize when they are thinking critically. When you identify examples of good thinking or exploit examples that could be improved, it enhances students' ability to understand. One of my students made this vivid for me when she commented on the good connection she had made

between a course concept and an insight from her literature class, “*That* is what you mean by critical thinking?” There after I have been careful to label a good critical thinking insight.

- **Endorse a questioning attitude.** Students often assume that if they have questions about their reading, then they are somehow being dishonorable, rude, or stupid. Having discussions early in the course about the role of good questions in enhancing the quality of the subject and expanding the sharpness of the mind may set a more critical stage on which students can play. Model critical thinking from some insights you have had about behavior or from some research you have conducted in the past. Congratulate students who offer good examples of the principles under study. Thank students who ask concept-related questions and describe why you think their questions are good. Leave time and space for more. Your own excitement about critical thinking can be a great incentive for students to seek that excitement.

- **Brace yourself .** When you include more opportunity for student critical thinking in class, there is much more opportunity for the class to go astray. Stepping away from the podium and engaging the students to perform what they know necessitates some loss of control, or at least some enhanced risk. However, the advantage is that no class will ever feel completely predictable, and this can be a source of stimulation for students and the professor as well.

## 35 Psychology-Based Critical Thinking Strategies

### 1. State-Dependent Recall

Definition: It is easiest to recall information when you are in a state similar to the one in which you initially learned the material.

Application: Urge your students to sit in the same room they studied in when they complete their take-home quiz. Let them listen to music when they complete their mid-term essays if they usually listen to it when they write.

### 2. The Fundamental Attribution Error

Definition: The tendency to overemphasize internal explanations for the behavior of others, while failing to take into account the power of the situation. The student who says, “Brian got an A on his English

paper because he is smarter than I am” instead of “Brian got an A on his English because he visited the Writing Center before he turned it in” suffers from the Fundamental Attribution Error.

Application: Sometimes students need your help distinguishing between internal and external factors that affect academic performance.

### 3. Effort Justification/Change Bias

Definition: After an investment of effort in producing change, remembering one’s past performance as more difficult than it actually was, thereby inflating the perceived value of the result.

Application: Unfortunately, effort does not always correlate positively with performance. Students may be angry if they do not receive the grade they expect on an assignment that cost them a lot of time. In your comments, always mention the work you see even if it misses the mark.

### 4. Cognitive Dissonance

Definition: The feeling of psychological discomfort produced by the combined presence of two thoughts that do not follow from one another, often resulting in the adoption of beliefs that align with one’s actions but contradict the beliefs one held before the action was committed.

Application: F. Scott Fitzgerald once said, “The test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function.” The world isn’t black or white, and neither is the mind. Share this wisdom with your students to promote critical thinking.

### 5. Chunking

Definition: A term referring to the process of taking individual units of information (chunks) and grouping them into larger units. Probably the most common example of chunking occurs in phone numbers. For example, a phone number sequence of 4-7-1-1-3-2-4 would be chunked into 471-1324.

Chunking is often a useful tool when memorizing large amounts of information. By separating disparate individual elements into larger blocks, information becomes easier to retain and recall.

Application: A great tool for students who must memorize long series of names, numbers, pictures, dates, terms, etc.

## 6. Positive Reinforcement

Definition: Positive reinforcement is a concept first described by psychologist B. F. Skinner in his theory of operant conditioning. Positive reinforcement is anything added that follows a behavior that makes it more likely that the behavior will occur again in the future. One of the easiest ways to remember this is to think of something being added to the situation.

Application: Bonus and extra credit assignments are some of the most basic examples of positive reinforcement. More nuanced techniques might include positive verbal feedback, class celebrations (but not reward competitions), or opportunities to contribute individually to the curriculum.

## 7. Spaced Repetition

Definition: A learning technique that incorporates increasing intervals of time between subsequent review of previously learned material in order to enhance retention. Proven to be significantly more effective than massed repetition (i.e. cramming).

Application: One of the most valuable things you can do to help students retain information is to hold weekly review sessions. Go over not only the main concepts presented in the past five days, but also touch on concepts covered multiple weeks or months ago.

## 8. Multi-Modal Learning

Definition: The more ways in which you learn something (visually, aurally, kinesthetically, verbally, etc.), the better you remember it. A key advantage of interdisciplinary courses and programs.

