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## Tolerance for Astrology?

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For years, one of my stock introductory astronomy multiple-choice exam questions (one I found in a test bank [see Note 1] and modified) was:

The constellations of the zodiac

- a) lie (roughly) along the path of the Sun
- b) are all about equal in size--30 degrees wide
- c) control your life
- d) are distributed fairly evenly over the entire celestial sphere
- e) [Both b and d above]

The correct answer is, of course "a," but response "c" was my modification--a little dig against astrology that I found irresistible. The only protest I ever had based on this question was from a student who had an identical twin (Sagan 1980; see Note 2) in the class. She answered the question correctly (and most others; she and her sister set the curve that semester and both earned high A's) and wrote on the answer sheet, next to the question number, "says you!"

A question I used to include in a laboratory exercise on using star-charts was:

When is your birthday? Find your birthday on the ecliptic. Name the constellation the Sun is in or closest to on your birthday.

Now compare how the Sun's location corresponds to the current astrological or zodiac signs for each date.

When going over the above question, I liked to ask: "Astrologers tell me I am a Gemini, so why was the sun in Taurus when I was born (May 29)?" Another one of my favorite quips was pointing out what an insult it was when Martin Luther called Copernicus an astrologer during his (Luther's) famous tirade (see Note 3). Actually, some early astronomers--Ptolemy and Kepler, for example--also worked as astrologers, casting horoscopes. For most of human history, astronomy was encompassed by astrology (see Note 4).

I am as dismayed as any instructor when a student refers to my class as astrology; I even recall one student calling the lab-class astronomy and the lecture astrology, but the twins' response to my above question got me thinking. The twins more than once identified themselves as avid believers in astrology. I had strived to point out that although I can't control what they choose to believe, astrology is not a science, as many textbooks point out (some more fervently than others) (see Note 5). That is, as we all know, true; astrology does not fit the criteria of a scientific theory, nor do its predictions hold up under scientific scrutiny. But for many like the twins, it is a belief. Often those who believe in something are not easily deterred, even by the presentation of proof to the contrary.

This brings up the question of how an instructor of astronomy (or any educator of science) handles issues of belief in the classroom (see Note 6), especially if the instructor subscribes to a belief system. Being a participant in a religion, I struggled for a long time to reconcile my faith with science. In fact, I could not fully embrace any faith until this reconciliation occurred. It finally came after years of reading (see Note 7) and discussions with others from many points of view. I gave a talk about my journey at a breakfast at my church, and one of the listeners told me afterward that I had suffered from cognitive dissonance; he was right.

After I had, as a colleague put it, "found a place to stand," I never had any trouble dealing with religion and science in the classroom. I just explained the difference between faith (which is based on belief and, for those who believe, does not require proof) and science (which is based on testability and must have proof) (see Note 8). This seemed to satisfy most students. In fact, my attempts to teach certain subjects like the Big Bang as theories (making sure I carefully explain what the word theory really means in science) without attempting to diminish beliefs endeared me to some (see Note 9).

During a discussion (sometimes heated) on religion, psychics, ghosts, and other things, the wife of a good friend asked me why, if I could allow for the acceptance of religion on faith without subjecting it to scientific scrutiny, I could not tolerate other beliefs such as astrology. She has an identical twin with whom she maintains she has a psychic connection. I really did not have a good answer, and I began to wonder if I had any business criticizing those who subscribed to astrology as a belief, whether it works scientifically or not. I certainly have the responsibility as a science educator to explain why astrology is not science, but telling someone that he or she should not believe his or her horoscopes could be perceived as no different than criticizing someone for accepting a religious faith without scientific evidence. In fact, because I subscribe to a faith, it could easily be considered a bit hypocritical, which is what she accused me of. One only has to read a horoscope to see that it is really not a prediction of future events, but very general instructions on what to do, vague enough to apply to many situations. Also, people born under the same sign certainly do not always have the same fates, as in the case of twins. This certainly shows that astrology does not stand up to scientific scrutiny, but I still maintain that if people choose to ignore the science and want to use their horoscopes as guide to living their lives, I would not know how to convince them otherwise.

Furthermore, a parallel with religious texts could be drawn here. Many parts of these writings are scientifically impossible or unlikely, such as the Sun standing still. However, there are many people, scientists included, who choose not to take the texts literally but use them as parables to guide them in living a decent and moral life. It could be argued that in both cases, a belief, regardless of scientific evidence, is being used as a guide for behavior.

I am not advocating acceptance of astrology as a valid part of a belief system any more than I am trying to convert anyone to a religious faith. I am simply suggesting that once the difference between faith and science has been explained, the instructor has done his or her job. There is very little else that can be said to dissuade those who still choose to believe something.

