CASE TEACHING NOTES
for
"Extrasensory Perception—Pseudoscience?
A Battle at the Edge of Science"

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INTRODUCTION / BACKGROUND

This case is intended for an introductory level science or psychology class. (It can also be used in most human biology classes when the nervous system is explored, taking off from the questions about human sensory systems.) The case should be presented at a point in the course where the students deal with scientific experimentation, data collection, and analysis. This case will help the students to understand and evaluate the need for controls and careful experimental design, especially when the claims being investigated are extraordinary. The students do not need to be focused on studies of paranormal activities; rather they just need a general knowledge of its existence. The case itself is not filled with scientific information; it merely serves to kick-start a discussion on ESP and the need for skepticism in viewing experimental results.

Objectives

The overall purpose of this case is to teach students to be skeptical of "scientific claims," especially those that are sensational and fall outside of the boundary of normal scientific explanation. With ESP, the students are examining a topic at the fringes of "normal science." ESP has yet to be demonstrated to the satisfaction of the scientific community and is often called a pseudoscience. The case serves to illustrate the boundaries and fundamentals of scientific data. Students evaluate information and data to determine whether they believe there is enough scientific evidence to confirm ESP's existence. The questions posed at the end of the case guide the students to consider:

- the subdivisions of ESP: clairvoyance, telepathy, precognition, psychokinesis
- J.B. Rhine and his studies at Duke University
- the Ganzfeld procedure
- criticisms of ESP and the difficulties that are inherent in performing adequate experiments in ESP testing

CLASSROOM MANAGEMENT

The case is structured as a directed case study: students read a story, look up the answers to specific questions, and then the teacher runs a discussion based upon the questions/answers. In addition, in this instance, students try out some of the early experimental procedures and criticize the method.

Classroom Case Discussion

The students are given the case ahead of time. All students should hand in a copy of their answers before the discussion and keep another copy for the discussion itself.

If working in teams, students could read the case and then divide up the questions that follow. Each student would look up the answers to his or her questions and then share the information with the rest of the team at the beginning of the next class period. A quiz could be given after this sharing period. The quiz ensures that the students are prepared for the general discussion; but perhaps, just as importantly, if the quiz is given to teams of students they will interact and be warmed up for the discussion to follow. A sample quiz might be:

1. Define psychokinesis.
2. Describe in general J.B. Rhine's initial experiments at Duke University.
3. What was the Ganzfeld procedure?
4. List two scientific principles that ESP experiments have been criticized to not follow.

One way to approach the discussion is to simply go around the classroom asking the students for their answers to the questions, using this opportunity to develop points that the teacher believes needs emphasis. Any questions that the students have about the case can be addressed at this time as well. The discussion can rotate around the topics that were mentioned in the quiz; telepathy, clairvoyance, precognition, pyschokinesis, the Ganzfeld procedure, and J.B. Rhine's experiments, but might not focus at this point on the criticisms of ESP. That topic might be discussed to a further extent after they have run through their student exercise.

Another approach (suggested by one of the case reviewers) is less structured and perhaps more exciting. The teacher can start the discussion simply by asking students to guess what made the sound at the end of the story. Do they think that Eliza was able to move the spoon? If her mother went into the room and found it moved, what are the most likely solutions to explaining its movement? The room can be divided into skeptics and believers based on their answers and these groups could have an informal debate on the issue. Also, this allows the teacher to launch into the student experiment phase of the class, asking how can we possibly test for the presence of ESP with absolute safeguards as to the integrity of the data.

Beginning students might need guidance as to the modeling of the scientific process of hypothesis testing, reproducibility, falsifiability, replication, and control of variables to give them a foundation on which to base their skepticism for any unusual results.

Student Exercise

After any questions have been answered and the quiz has been fully understood, the experiments conducted by J.B .Rhine are further evaluated. The instructor should prepare before class a deck of 25 cards for each group which is similar to that used in the experiments Rhine conducted. He can create the deck for each group using three-by-five index cards. Using a pencil, or some other writing instrument that will not bleed through the card or be able to be seen through, one symbol should be placed on each card (square, three wavy lines, plus sign, circle, and star), as shown below.

Five cards of each symbol should compose the deck. [Note: if a magic shop is in town, ESP cards (as they are called by magicians) can be purchased; they have blue patterned backs on them so that the symbols of the other side are not visible.]

Each group of students should conduct an experiment for *telepathy*. One member of the group should hold the deck of cards and look at one card at a time, while other members attempt to guess the symbol that is on the card. The students should record their guesses on a piece of paper numbered from 1 to 25. When all of the cards have been "transmitted," then (and not before) the student who has played the role of the "sender" should look at the cards and reveal what the order really was. The students should count the number of their correct "hits." Obviously, by chance they should get about 20% correct.

Other tests can be attempted. Students can test for *clairvoyance* by first shuffling the deck. Then someone should take a card out of the deck and place it face down without looking at it. The students should then record what they think the card is. This should be repeated until all of the cards have been dealt. Only then, not before, should the names of the cards be checked against the students' predictions. Note: If the cards are checked as the test is being conducted (in order to see how things are going), students will—consciously or not—take mental note of the relative numbers of symbols that have already passed and likely end up with a higher number of hits.

Students can test for *precognition* by writing down the order of 25 cards *before* the deck is shuffled and then dealt face up. As in all such tests, it is easy to cheat or to inadvertently give clues. Remember that magicians readily perform ESP effects all of the time and they have frequently fooled parapsychologists. After performing such tests it is useful to ask the students if they can design a test that is fail-safe; one where trickery could not be used.

The data that are collected should be placed on a blackboard or overhead. In all tests of this type you would expect to get an average of 1/5 correct hits; i.e., students will guess 5/25 correctly. Obviously, if large numbers of students are doing this many times, you would expect by chance that the values will fall outside of the expected probability. This is clearly a chance for the teacher to discuss statistics and what constitutes reasonable evidence for the existence of ESP. In fact, this reveals one of the major problems that plagues ESP work: Investigators do multiple testing and only report the top results—discarding all of the negative data.

Given the results of the entire class, the groups will then be asked to criticize the procedure of the test. They should readily identify many flaws and can be asked how they might redesign the procedure to eliminate them.

As a final wrap up to the class, students could be asked to consider the question, "Does ESP exist?" Along with their statement should be a solid backing as to why they chose the answer that they did. In coming to this conclusion they should also incorporate the ideas introduced in the case story line and the

argument that Eliza's parents have. For example, if they chose to believe that ESP does not exist, and follow the beliefs of the father, even if some of the results were above the probability ratio, they need to support that statement with criticisms of the experiment or the data. After each group has come to a conclusion and written down their statements, a discussion of their decisions can follow using either a discussion or a debate style presentation.

DETAILED CASE ANALYSIS

Detailed case analysis is provided in a separate file that is password-protected. To access this information, go to the detailed case analysis. You will be prompted for a username and password. If you have not yet registered with us, you can see whether you are eligible for an account by reviewing our password policy and then apply online or write to answerkey@sciencecases.org.

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Additional Reading

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