A Statistical Test
of Sun-Sign Astrology

John D. McGervey

It has been said that the basic premise of astrology is that the stars and planets can influence terrestrial processes. If astrology did indeed develop from such a premise by careful observations followed by testing of results against predictions in a scientific way, one could have no quarrel with it. Nobody denies that extraterrestrial influences exist.

We could even accept the fact that astrologers can identify no known physical mechanism on which to base their predictions. If the predictions of astrology come true, then the subject cannot be dismissed, even though the basis of the prediction is not understood. However, the bases of astrological predictions are so far removed from any logical cause-and-effect relationship that it becomes difficult for any logical thinker to remain open-minded. The predictions are not based on any observable or even hypothetical physical *process*; instead they are often based on superficial aspects of the appearance of celestial objects. For example, Mars is red and blood is red, so Mars has something to do with blood, and by extension, Mars governs (in some vague sense) warfare and combat.

If we try to discredit astrology simply by pointing to the stupidity of this sort of reasoning, we run the risk of being considered closed-minded. Since advances in science are often based on ideas that seem stupid when they are first proposed, we should apply unbiased tests to the *results* of a theory and not apply value judgments to the reasoning that leads to these results. Who knows? Maybe by some curious coincidence the planet Mars does have something to do with warfare.

Unfortunately it is hard to evaluate the various "one-shot" predictions that astrologers make, because nobody knows what would be a good percentage of successful predictions; there are no standards of performance, and any particular failure can be attributed to an individual astrologer's mistake rather than to the "science" of astrology. However, there

are some predictions, applicable to the entire population, that result from the drawing up of horoscopes. A number of tests of planetary and solar influences in horoscopes have been reported, but all appear to suffer from either a small sample or the possibility that the cause-and-effect relation has been incorrectly diagnosed. For example, effects claimed to be associated with the rising of one of the planets could be, and probably are, the result of the fact that more people are born in the morning hours than in the evening hours (Jerome 1976).

Tests of planetary influence are difficult because of the necessity of knowing the exact time of birth as well as the date, so such tests always involve a relatively small population. It is clear that in a small number of people one can always find common traits that one can then attribute to some astrological phenomenon; even Adolf Hitler and Julie Andrews probably have some traits in common. But one element of a horoscope that can be tested with good statistics using readily available information is the effect of the "sun sign." Although "serious" astrologers say that the sun sign is simply one component of a horoscope and that the "ascendant" and planetary influences are equally or even more important, to my knowledge they have never said that the sun sign has no influence whatsoever. They may say, for example, that sun-sign astrology as given in newspapers does not *completely* determine one's destiny, but they still refer to the *influence* of the sun. Clearly, if the sun has any influence at all, it should be detectable in a large enough population.

To test the effect of the sun sign, we need a characteristic that can be determined unambiguously for each member of a large population. A person's occupation is ideal for such a study, because it can be determined unambiguously by using standard reference books. For example, Americans who have done sufficient work in science to be listed in *American Men of Science* (1965) are scientists, and others are not. Although various astrologers may disagree on the specific effects of a given sign and may even define the signs differently (some of them have now become aware of the precession of the equinoxes), virtually all of them claim some connection between one's sun sign and one's chances of success in (or aptitude for) a given occupation.[1]

In searching for such a correlation I have tabulated the birthdates of 16,634 persons listed in *American Men of Science* and of 6,475 persons

1. For a summary of such claims see M. Zeilik II, *American Journal of Physics* 42 (1974): 538-42, or L. E. Jerome, *Leonardo* 6 (1973): 121-30.