The next question is what to do about the claims of psychics, and those who profess to have seen ghosts or to have had contact with aliens. It is well documented that there is no physical evidence that we have ever been visited by aliens (see Note 10). As with alien "sightings," many incidences supposedly involving ghosts and psychic phenomena have been exposed as frauds and shams (see Note 11). If these topics come up, they should be dismissed on the basis of having no scientific evidence to support them. But if people still want to believe in government cover-up conspiracies, tabloid newspaper stories, or what they saw on television, they can still choose to do so.

How do I handle astrology? I have found that the strategy that works best for me is to simply mention that in astrology, the constellations that the Sun, Moon, or planets are "in" are used as the basis of some predictions, and that studies have shown them not to be scientifically valid. It is very important to make the distinction that astrology is not a science, but I do not feel it necessary to go to great lengths and spend too much precious class time to attempt to diminish it or those who choose to believe its predictions. Anything more would be unnecessary for those who have accepted my explanation, and would be unlikely to convince those who still want to "believe." I would be very interested to hear how other instructors handle astrology, and any other matters of belief in the classroom.

In my years of teaching, I have learned through trial and error that among the behaviors that can most quickly render an instructor ineffective, arrogance is one of the worst. (I'm not afraid to admit that I have made plenty of mistakes.) Taking an authoritarian attitude (see Note 12) that the teacher knows everything and the student knows nothing--especially when it comes to what, scientific evidence notwithstanding, individuals choose to believe--comes across just that way and can cause students to "turn us off." It is an easy trap to fall into, especially when it comes to astrology, because the public confusion about its relationship to astronomy and the misconceptions caused by it are so frustrating to science educators. Slipping into this type of attitude when discussing any type of belief could be considered a bit ironic too, because we could come across as "preaching" about science.

Perhaps the most important goal of any introductory science course is instilling in students an appreciation of the scientific process. Explaining what science is not is certainly a big part of that. It is my opinion that it can be done without taking an arrogant or authoritarian attitude--an attitude that could reduce the credibility of an instructor and harm the mutually respectful relationship most of us work so hard to build with students.

## **Acknowledgments**

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## Notes

**Note 1.** From the test-bank to accompany a previous edition of K. Kuhn and T. Koupelis, *In Quest of the Universe*.

**Note 2.** The lives of twins are often used as a test of the scientific validity of astrology, since they are born in the same place under the same sign; they should have similar destinies, but often do not. See C. Sagan, *Cosmos* p. 49, or the third episode of the video series.

**Note 3.** Recently there has been some question as to how serious Luther was about his remarks. See D. Kobe, "Copernicus and Martin Luther: An Encounter Between Religion and Science." Sagan quotes Luther in *Cosmos*, p. 53.

**Note 4.** See *Cosmos*, p. 51.

**Note 5.** I examined how 12 different texts written for a one-semester introductory course in astronomy (like the one I teach) handle astrology. I found that five ignore it or just mention it in passing when discussing the zodiac, while the other seven explain why it is not science. Of those seven, five recognize it as a belief, three put the term "astrology" in their glossaries, and two acknowledge its historical connection to astronomy. Only one takes a tone that seems hostile. Interestingly, that was the text I used the semester I taught "the twins."

**Note 6.** There is no need for me to go into the handling of potential problems when discussing evolution. See M. Bobrowsky, "Teaching Evolutionary Processes to Skeptical Students." Dr. Bobrowsky and I served on a discussion panel on Science and Religion, Creationism, Astrology, UFOs, and so on at the Astronomical Society of the Pacific's 2000 *Cosmos in the Classroom* Symposium.

**Note 7.** See G. Schroeder, *The Science of God* and J. Polkinghorne, *One World*, to name a few.

**Note 8.** *In Quest of the Universe*, p. 586, has a nice explanation of the difference between faith and science. In the authors' discussion of why astrology is not science (p. 39), they remind readers that those who believe do not need proof. No other text I surveyed does this. I have used this text in its previous editions.

**Note 9.** See M. LoPresto, "Dealing with Conflicts Between Religion and Science in Introductory Astronomy," for my take on how to handle this issue in the classroom and for more detail on some student reactions.

**Note 10.** See *Cosmos*, p. 307.

**Note 11.** See C. Sagan, *The Demon-Haunted World*, p. 242.

**Note 12.** Believe it or not, even Sagan claimed to have objected to taking too much of an authoritarian attitude when discussing astrology. See *The Demon-Haunted World*, p. 302.

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