

Alternative Explanations in Science: The Extroversion-Introversion Astrological Effect

This "effect" is due to people's own knowledge and expectations about their zodiac signs

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Recent years have shown a significant growth of interest in purportedly paranormal phenomena. It often appears that many individuals will believe almost anything that wears the mantle of science. Too many of us forget that scientific truth is acquired by the rigorous testing of ideas and by the elimination of alternative explanations. It is premature to entertain a paranormal hypothesis unless all plausible "normal" alternative hypotheses have been ruled out. Presentations of ideas to the scientific marketplace where they can be confronted by informed critics should precede general publication. In the paranormal field this does not always occur, and so the public is often misled by a presentation of disputable data in support of paranormal claims.

An example of the importance of ruling out alternative explanations can be found in recent psychological literature. Jeff Mayo, a prominent astrologer, approached Hans Eysenck, the renowned British personality theorist, to collaborate with him on a test of astrology. Astrologers contend that there is a relationship between the personality of human beings and configurations of the constellations and planets. Most prominent in astrological theory is the zodiac, or sun sign, of an individual. This refers to the time of year during which an individual is born. There are twelve zodiac signs, and they can be classified in various ways. As well as its individual characteristics, each sign is said to be either positive or negative:

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positive signs describe a tendency to be extroverted; negative signs, a tendency to be introverted. Mayo and Eysenck were to examine the popular astrological claim that individuals possessing an extroverted personality are born more often than would be expected by chance under the odd-numbered or positive signs (Aries, Aquarius, Gemini, Leo, Libra, and Sagittarius). Introverted individuals, by this claim, tend to be born more often than would be expected by chance under the even-numbered or negative signs (Cancer, Capricorn, Pisces, Scorpio, Taurus, and Virgo). If there was some validity to this assertion, it would be reflected in the scores of personality tests. The Eysenck Personality Inventory (EPI) was chosen as the vehicle to examine this claim.

A total of 2,324 adults (917 males and 1,407 females) completed the test. The results of the study provided *prima facie* support for both hypotheses. All the positive zodiac sign groups had higher than average extroversion scores and all the negative zodiac sign groups had higher than average introversion scores. Although the differences between the groups were marginal, they were statistically significant (that is, they could not be accounted for by chance).

Even before the study was published, astrologers had heard about the results and trumpeted their triumph to the media. Sydney Omarr, the noted astrologer, boasted about the results in early 1977 in his daily column, which appeared in hundreds of newspapers across North America. The Canadian magazine *MacLean's* also gave prominent coverage to the findings. Eysenck was featured on the NBC television special "In Search of . . . Astrology," where these results were further disseminated to the public.

The study was subsequently published in the *Journal of Social Psychology* under the title "An Empirical Study of the Relation Between Astrological Factors and Personality" (Mayo, White, and Eysenck 1978). The article created considerable controversy in psychological literature. There followed in rapid succession two studies that supported the findings (Smithers and Cooper 1978; Jackson 1979) and then two failures to replicate (Veno and Pamment 1979; Jackson and Fiebert 1980). More recently, Saklofske, Kelly, and McKerracher (1981) examined the responses of 241 New Zealand university students (average age 20.9 years) to the Eysenck Personality Questionnaire (EPQ) in relation to odd and even zodiac signs.¹ There were 165 females and 76 males in the sample. Regarding the main hypothesis examined, there were found to be no significant differences in extroversion between odd and even zodiacal signs for the total sample or for males and females considered separately. Although females scored higher than males on the neuroticism scale irrespective of zodiac sign, once again the scores showed no significant differences between odd and even signs for either sex or for the total sample. On the psychoticism scale, males scored higher than females. However, when psychoticism relative to odd and even zodiac signs was considered there

were no significant differences for males, females, or the total sample. In order to ensure that subjects were responding truthfully to the questionnaire items, lie scale items were utilized. There were no sex differences on this scale in response to the items; and when odd and even zodiac signs were considered, again there were no differences noted for females, males, or the total sample. ²

There were some other puzzles. As Kelly (1979-80) asked, Why did other studies that had examined possible zodiac sign and personality interactions using other personality tests not give significant findings on scales (such as sociability) that are related to the introversion-extroversion dimension of the EPI? This question was soon answered.

