Critical Thinking Activities for the Teaching of Psychology

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Over the past four decades teachers of psychology have taken on responsibility for the development of students' critical thinking skills. In 2007 critical thinking skills were included in the APA Guidelines for the Undergraduate Psychology Major (APA, 2007) among the goals related to "Knowledge, Skills, and Values Consistent With the Science and Application of Psychology". In this context, critical thinking skills include evaluating information ("including differentiating empirical evidence from speculation", p. 15), challenging untested claims, using science to resolve disputes about claims, recognizing and avoiding reasoning fallacies, resisting the sway of emotion and appeals to authority in evaluating claims, and demonstrating "persistence, open-mindedness, tolerance for ambiguity, and intellectual engagement" (p. 15).

The set of critical thinking skills identified in the APA Guidelines suggests a working definition of critical thinking that is restricted to the kinds of thinking required to effectively evaluate the truth of claims. Critical thinking is often defined much more broadly, to include general effective thinking, as for example in Halpern (1989): "The term critical thinking is used to describe thinking that is purposeful, reasoned, and goal directed" (p. 5). Under this definition Halpern includes creative thinking and problem solving, which fall outside of the bounds of thinking directed at determining whether or not a claim is true. I prefer to restrict my use of the term "critical thinking" to thinking directed at that determination, but not because I think that other sorts of thinking are unimportant. I believe that the ability to evaluate truth values should not be considered simply one of several ways for a student to demonstrate "critical thinking". It is an ability that deserves special attention, particularly in psychology programs, where an analysis of the shortcomings of the normal means by which we judge claims is part of the subject matter. In this document, the term "critical thinking" will be used to refer to the kinds of thinking used to evaluate the truth of claims, as in the APA Guidelines.

However defined, it is clear that critical thinking is multi-faceted, with a variety of components ranging from purely cognitive skills such as effective reasoning (Halpern, 1989), to affective skills such as the ability to resist emotional impulses and instead invest cognitive effort (Halpern, 1998), to underlying habits of the mind such as persistence and open-mindedness (Bensley, 2009; West, Toplak & Stanovich, 2008). Critical thinking skills can be difficult to acquire, and because they conflict regularly with our intuitions, our experiences, our emotions, and the assumptions of our cultures, they tend to go unused even after they are learned (Trosset, 1998). Critical thinking can result in emotional discomfort, as it requires us not only to question our beliefs about the world around us, but also our most deeply held beliefs about ourselves. Uncritical thought has proven to be frustratingly resilient, but our colleagues continue to rise to the task with creativity and dedication, identifying roadblocks to students' critical thinking, and developing activities to help students through those roadblocks. Here are some of the activities designed to give students experience working with some of the difficult aspects of critical thinking. In each case, the goal of the activity is described, followed by the details of the activity and its implementation in the classroom.

Annotated Bibliography

Deep Processing

This activity is designed to show students the importance of deep processing while studying. Students are asked "Which of the following is the MOST important ingredient for successful learning?", with the options "The intention and desire to learn", "Paying close attention to the material as you study", "Learning in a way that matches your personal learning style", "The time you spend studying", and "What you think about while studying". Then they are asked to read a list of words, with one group of students assigned a task that encourages shallow processing ("Does the word

contain and E or a G?") and the other group assigned a task that encourages deep processing ("Is the word pleasant?"). If the class is sufficiently large, an "intent to learn" versus non-"intent to learn" variable is added, by informing in advance half of the deep and half of the shallow processing groups that they will be tested on recall. After studying the words, the students are tested on the number of the words they can freely recall. Typically the deep processing groups do best, regardless of whether or not they were forewarned about the task. All students are given the same study time, and it is assumed that they were all paying close attention, and that "learning styles" were evenly distributed across groups, so the activity demonstrates the importance of deep processing (or "What you think about while studying").

