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Horoscopes Versus Telescopes: A Focus on Astrology

A Note from the Editor:

The revelation in 1988 that First Lady Nancy Reagan consulted a San Francisco astrologer in arranging the president's schedule may have surprised or amused many teachers and parents who pay little attention to this old superstition. Unfortunately, belief in the power of astrology is much more widespread among our students than many people realize. A 1984 Gallup Poll indicated that 55% of American teenagers believe that astrology works. Astrology columns appear in over 1200 newspapers in the US; by contrast, fewer than 10 newspapers have columns on astronomy. And all around the world, people base personal, financial, and even medical decisions on the advice of astrologers.

Furthermore, astrology is only one of a number of pseudo-scientific beliefs whose uncritical acceptance by the media and the public has contributed to a disturbing lack of skepticism among youngsters (and, apparently, presidents) in the U.S. Many teachers feel that it is beneath our dignity to address topics like this in our courses or periods on science. Unfortunately, by failing to encourage healthy doubt and critical thinking in our children, we may be raising a generation that is willing to believe just about any far-fetched claim printed in the newspapers or reported on television.



We therefore devote this issue of **The Universe in the Classroom** to information about debunking astrology and using student interest in such "fiction sciences" to help encourage critical thinking and illustrate the use of the scientific method.

Andrew Fraknoi

Some Thought-Provoking Questions About Astrology

- For those who follow newspapers or magazine columns on astrology, it's useful to begin by asking

how likely it is that 1/12 of the world — over 400 million people for each sign of the zodiac — will have the same kind of day? This question sheds some light on why the predictions in astrology columns are always so vague that they can be applied to situations in almost everyone's life.

- Why is it the moment of birth, rather than the moment of conception, which is the critical one for calculating a horoscope? To figure this one out, it's helpful to know that when astrology was first set up thousands of years ago, the moment of birth was considered a magic time. But today, we understand that birth is the culmination of roughly nine months of complex, intricately orchestrated development inside the womb. Many aspects of a child's personality are set long before the time of birth.

The reason the astrologers still adhere to the moment of birth has little to do with astrological "theory". The simple fact is, almost everyone knows his or her moment of birth — but it is difficult (and perhaps embarrassing) to find out one's moment of conception.

- "Serious" astrologers claim that the influence of all the major bodies in the solar system must be taken into account to arrive at an accurate horoscope. They also insist that the reason we should believe in astrology is because it has led us to accurate predictions or personality profiles for many centuries.

But anyone who knows the history of astronomy can tell you that the most distant known planets — Uranus, Neptune and Pluto — were not discovered until 1781, 1846, and 1930, respectively. So why weren't all the horoscopes done before 1930 incorrect, since the astrologers before that time were missing at least one planet from their inventory of important influences? Moreover, why did the problems or inaccuracies in early horoscopes not lead astrologers to "sense" the presence of these planets long before astronomers discovered them?

- All the long-range forces we know of in the universe get weaker with distance (gravity is an excellent example). Yet for astrology it makes no difference whether Mars is on the same side of the Sun as we are (and therefore relatively near us) or way on the other side — its astrological influence (force) is the same. If some influence from the planets and the stars really did not depend on how far away the source of the influence was, it would mean a complete revolution in our understanding of nature. Any such suggestion must therefore be approached with extreme skepticism.

Furthermore, if the astrological influences do not depend on distance, why don't we have to consider the influences of other stars and even galaxies in doing a horoscope? What inadequate horoscopes we are getting if the influence of Sirius and the Andromeda Galaxy are omitted! (Of course, since there are billions of stars in our Galaxy and billions of other galaxies, no astrologer could ever hope to finish a horoscope that took all their influences into consideration.)

- Even after thousands of years of study and perfecting their art, different schools of astrology still vehemently disagree on how to cast a horoscope and — especially — on how to interpret it. You can have your horoscope cast and read by different astrologers on the very same day and get completely different predictions, interpretations, or suggestions. If astrology were a science — as astrologers claim — you would expect after all these years that similar experiments or calculations would begin to lead to similar results.