Table 1.
Number of births by astrological sign

Sign	Dates (inclusive)	Scientists*	Politicians°
Capricorn	Dec. 24 - Jan. 19	1241	462
Aquarius	Jan. 23 - Feb. 18	1217	445
Pisces	Feb. 21 - Mar. 19**	1173	460
Aries	Mar. 23 - Apr. 18	1160	432
Taurus	Apr. 23 - May 19	1185	471
Gemini	May 24 - Jun. 19	1153	471
Cancer	Jun. 24 - Jul. 20	1245	486
Leo	Jul. 25 - Aug. 20	1263	504
Virgo	Aug. 25 - Sept. 20	1292	497
Libra	Sept. 25 - Oct. 21	1267	523
Scorpio	Oct. 25 - Nov. 20	1246	488
Sagittarius	Nov. 24 - Dec. 20	1202	453

*Birthdays taken from consecutive pages in two different volumes listed in *American Men of Science* (1965). A small percentage of scientists (less than 1 percent, in my estimation) may choose not to be listed in this directory, but elimination of this small number from the sample can hardly have a significant effect on the overall distribution. Some of those listed may also pursue other occupations, but this does not nullify the fact that they have achieved something in science to set them apart from nonscientists.

°Virtually all of the birthdays in *Who's Who in American Politics* (1973) were used. About 1 percent of the IBM cards were punched incorrectly and not redone.

**February 29 not included.

Table 2.
Number of births on each date

Scientists	Politicians
46 40 52 50 50 51 49 31 50 39	26 14 17 18 23 19 16 08 11 15
48 48 40 28 47 45 63 45 43 36	15 20 23 18 12 16 20 14 22 24
40 55 47 53 52 47 39 47 47 36 44	20 23 15 17 15 19 11 14 16 13 15
48 59 48 41 45 43 39 34 49 35	17 16 17 12 25 20 19 14 25 14
48 46 42 49 42 48 54 35 48 52	17 19 19 19 13 09 21 14 21 23
33 47 50 43 58 41 36 55 10	11 17 18 20 21 15 18 20 07
50 47 37 26 42 38 45 45 41 38	21 13 14 15 19 20 16 21 17 19
45 44 54 48 40 44 61 46 39 42	24 14 20 20 16 19 21 12 19 20
51 52 36 45 48 43 41 43 40 42 45	19 18 16 13 11 22 19 24 12 19 12
43 38 36 46 37 45 43 41 34 49	21 13 13 13 18 16 15 18 17 20
43 36 46 54 40 51 43 50 48 58	16 24 20 14 14 18 20 14 18 16
44 51 47 56 40 43 45 40 44 31	17 18 14 16 18 15 20 11 18 16
48 43 34 44 46 47 51 50 38 36	15 17 13 16 15 16 17 20 16 20
37 57 48 48 38 42 45 35 52 53	14 21 21 22 22 22 15 18 23 13
52 48 50 46 47 44 40 54 40 50 41	17 15 10 13 19 10 11 19 10 12 16
46 32 45 33 47 47 43 44 46 45	18 18 17 23 10 12 20 20 18 18
48 37 36 34 38 40 54 36 40 49	13 31 17 16 21 26 22 17 24 13
39 52 51 44 46 45 42 46 34 52	21 19 14 15 13 17 19 20 31 19
53 49 53 52 39 43 56 37 42 39	19 12 21 24 14 21 18 19 22 26
49 45 50 44 58 53 31 57 51 35	19 17 16 21 12 24 20 21 16 18
50 42 54 38 46 42 37 52 31 45 33	10 30 20 25 23 23 25 13 19 12 17
56 52 46 45 54 50 47 44 60 47	13 16 21 33 20 16 21 18 21 22
52 52 33 46 56 43 51 46 41 56	09 17 21 18 19 18 18 12 22 17
50 58 45 55 49 53 43 42 47 43 51	24 21 13 24 16 22 24 18 17 17 28
59 56 57 39 35 56 56 57 40 40	28 24 23 18 22 17 22 14 19 17
47 39 56 55 40 44 60 40 43 45	11 23 20 18 13 21 12 12 11 20
50 49 49 47 45 57 46 38 38 34	24 27 17 21 17 16 28 16 17 18
42 57 52 55 46 57 43 57 49 52	25 22 13 17 19 14 24 15 23 28
47 51 44 46 48 52 38 54 41 45	15 21 16 09 26 17 17 19 25 18
33 61 46 37 50 43 44 69 44 48 53	18 11 15 18 16 14 19 24 23 13 12
43 42 45 34 38 40 43 47 48 42	20 21 15 15 19 18 25 13 17 20
45 43 45 49 53 58 42 39 44 55	22 17 21 21 19 16 17 15 20 16
45 49 51 51 45 53 48 33 51 48	18 17 24 17 14 23 15 17 18 20
52 30 43 33 52 48 33 40 39 48	14 17 19 17 19 13 13 08 16 20
42 47 36 45 40 43 40 57 54 51	22 20 15 12 17 20 11 21 19 16
44 42 47 53 51 39 45 46 44 51 47	22 14 22 13 06 20 20 14 20 24 18