Application: Provide examples of major concepts in different modes. Use texts, videos, recordings, visual representations, and creative exercises to reinforce the material.

## 9. Declarative Knowledge vs. Procedural Knowledge

Definition: Knowing “what” (facts) as opposed to knowing “how” (procedural knowledge).

Application: In college, it is downright difficult, if not impossible, to train complex cognitive skills in a single semester; yet look what most problem solving courses in the corporate training world are—a couple of hours, eight hours tops. We expect learners to transfer what they have learned in the classroom to the job, but all they have are a very few simple if/then statements to take back to the job. Keep in mind that teaching your students “what” is not the same as teaching them “how.”

## 10. The Method of Loci

Definition: A mnemonic device used in ancient Greek and Roman times wherein items to be remembered are mentally associated with specific physical locations. Examples include the various rooms of a house and paths through the forest.

Application: A great tool to help students memorize terms, related concepts, or anything else that can be “placed” as an image on a mental map.

## 11. Interacting Images

Definition: An item is much more likely to be remembered if it is imagined as being actively involved with another item in some way rather than sitting there doing nothing. When items are intertwined or associated they are said to be interacting and they become a single chunk or whole in memory.

Application: It is far more difficult to remember concepts and definitions than it is to remember actions and descriptions. So, use the latter to trigger the former. If you are teaching your law students about double jeopardy, advise them to imagine someone robbing a bank, going to jail, then robbing the same bank again, free of conviction.

## 12. Dual Coding

Definition: The ability to code a stimulus two different ways increases the chance of remembering that item compared to if the stimulus was only coded one way. For example, say a person has stored the stimulus concept, “dog” as both the word ‘dog’ and as the image of a dog. When asked to recall the stimulus, the person can retrieve either the word or the image individually or both, simultaneously. If the word is recalled, the image of the dog is not lost and can still be retrieved at a later point in time.

Application: Never present students with lists of keywords and definitions without adding stimuli (or letting them add their own). They will be far more likely to recall the difference between sedimentary and igneous rocks if they associate the former with baking a layer cake and the latter with crystallizing caramel. Trust me – adding images reduces the effort needed to remember.

## 13. The Immediate Environment

Definition: Multiple studies have shown a dependence on context of one’s environment as an aid to recall specific items and events.

Application: Simply remembering what you were wearing when you learned the 1st amendment of the Constitution will help you recall the material later. Encourage students to use their immediate learning environment to build associations and boost memory.

## 14. Dichotic Listening Task

Definition: A useful way to study selective attention, this test involves different auditory stimuli presented directed into different ears over headphones. Participants are instructed to repeat aloud the words they hear in one ear while a different message is presented in the other ear. People do not recall the attended message well, and are generally able to report almost nothing about the content of the unattended message. In fact, a change from English to German goes unnoticed. Some things, however, such as the participant's name being spoken (called 'the cocktail effect') and a switch from the voice of one gender to another, are noticed.

Application: It is not every day that students are asked to listen to two different streams of voice recordings at once, but they are asked regularly to process multiple messages at once—often to their own disadvantage. Requiring students to copy notes written on an overhead while you lecture, for instance, is a ridiculous habit that should have been phased out long ago. How can any teacher reasonably expect this to be effective?

## 15. Change Blindness

Definition: A psychological lack of attention unassociated with any defects or deficits. One famous Harvard study asked subjects to watch a short video of two groups of people (wearing black and white t-shirts) pass a basketball around. The subjects are told to either count the number of passes made by one of the teams or to keep count of bounce passes vs. aerial passes.

In different versions of the video, a woman walks through the scene carrying an umbrella or wearing a full gorilla suit. After watching the video the subjects are asked if they saw anything out of the ordinary take place. In most groups, 50% of the subjects did not report seeing the gorilla. The failure to perceive the change is attributed to the failure to attend to it while engaged in the difficult task of counting the number of passes of the ball.

Application: Unfortunately, human attention is not designed to absorb important facts just because they are important. When you are highlighting important definitions or differences between concepts—things that require considerable attention—don't require your students to be doing anything else but listening to you speak. Otherwise, that "gorilla" you deem so pivotal in World War I will walk on by unnoticed, so to speak.

On the other hand, if you are reviewing familiar materials, multi-tasking is acceptable, since students have already captured the material at least partially in their long-term memory store.