- Chew, S. L. (2010, April). Improving classroom performance by challenging student misconceptions about learning. *APS Observer, 23*(4). Retrieved from http://www.psychologicalscience.org/observer/getArticle.cfm?id=2666

Illusion of Control

This activity demonstrates the illusion of control: the sense people have that they have control even in situations in which they do not. The instructor offers a one dollar bill as a prize to be given to the student who draws the highest card from a deck of cards. The instructor then hands a card to the first student without showing the student the face of the card, allows the second student to draw a card, again without looking at the face, hands a card to the third student, and alternates this way until all of the students have cards. Then before they are allowed to look at the value of their cards, the students are asked to judge how confident they are that they will win. Students will typically be overconfident, with the group of students who drew their own cards significantly more confident than the group who were handed the cards. In discussion students are asked to consider how the illusion of control is used in gambling contexts.

- Dollinger, S. J. (1990). The illusion of control. In V. P. Makosky, C. C. Sileo, L. G. Whittemore, C. P. Landry, & M. L. Skutley (Eds.), *Activities handbook for the teaching of psychology*, *Vol. three* (pp. 201-202). Washington, DC: American Psychological Association.

Explaining "Psychic" Phenomena

This activity is designed to give students practice thinking critically about explanations of "psychic" phenomena. Three classroom demonstrations are described, each a magic trick that appears on the surface to demonstrate a "psychic" power. Students are then assigned to develop non-paranormal explanations for the tricks, and to report their explanations to the class.

- Goss, S. S. & Bernstein, D. A. (1999). Research methods and critical thinking: Explaining "psychic" phenomena. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. Blair-Broeker (Eds.), *Activities handbook for the teaching of psychology*, *Vol. four* (pp. 25-27). Washington, DC: American Psychological Association.

Four Ways of Determining the Truth of a Claim

The goal of this activity is to introduce students to four ways of determining the truth of a claim: intuition, authority, rationalism, and empiricism. Students are introduced to those terms, and given examples. Then they apply them to the evaluation of ten claims that come from popular "urban legends" (e.g., "Tattoos laced with LSD are used to hook children on drugs", p. 23). Students are required to apply all four "ways of knowing", and have a discussion about the relative value of each.

- Hughes, A. (1999). The use of urban legends to improve critical thinking. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. Blair-Broeker (Eds.), *Activities handbook for the teaching of psychology*, *Vol. four* (pp. 22-24). Washington, DC: American Psychological Association.

Measurement Error

This activity is designed to give students experience with error in measurement. Students are given answer sheets on which they can mark ten items as "True" or "False". The instructor then instructs the students to select an answer for "each of 10 questions I will think of". The students' responses should be essentially random. An answer key is presented, and the students compute a score equal to the number of correct answers minus the number of incorrect answers, yielding a mean near zero. Discussions and further demonstrations use the experience to illustrate measurement error and regression to the mean.

- Hunter, W. J. (1981). To err is human, especially in measurement. In L. T. Benjamin & K. D. Lowman (Eds.), *Activities handbook for the teaching of psychology* (pp. 22-23). Washington, DC: American Psychological Association.

Parsimonious Explanation

The goal of the three activities described in this article is to introduce the concept of parsimony and to give students practice in applying that concept. For each activity, an explanation is provided, but students

are challenged to come up with more parsimonious explanations. In the first activity the instructor pretends to do a "Clever Hans" demonstration to figure out students' names, but has actually collected the names beforehand from seating charts (or other simple sources). In the second demonstration the instructor performs a series of simple "mind-reading" tricks. The third demonstration uses a simple stage magic trick with a prepared piece of newspaper column. Follow-up discussion focuses on notions such as "extraordinary evidence for extraordinary claims", the weakness of anecdote as evidence, and the importance of replication.

- Kalat, J. (1999). Parsimonious explanations of apparent mind reading. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. Blair-Broeker (Eds.), *Activities handbook for the teaching of psychology*, *Vol. four* (pp. 18-21). Washington, DC: American Psychological Association.

Diagnosing Student Thinking

This is not a single classroom activity, but rather an overview of methods of diagnosing students' preconceptions. The article includes a series of recommended practices for diagnosis, including having students justify their answers, offering questions in two or more formats in order to assess the impact of format on students' difficulties (Difficulty Factors Assessment), and including either implicit or explicit measures of student confidence in their answers (Two-Dimensional Tests).