listed in *Who's Who in American Politics* (1973). The results are summarized in Table 1. Because the starting and ending dates of a given sign vary from year to year, I have tabulated the totals for the central 27 dates of each sign. The dates not included in these signs show no significant deviation from the flat pattern observed in the dates that were used, as can be seen by referring to the complete tabulation in Table 2.

The number of scientists born under each sign lies between 1,153 and 1,292; the mean (m) is 1,220 and the standard deviation is 456. The theoretical standard deviation for a binomial distribution of this size with randomly selected signs would be 33.4. The maximum deviation observed is 2.1 times the theoretical binomial standard deviation. Corresponding numbers for the politicians are: $m = 474$, $\sigma = 26.2$, and binomial $\sigma = 20.8$. The value of the reduced chi-squared for a fit to a flat distribution is 1.70 for scientists and 1.45 for politicians. These values are slightly high, and careful study of the numbers in Table 1 shows that there is a definite trend in the dates. *Both* sets shows an excess of births in late summer and a corresponding deficiency in the spring. These deviations are somewhat too large to be random fluctuations, even though they are a small percentage (less than 5 percent) of the mean. But there is no need to invoke astrological influences for this effect; the same pattern appears in "live births by month" in the U.S. population, where an excess of about 5 percent in July, August, and September occurs (*Vital Statistics of the United States 1968-69*). Thus any effect of one's sun sign on one's choice of occupation must be considerably less than 5 percent, hardly enough to justify the vast literature on the subject.

No effect was observed in the individual dates, either; for scientists, the mean number per day was 45.6, the maximum observed was 69, and the minimum 26. One hundred twelve dates, or 30.7 percent of the total of 365 dates, had more than 52 or fewer than 39 scientists' birthdays; that is, there were 253 cases within one standard deviation of the mean—just about what one would expect for a random normal distribution. In other words, a table of birthdates serves reasonably well as a random number generator (unless a pair of twins is listed).

An astrologer might argue that the class of scientists and the class of political figures is too broad and that subsets of these groups (e.g., microbiologists, paleontologists) might favor certain signs, but that these sets would distribute themselves among the various signs so that no overall effect is seen. However, books on astrology consistently insist that "scientists" or "politicians" are favored by one sign or another. Furthermore, it

is highly improbable that the various scientific disciplines could be favored by certain signs in such a way that when the groups are added together no effect of the sun sign remains. By breaking the population up into sufficiently small subsets one can undoubtedly find, in one subset or another, a surprisingly large deviation from the mean in some range of birthdates. But the significance of such a deviation must be viewed in the light of the large number of possible subsets that could be chosen, as well as the large number of ranges of dates that could be used. If an astrologer chooses the occupation and the range of dates *before* looking at the data and correctly *predicts* a large deviation on the basis of his "science," then the result might be significant. However, that has not yet happened.

In the face of this negative result some astrologers might be tempted to claim that they never attached *any* significance to sun signs. But they are then faced with the task of explaining (1) why their "science," thousands of years old, suddenly has lost one of the elements that has appeared in every book on the subject, (2) how the positions of the planets can have an influence if the sun's position does not, and (3) how the time of day when one is born can have an influence which varies with the seasons and planets if the date of the year has no influence in itself. If logic had any place in astrology, they would be faced with a hopeless task.

References

American Men of Science 1965, 11th ed. *The Physical and Biological Sciences.* New York: R. R. Bowker.

Jerome, L. E. 1976. *The Humanist,* March/April 1976, pp. 52-53.

Vital Statistics of the United States 1968-69, Public Health Service, Department of Health, Education, and Welfare; and *Vital Statistics of the United States* 1937-39, Census Bureau, U.S. Department of Commerce.

Who's Who in American Politics 1973, 4th ed. New York: R. R. Bowker.