## 16. Bottom-up & Top-down Processing

Definition: Strategies of information processing and knowledge ordering. The top-down approach, also known as deductive reasoning, involves starting with the bigger picture and breaking it down into smaller segments in order to derive a theory. The bottom-up approach, also known as inductive reasoning, involves beginning with a small segment of information and growing into a more complex, bigger picture. The former uses known data first to form a perception; the latter uses incoming data from the environment first to form a perception.

Application: Be aware of the type of processing you are expecting when you assign a project or ask a question. Different fields require different types of processing: top-down is more prevalent in the sciences and bottom-up is more prevalent in the humanities. Try to phrase questions in terms of big picture first, small picture second or small picture first, big picture second.

## 17. Divided Attention

Definition: Divided attention concerns our ability to 'multitask', i.e. whether we can attend to more than one task at a time. While the dichotic listening task involves trying to attend to only one message, in studies of divided attention the task is to attend to more than one source of information. Early studies have shown two important factors that determine our ability to multitask: 1) The similarity of the tasks. Allport et al. (1972) asked participants to learn a set of words while shadowing a spoken message. They found that the words could be learned when they were presented visually but not when they were presented as spoken words.

However, if messages were sufficiently different then both could be attended to. 2) How well practiced we are at the task. Spelke et al. (1976) found that, with practice, students could learn to read a story while writing down a list of words read out loud to them.

Application: Students should not be expected to arrive to class with well-honed multi-tasking skills, especially after a long vacation or break from studies. It's best for instructors to ease students into tasks that involve divided attention.

## 18. Serial vs. Parallel Processing

Definition: Learning one object at a time, sequentially (serial processing), versus learning all of them at once (parallel processing).

Application: Cognitive psychology compares the processing of the human mind to the information processing of computers. Computers operate largely under a serial processing system, and the human mind has been shown to function more efficiently this way as well.

## 19. Incidental Memory

Definition: Information acquired without intention, often just as memorable as information acquired with intention. Craik and Tulving demonstrated that it was not the intention to learn that was critical for later memory, but rather the type of processing engaged at the time of encoding. Information that was processed meaningfully was well remembered whether or not there was an intention to retain it.

Application: This is solid evidence that asking your students to "study hard" simply isn't enough. You will have to present the information in a memorable way (using emotion, personalization, or any number of the tips listed here) or urge students to adopt effective memorization strategies.

## 20. Working Memory Capacity

Definition: Working (or short term) memory is generally considered to have a limit of about 7 elements, or chunks.

Application: Design your lesson plans around this number, and don't expect your students to effectively process more terms or concepts than this in a given session.

## 21. Priming

Definition: An effect in which exposure to a stimulus influences a response to a later stimulus. For example, if a person reads a list of words including the word table, and is later asked to complete a word starting with tab, the probability that he or she will answer table is greater than if they had not been primed.

Application: Larry Ferlazzo uses priming with his students before tests, asking them to spend a few minutes writing on a topic covered in the quiz.

## 22. Schema

Definition: A way of organizing current knowledge that provides a framework for future understanding. Examples of schemata include academic rubrics, social schemas, stereotypes, social roles, world views, and archetypes. The brain automatically uses schema to process and understand new information more efficiently.

Application: The brain doesn't remember facts; it remembers connections. In English and literature instruction, for example, urge students to make connections between the text at hand and their own lives, the text at hand and other texts they've read, and the text and the world around them.

## 23. Forgetting Curve

Definition: A graph that hypothesizes how information is lost over time when there is no attempt to retain it. A typical curve shows that humans tend to halve their memory of newly learned knowledge in a matter of days or weeks unless they consciously review the learned material.

Application: More cognitive evidence for spaced repetition and weekly reviews of learned material. Forgetting happens fast—don't just review before the test!

#### 24. Episodic vs. Semantic Memory

Definition: Episodic memory is recall for events (or episodes) that happened in the past; semantic memory is recall for specific facts. These two types of memory occur in different parts of the brain.

Application: Many people assume that recalling the name of the 13th president should be as easy as recalling how you learned to ride a bicycle. On the contrary, these types of memory operate very differently in the brain, and recalling anything that has personal value is much easier than recalling a random fact. Using episodic memory to enhance semantic memory can be a useful tool—much like interacting images and dual coding.