- Lucariello, J. (n.d.). How do my students think: Diagnosing student thinking. Retrieved from http://www.apa.org/education/k12/student-thinking.aspx

The Costs and Benefits of Good Information

The activity's goal is to make students aware of differences in quality of information, and of effort required to gain information. Students are given the assignment of explaining the behavior of a mass murderer, based on a short case history provided. In small groups, students make mock purchases of additional information for use in their explanations, choosing from three levels of information varying by cost and by how specific the information is to the killings. They are introduced to Bloom's taxonomy and present explanations using information from across Bloom's categories. The groups earn points based on the quality of the explanation and on how much of the allotted money they have left over. A follow-up discussion emphasizes the relationship between effort and quality of information.

- Osborne, R. E., Laws, J., & Weadick, K. (1999). The costs and benefits of critical thinking. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. Blair-Broeker (Eds.), *Activities handbook for the teaching of psychology*, *Vol. four* (pp. 11-17). Washington, DC: American Psychological Association.

Hypothesis Generation and Testing

This activity is designed to introduce students to the thinking required for scientific investigation, particularly hypothesis generation and testing. In a group classroom setting, students are presented with a set of four cards arranged in a specific way, and told that the arrangement matches a pattern. They generate several hypotheses about the nature of the general pattern. Then they draw additional cards, and the instructor signals whether or not each card fits with the real pattern. This continues until only one of the hypothesized patterns remains, demonstrating the role of hypothesis generation and observation in the elimination of alternative hypotheses.

- Peden, B. F. & Keniston, A. H. (1987). Simulating and stimulating scientific thinking. In V. P. Makosky, L, G. Whittemore, & A. M. Rogers (Eds.), *Activities handbook for the teaching of psychology*, *Vol. two* (pp. 12-15). Washington, DC: American Psychological Association.

Illusory Correlation Effect

The goal of this activity is to demonstrate "illusory correlation". Students are shown 20 drawings of people, 10 with unusual eyes and ears, and the other 10 with an oversized mouth and a passive posture. Half of the drawings of each type are labeled as having been drawn by a person who is "suspicious of other people" and the other half are labeled as having been drawn by a person who "is concerned with being fed and taken care of". Students are shown the 20 drawings and asked to identify the characteristics of drawings done by suspicious people and by people concerned with being taken care of. Despite the fact that there is no correlation between the characteristics of the drawings and the label given to the persons who produced them, students tend to believe they saw a correlation, with the unusual eyes and ears signaling suspicion and the passive posture signaling a concern about being taken care of.

- Rocklin, T. (1990). A demonstration of the illusory correlation effect. In V. P. Makosky, C. C. Sileo, L. G. Whittemore, C. P. Landry, & M. L. Skutley (Eds.), *Activities handbook for the teaching of psychology*, *Vol. three* (pp. 25-26). Washington, DC: American Psychological Association.

Debunking Astrology

The goal of this activity is to introduce students to empirical testing of claims. Students are given a list of 36 adjectives describing personality. They are instructed to select those that they believe describe their own personality. Students then compare their choices with the personality characteristics typically attributed by astrologers to persons of their own astrological sign, demonstrating the lack of relationship between sign and personality.

- Werpetinski, V. A., Eaton, M. M, Juraska, S. E., Lucas, S. G., Allman, A. L., Shenker, J. I. & Bernstein, D. A. (2006). Instructor's Resource Manual for Psychology, Seventh Edition, (p. 11). Boston: Houghton Mifflin Company.

Proving the Obvious

The purpose of this activity is to refute the notion that psychological research simply confirms what we already know. Students are given one of two forms of a handout containing three statements about human psychology. Each form of the handout contains statements contradicting the corresponding statement on the other form. For example, one of the handouts has as its second statement,"Research on interpersonal attraction finds that people generally are happiest when they date someone similar to themselves", while the second statement on the other version reads "Research on interpersonal attraction finds that people generally are happiest when they date someone different from themselves." Students are asked to put checkmarks next to each of the statements they find surprising. They are then asked to raise their hands if they found the first, second, and then third statements surprising.