What's the Mechanism?

But even if we put such nagging thoughts about astrology aside for a moment, one overriding question still remains to be asked. Why would the positions of celestial objects at the moment of our birth have an effect on our characters, lives, or destinies? What force, what influence, what sort of energy would travel from the planets and stars to all human beings and affect our development or fate?

One can see how the astrological world view might have been appealing thousands of years ago when

astrology first arose. In those days, humanity was terrified of the often unpredictable forces of nature and searched desperately for regularities, signs, and portents from the heavens that would help them guide their lives. Those were days of magic and superstition, when the skies were thought to be the domain of gods or spirits, whose whims humans had to understand — or at least have some warning of — if they were to survive.

But today, when our spacecraft have traveled to the planets and have explored them in some detail, our view of the universe is very different. We know that the planets are other worlds and the stars other Suns — physical bodies that are incredibly remote and mercifully unconcerned with the daily lives of creatures on our small planet. No amount of scientific-sounding jargon or computerized calculations by astrologers can disguise this central problem with astrology — we can find no evidence of a mechanism by which celestial objects can influence us in so specific and personal a way.

Introducing Jetology

Let's take an analogy. Imagine that someone proposes that the positions of all the *jumbo jets* in the world at the moment that a baby is born will have a significant effect on the child's personality or future life. Furthermore, for a fee, a "jet-ologer" with a large computer might offer to do an elaborate chart showing the positions of the planes at the right time and to interpret the complex pattern of the plane positions to help you understand their influence on your life. No matter how "scientific" or complex the chart of jet positions turned out to be, any reasonably skeptical person would probably ask the "jet-ologer" some rather pointed questions about why the positions of all these planes should have any connection with someone's personality or with the events that shape human lives. (Students might enjoy inventing other such "sciences" and making an elaborate set of rules for them.)

In the real world, it is quite simple to calculate the planetary influences on a new-born baby. The only known force that is acting over interplanetary distances in any significant way is gravity. So we might compare the pull of a neighbor planet like Mars with other influences on the baby. It turns out that the gravitational pull of the obstetrician is significantly greater than that of Mars. (And the hospital building — unless the baby happens to be in the exact geometric center of it — has an even greater pull than the doctor!) For those classes that would like to work out such calculations for themselves, formulas and examples can be found in the book by Culver & Ianna cited in the [Resource Corner](#).

Testing Astrology

Some astrologers argue that there may be a still unknown force that represents the astrological influence. Suppose we give them the benefit of the doubt and assume that there is something connecting us to the heavens, even if we do not know what it is. If so, astrological predictions — like those of any scientific field — should be easily tested. If astrology predicts that Virgo and Aries are incompatible signs — to take a simple example — then if we look at thousands of marriage and divorce records, we should see more Virgo-Aries couples getting divorced and fewer of them getting married than we would expect by chance.

Astrologers always claim to be just a little too busy to carry out such careful tests of their efficacy, so in the last two decades scientists and statisticians have generously done such testing for them. There have been dozens of well-designed tests all around the world, and astrology has failed all of them. (See the [Resource Corner](#) for more on these tests and the [Activities Corner](#) for some experiments you can do with your students.)

For example, psychologist Bernard Silverman of Michigan State University looked at 2,978 marriages and 478 divorces for 1967 and 1968 to see if "compatible" astrological signs were more likely to get and stay together. He found that there was no correlation — compatible and incompatible signs got married and divorced equally often. In another test, staff members at the U.S. Geological Survey analyzed 240 earthquake predictions by 27 astrologers and found that they were less accurate than one could be by simply guessing! And so each of the tests has gone.

In addition, astronomers Roger Culver and Philip Ianna ([reference](#)) tracked the specific published

predictions of well-known astrologers and astrological organizations for a period of five years. Out of over 3000 specific predictions (including many about politics, film stars, and other famous people) in their sample, only about 10% came to pass.

