

AST 101LB Solar System Laboratory

Understanding Pseudoscience

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Rev. 10/00

In this lab exercise I want to encourage you to bring to bear your own experiences and reflect on the information about pseudoscience given in the three Introductory Notes units:

- IX. "Non-psychological Reasons for why people believe in pseudoscientific claims"
- X. "Psychological Reasons for why people believe in pseudoscientific claims"
- XI. "Other Aspects regarding Pseudoscience and Testing of it"

To prepare for this exercise I suggest you watch the television lab course (end of Lesson 1 and beginning of Lesson 2), with the Introductory Notes handy for further examples and insights, and answer the questions either as you proceed through the video or after watching each of the segments.

Respond on separate sheets to the questions below. Your responses must not include examples from the videos or Introductory Notes; i.e., the examples are to come from your life or others you know. Answer as many as you can. I realize you may not honestly be able to respond to all parts of all the questions and I allow for that in the grading. If a question does not apply to you, just note the question by writing down its number and say so; but don't overdue that. Double space as with the Topical Review reports.

"Why Pseudoscience? Non-psychological Reasons"

- 1) (3 pts.) Can you think of an example of the committing of the *post hoc* (false-cause) fallacy from your own experience? (either a time that you committed the fallacy or someone you know did)
- 2) (4 pts.) Describe a conversation you had on some topic of which you think yourself to be expert with a person who insisted on asserting to you some preposterous, or at least dubious, proposition about this topic. (The topic needn't have been a scientific one.) The person clearly appeared to you to be ignorant of some important aspects of the topic, and yet there he/she was insisting on the rightness of their wrong idea. How did the conversation go? What was the topic, and the person's off-base assertion? How insistent was the person in asserting his correction? How did you deal with the person? And a final question, with a twist: Did you later learn something about the topic that put that person's assertion in a different light, affording it, in some sense, some validity after all?
- 3) (1 pt. @ for 3 pts. total) Try to give an example that you have noticed for each of the sources listed, of a pseudoscientific or superstitious idea spread by that source.
 - The entertainment and communications media
 - Proponents themselves
 - Parents

“Why Pseudoscience? Psychological Reasons”

- 1) (3 pts.) Describe an example from your life that exemplifies the distinction between objective reality and subjective reality. In other words, think back to some experience or subject that you now view differently, and you honestly think more objectively and with better understanding, because of the later addition of some further information (*a la* my advertising plane UFO.) If you can't think of any (really?), see if someone close to you can provide an example from his/her life.
- 2) (3 pts.) With the memory selection effect in mind, can you think back to any experience or series of experiences that you had which got you to thinking in a certain way about some subject, that you can now look back and see that you may have been misled by a memory selection effect?
- 3) (Respond to either for 3 pts., both for more) Do you think you might have been guilty of the mental block? Describe. Have you ever felt the frustration of dealing with someone else with a mental block? Describe.
- 4) This question is thought-provoking, but perhaps too personal Answer only to yourself. I don't need to know the answer. You probably have a number of beliefs in various things. Do you remember when you came to believe these things? Especially for the things held near and dear, did you come to any of these beliefs at an uncertain, perhaps turbulent and fearful, time in your life? There are reasons for your belief(s), of course, but how much was your acceptance of them increased by emotional need?
- 5) (3 pts.) Do you recall any health crisis situations in your life or in those close to you in which you or the person pulled out of it, apparently because of some attempt to cure that lay outside of medical science? Looking back on it, how do you know it wasn't just the placebo effect at work, helping the body to cure itself?

“Other Aspects and Testing”

- 1) (5 pts.) Comment on any of the information given in this section that you wish. Specifically, do you have any questions or comments on the paranormal tests you observed?

Afterthought—the challenge

With this exercise, following up on the “science boot camp,” some students wonder, and sometimes with irritation, “What has this to do with astronomy?” Remember that term “de-acculturation–re-acculturation” from the Intro Notes (Unit I on goals/Personal Growth)? If you are one of those students, particularly if you are feeling annoyed, read on... Astronomy is a science. As a person who presumably wants to be educated, you want to see the forest more than learn about a few trees. As a science, astronomy is permeated by scientific thought, habits of mind, and practices. All that we humans have learned in astronomy—any science—are the fruits of this great human ability—objective, or critical thinking. Moreover, science is not just for scientists. We—individually and collectively as a society—benefit from knowing science. Science is a foundation of the modern world, not only through resulting technological advances, but through the enlightenment it has brought us as to the nature of the physical world and that of our own. The Scientific Revolution ignited other revolutions in thought, leading, most notably, to the resurrection of democracy. Recognition of all this is why science is an essential part of a democratic citizen's formal education, and not the understandings or beliefs that are contradicted by scientifically established fact and theory that some of you may hold near and dear, beliefs you acculturated.

As Carl Sagan once wrote, “Science may be hard to understand. It may challenge cherished beliefs.” That's the way it is. But you are here to learn, right? If you are going to become educated, you've got work ahead of you. Take on the challenge. Your work will echo that of the intellectual pioneers. You will strengthen and grow with the effort. What did you think you were going to get out of becoming educated?