- Werpetinski, V. A., Eaton, M. M, Juraska, S. E., Lucas, S. G., Allman, A. L., Shenker, J. I. & Bernstein, D. A. (2006). Instructor's Resource Manual for Psychology, Seventh Edition, (p. 12). Boston: Houghton Mifflin Company.

Intuition Versus Empiricism

This activity is designed to help students to understand the importance of empirical data. An activity elicits students' intuitions about the counterintuitive outcome of a simple choice activity. Then a follow-up activity has students collect data about the value of each possible choice. Students compare empirically-obtained results with their prior intuitions.

- Werpetinski, V. A., Eaton, M. M, Juraska, S. E., Lucas, S. G., Allman, A. L., Shenker, J. I. & Bernstein, D. A. (2006). Instructor's Resource Manual for Psychology, Seventh Edition, (pp. 13-15). Boston: Houghton Mifflin Company.

Ambiguous Stimuli

This activity demonstrates the role of expectancies and top-down processing in perception. Students are given one of two forms of written instructions for an activity, differing in a single statement that will lead them to perceive an ambiguous figure in one of two ways. Then all students look at the same ambiguous figure, and then are asked yes/no questions about whether or not certain objects appeared in that figure. After the activity, they discuss the role of the instructions in determining how they perceived the figure.

- Werpetinski, V. A., Eaton, M. M, Juraska, S. E., Lucas, S. G., Allman, A. L., Shenker, J. I. & Bernstein, D. A. (2006). *Instructor's Resource Manual for Psychology, Seventh Edition*, (pp. 173-174). Boston: Houghton Mifflin Company.

Constructive Memory

This activity uses a "rumor chain" to demonstrate the constructive nature of memory, and more specifically, distortions of memory during retrieval and encoding. Several students are sent out of the classroom, and a story is read aloud to one of the remaining students. Then one by one the students are brought back into the classroom, and the story is repeated to them by the last student to have heard it. Predictable memory distortions are noted: omissions of non-distinctive details, sharpening of distinctive details, addition of extraneous information from the students' own schemas.

This activity also demonstrates the constructive nature of memory. The activity presents a "personality sketch" about a fictional person. The sketch includes information that leads students to make certain assumptions about the person's occupation. It is read aloud to the students, who are told to listen carefully, but not to take any notes. A half-hour later they are asked a series of questions about the person described in the sketch. A classroom discussion of the information incorrectly attributed to the story illustrates the students' use of the representativeness heuristic and schemas.

- Werpetinski, V. A., Eaton, M. M, Juraska, S. E., Lucas, S. G., Allman, A. L., Shenker, J. I. & Bernstein, D. A. (2006). *Instructor's Resource Manual for Psychology, Seventh Edition*, (p. 236). Boston: Houghton Mifflin Company.

Social Cognition: First Impressions

This activity illustrates the way that first impressions generate expectancies that then influence interpretation of subsequent information. Half of the students read a statement that "Jim is rumored to be stubborn" while the other half read that "Jim is

rumored to be persistent". Then all students are provided with a paragraph of other information about "Jim", and then asked to make judgments about whether Jim is likable, is likely to be argumentative, and whether they would like him as a roommate.

- Werpetinski, V. A., Eaton, M. M, Juraska, S. E., Lucas, S. G., Allman, A. L., Shenker, J. I. & Bernstein, D. A. (2006). *Instructor's Resource Manual for Psychology, Seventh Edition*, (p. 627). Boston: Houghton Mifflin Company.

Everything Makes Sense: The Roles of Rationalism and Empiricism in Critical Thinking

As you can see, published critical thinking activities address a number of very different challenges to students' ability and proclivity to think critically. Here I will describe an activity I have developed to address another of these challenges: our natural tendency to favor reason over evidence.

In my introductory research methods course I have noticed over the years that it can be very difficult to focus students on discussions about research methods. They tend to be easily distracted by the psychological or social content of the examples. For example, if I describe a study of public schools versus "Choice" schools to illustrate the importance of random assignment to groups, students become eager to express their beliefs about public schools and "Choice" schools, and quickly forget that the topic is random assignment to groups. Focusing students' attention on observational methods is a constant challenge in my introductory methods course.