If reading the stars has led astrologers to incorrect predictions nine times out of ten, they hardly seem like reliable guides to the uncertainties of life or the affairs of our country. Perhaps we should let those beckoning lights in the sky awaken our students' interest in the real (and fascinating) universe beyond our planet, and not permit them to be tied to an ancient fantasy left over from a time when we huddled by the firelight, afraid of the night.

Activity Corner

One of the best ways to get students to think about the validity of astrology is to have them test astrological predictions for themselves. Here are a few practical activities to get you started; you and your students may be able to suggest other tests and projects yourselves. (Let us know if you think of some good ones.)

For many of these tests, it is useful to gather a large sample of data for statistical purposes. In some schools, where one class does not have enough students or time to gather all the necessary data, other classes and family members have sometimes been drawn into the study.

1. Same Day, Different Horoscopes

If your town has a good newsstand and the class budget permits, have students buy as many newspapers and magazines with astrology columns as possible. Have students compare the predictions and statements of different astrologers for the same sign. How many disagree? How many contradict each other?

2. Mixed-up Horoscopes

Cut out the 12 horoscopes from a newspaper (preferably one that the students are not likely to have seen) and, after making a master copy for yourself, cut off the dates and zodiac designations from each paragraph. Mix them up, give each a number, and then distribute the unlabeled paragraphs to each student on the next day. Ask students to list their birthdays and then to select the one paragraph that best applied to them yesterday. After all the papers have been collected, mix them up and give them back so each student gets someone else's paper. Then put the dates the astrologers specified for each paragraph on the blackboard and have the students total how many hits and misses there were. How many hits would students predict by chance?

3. Professions and Astrology

Even astrologers who disdain the newspaper horoscopes (because they deal only with the position of the Sun and not other celestial bodies) will often claim that the Sun sign is connected with a person's choice of profession. Many astrology books specify which signs are the most likely to select a given profession. For example, Leos might be more likely to go into politics and Virgos into science. Once the class looks through some astrology books and finds such "hypotheses", they can then begin testing them.

One test would be for the class to send a survey to people in the profession they selected, asking for their birth dates. (You should be sure the students explain why they want the information, discuss the approach, and enclose a stamped self-addressed envelope.) Another way to gather data — at least for people who are well-known — is to look in leadership directories, such as *Who's Who in American Politics* and correlate birthdays and professions. It's important to gather enough examples so that statistical quirks begin to average out in your sample.

Large-scale tests like these have revealed no correlation between signs and professions — the members of

a given profession are pretty evenly spread among all the signs of the zodiac.

(Thanks to Diane Almgren, Broomfield, CO; Daniel Helm, Phoenix, AZ; and Dennis Schatz of the Pacific Science Center in Seattle, WA for suggestions.)

*"The fault, dear Brutus, is not in our stars,
But in ourselves..."*

Shakespeare's *Julius Caesar*, Act 1, Scene 2.

Resource Corner

To read more about astrology, we suggest:

Astrology: True or False by Roger Culver and Philip Ianna (1988, Prometheus Books, 700 E. Amherst St., Buffalo, NY 14215) — The best book on this subject.

"A Double-Blind Test of Astrology" by Shawn Carlson in *Nature*, vol. 318, p.419 (5 Dec 1985) — A report on a sophisticated test of astrologers in a scientific journal.

Science and the Paranormal ed. George Abell & Barry Singer (1981, Scribners) — A general introduction to debunking a number of "fiction sciences"

Science Confronts the Paranormal and *Paranormal Borderlands of Science* (Prometheus Books), two excellent collections of articles from *The Skeptical Inquirer* magazine, provide superb ammunition to use against many pseudoscientific claims, including UFO's as extraterrestrial spacecraft and ancient astronauts coming here to help us start civilization (because our ancestors were too dumb to do it themselves!)

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