#### 25. Social-Emotional Learning (SEL)

Definition: Psychologists in the 1980s found that attributes like self-restraint, persistence and self-awareness might actually be better predictors of a person's life trajectory than standard academic measures. Now a movement is in the works across school districts to promote "emotional literacy" in students.

Application: Allow students to sort through their feelings about your class or subject with assignments that call for self-reflection. Although this technique is mostly geared towards children whose emotions are not yet fully developed, emotion affects learning at any age.

#### 26. Metacognition

Definition: Cognitive psychologists use the term metacognition to describe our ability to assess our own skills, knowledge, or learning. That ability affects how well and how long students study—which, of course, affects how much and how deeply they learn. Students with poor metacognition skills will often

shorten their study time prematurely, thinking that they have mastered course material that they barely know.

Application: Studies show that awareness of one's learning is enough to enhance it. Help students step back and assess their own habits and skills.

## 27. Knowledge Organization

Definition: The hierarchical method of organizing information and how it maps well onto the brain's memory.

Application: One well-known example of knowledge organization is instructional scaffolding, wherein guidance is provided to novices until they begin to master the material, at which point the "scaffolding" is removed. This process complements the hierarchical nature of learning.

## 28. Pattern Recognition

Definition: Pattern recognition refers to the process of recognizing a set of stimuli arranged in a certain pattern that is characteristic of that set of stimuli. It does not occur instantly, although it does happen automatically and spontaneously. Pattern recognition is an innate ability of animals.

Application: Some types of recognition, such as facial recognition and pattern recognition, require large amounts of brain processing capacity. This is why the ability to make connections (or recognize patterns) has been linked time and time again to intelligence. The main systems our brains use to organize information (schemas, heuristics, etc.) rely on patterns. Point out patterns to your students as often as possible to promote critical thinking skills and heightened comprehension.

## 29. Anchoring

Definition: The common human tendency to rely too heavily on the first piece of information offered (the “anchor”) when making decisions. For example, the initial price offered for a used car sets the standard for the rest of the negotiations, so that prices lower than the initial price seem more reasonable even if they are still higher than what the car is really worth.

Application: To prevent this, promote delayed gratification and teach your students that the first reasonable answer presented is not always the right answer.

### 30. Choice-Supportive Bias

Definition: Remembering chosen options as having been better than rejected options.

Application: There is nothing wrong with changing your mind in light of new evidence. Students’ reasons for liking or disliking subjects are often based on experiences they can hardly remember or explain. Urge students to be open to new attitudes and critical of old ones.

### 31. Context Effect

Definition: The idea that cognition and memory are dependent on context, such that out-of-context memories are more difficult to retrieve than in-context memories (e.g. recall time and accuracy for a work-related memory will be lower at home, and vice versa).

Application: A close relative of state-dependent learning and priming. Providing the right context for a question or concept can make all the difference—more difference even than wording, tone of voice, or student mastery.

### 32. Primacy & Recency Effect

Definition: The finding that memory recall is higher for the first item(s) on a list and the last item(s) on a list.

Application: Present important concepts at the beginning of a lesson and at the end. Much of what's in the middle will likely be lost, so you don't want to deliver the main material you plan to test your students on then.

### 33. Verbatim Effect

Definition: That the "gist" of what someone has said is better remembered than the verbatim wording.

Application: Expecting students to remember the verbatim wording of an answer is asking too much in most cases. On the other hand, asking students to re-phrase important statements, events, or concepts in their own words greatly enhances the likelihood that they will recall the gist of what they need to learn.

### 34. Tip-of-the-Tongue phenomenon

Definition: When a subject is able to recall parts of an item, or related information, but is frustratingly unable to recall the whole item. This is thought to be an instance of "blocking" where multiple similar memories are being recalled and interfere with each other.

Application: An extremely common phenomenon in any testing environment. "Blocking" can be reduced with many of the tricks mentioned above, including context, dual coding, chunking, and interacting images. Remember that all a student needs to recall a fact is the correct "retrieval cue."

### 35. Heuristics

Definition: A heuristic is an experience-based technique that helps in problem solving, learning, and discovery. A heuristic method is particularly used to rapidly come to a solution that is hoped to be close to the best possible answer, or 'optimal solution'. Heuristics are "rules of thumb", educated guesses, intuitive judgments, or simply common sense. An example is the availability heuristic, a mental shortcut

that occurs when people make judgments about the probability of events by the ease with which examples come to mind.