Much of the history of philosophy can be summarized as a struggle between the rationalists, who believed that reason alone could provide sufficient justification for claims about the nature of the world and the empiricists, who believed that claims are only properly justified when reason is followed up by systematic observation. The empiricists eventually won out, and methodical observation – science -- has clearly shown itself to be spectacularly successful at winnowing the true claims about the world from the false ones, where pure reason has demonstrated itself to be ineffective.

Many efforts to improve students' critical thinking skills seem to assume that the students already recognize the value of empirical observation. But people are not by nature empiricists: Human beings are meaning makers. It is in our nature to theorize about events. Then, seduced by the sensation of certainty produced by having made logical sense of a claim, we filter our subsequent observations through our theories, believing that we have already justified our claims about the world by having made sense of them. In the public discourse, one would never guess that empiricism won the struggle against rationalism, as both the opinion makers and the lay public routinely hold up "it makes sense" as though making sense were evidence in support of claims about how the world is.

The "Everything Makes Sense" activity is designed to demonstrate to students that we can and do make sense of claims regardless of whether or not those claims are true, and therefore that "making sense" is not a very helpful criterion for determining whether or not a claim is true. This activity is based on a discussion of parenting presented in Freakonomics, by Steven D. Levitt and Stephen J. Dubner (2005). Shortly after the book was published, Beth Benoit of Granite State College posted to the TIPS mail list a suggestion about using the chapter on parenting as a catalyst for discussion in a developmental psychology course. I realized that it could also be the basis of a demonstration of the shortcomings of rationalism as a method of evaluating empirical claims.

Levitt and Dubner present a list of 16 factors about a child's early life, 8 of which are correlated (either positivity or negatively) with a child's later test scores in school, and 8 of which have no correlation with those test scores (according to the Department of Education's Early Childhood Longitudinal Study). The 16 factors are:

1. The child has highly educated parents.
2. The child's family is intact.
3. The child's parents have high socioeconomic status.
4. The child's parents recently moved into a better neighborhood.
5. The child's mother was thirty or older at the time of her first child's birth.
6. The child's mother didn't work between birth and kindergarten.
7. The child had low birthweight.
8. The child attended Head Start.
9. The child's parents speak English in the home.
10. The child's parents regularly take him to museums.
11. The child is adopted.
12. The child is regularly spanked.
13. The child's parents are involved in the PTA.
14. The child frequently watches television.
15. The child has many books in his home.
16. The child's parents read to him nearly every day

(Levitt & Dubner, 2005, pp. 168-169)

All of the factors are ones that a reasonable person might expect would be related to a child's test performance later in school.

In my classroom activity, students are given Levitt and Dubner's list of 16 factors, and are told that eight of the factors are correlated with test scores and eight are not. They are then asked to individually decide which of the factors are related to test scores, and which are not, and also to prepare to explain why they chose the factors they chose. After they have had a reasonable amount of time write down their choices, we go together through the items, one at a time, first asking for a show of hands of students who chose that item as one correlated to later school performance, and then asking if any of those who chose that item would like to explain their choice. Finally I reveal whether or not the factor really was related to later test performance, and read the brief explanation that Levitt and Dubner provide.

Because the students commit both in writing and by raising their hands to acknowledge in public that they have chosen a particular factor, they feel that they have some stake in their answers. But because there are 16 factors and all of them appear to be the kinds of things that would relate to later school test performance, all of the students get some right and some wrong. In other words, all of the students have the experience of having made sense of a claim that then turns out to be false, and they also all have the experience of listening to other students make sense of a claim that then turns out to be false.

The purpose of the activity is to demonstrate to students that the fact that someone can make sense of a claim is not evidence that the claim is true. No matter how reasonable a claim seems, the test of the claim comes only when you make the kinds of systematic observations that distinguish between "sensible, and true" on the one hand and "sensible, but false" on the other hand.

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