Although the results of the Mayo-White-Eysenck study were construed as supporting the astrological hypotheses, both psychology and chronobiology could produce alternative hypotheses for the data. Kelly (1979, 1979-80) pointed out that an obvious alternative explanation would be a seasonal effect operating on a critical perinatal development stage or phase. The chronobiologist Hans Wendt (1978) suggested a related explanation in terms of an imprinting or learning phenomenon that may be contingent upon certain triphasic biological rhythms.³ Another possibility would be that very early critical stages (nearer conception, perhaps) are also susceptible to some sort of electromagnetic field vector.

Finally, one could consider the systematic self-attributions people make because of their personal notions of "astrology." Individuals aware of their zodiac sign may answer test questions in light of what they know about the characteristics associated with their sign.^{4,5} Pawlik and Buse (1979) pursued the latter hypothesis and used controls for their subjects' own beliefs of what their zodiac signs were supposed to mean. They found that the so-called astrological effect in their Hamburg students could be statistically ascribed to their self-attributions. Subsequent research by Eysenck and Nias (Nias 1979, Eysenck 1979) replicated the findings of Pawlik and Buse. They concurred that the entire astrological effect was due to the subjects' expectations and familiarity with the characteristics associated with their zodiac signs. Eysenck and Nias tested over 1,000 children, who showed no sign of the effect. In a second study, adults (Salvation Army students) were selected specifically to exclude any with knowledge of astrology, and they too showed no sign of the effect. The effect appeared in the Mayo-White-Eysenck research because even the group classified as lacking knowledge of astrology probably knew about zodiac signs (and this, after all, is all that is necessary). In fact, in the Mayo-White-Eysenck study subjects had been classified on the basis of their answers to the question: "Do you know how to interpret an astrological chart?" Such a chart involves a relatively advanced level of knowledge.

It is also significant that, of the several studies relating EPI scores to zodiac signs, the one most perfectly in accord with astrological claims (Mayo-White-Eysenck) contained the highest proportion of people in-

clined toward astrology.

The Mayo-White-Eysenck “astrological effect” is an instructive example that underscores the need to eliminate all “normal” alternative hypotheses before embracing a paranormal one. In this case, what at first appeared to be supportive of a paranormal hypothesis was, with subsequent research, destined to have a nonastrological explanation after all and, indeed, to count *against* the astrological hypothesis.

References

- Dean, M. 1980. *The Astrology Game*. Don Mills, Ontario: Nelson Foster & Scott.
- Delaney, J., and H. Woodyard 1974. “Effects of Reading an Astrological Description on Responding to a Personality Inventory.” *Psychological Reports* 34:1214.
- Eysenck, H. 1979. “Astrology—Science or Superstition?” *Encounter*, December, pp. 85-90.
- Jackson, M. P. 1979. “Extroversion, Neuroticism, and Date of Birth: A Southern Hemisphere Study.” *Journal of Psychology* 101:197-98.
- Jackson, M., and M. S. Fiebert 1980. “Introversion-Extroversion and Astrology.” *Journal of Psychology* 105:155-56.
- Kelly, I. W. 1979. “Astrology and Science: A Critical Examination.” *Psychological Reports* 44:1231-40.
- 1979-80. “Studies of Astrology and Personality.” *Psychology* 16:25-32.
- Mayo, J., O. White, and H. J. Eysenck 1978. “An Empirical Study of the Relation Between Astrological Factors and Personality.” *Journal of Social Psychology* 105:229-36.
- Nias, D. K. B. 1979. Personal communication, December.
- Pawlik, K., and L. Buse 1979. “Selbst-Attribvierung als differentiell-psychologische Moderator variable: Nachprufung und Erklarung von Eysencks Astrologi-Personlichkeit-Korrelationen.” *Zeitschrift fur Sozialpsychologie* 10:54-69.
- Saklofske, D. H., I. W. Kelly, and D. W. McKerracher 1981. “Astrology and Personality: Yet Another Failure to Replicate.” Unpublished manuscript, University of Saskatchewan, Saskatoon.
- Smithers, A. G., and H. J. Cooper 1978. “Personality and Season of Birth.” *Journal of Social Psychology* 105:237-41.
- Veno, A., and P. Pamment 1979. “Astrological Factors and Personality: A Southern Hemisphere Replication.” *Journal of Psychology* 101:73-77.
- Wendt, H. 1978. “Season of Birth, Introversion, and Astrology: A Chronological Alternative.” *Journal of Social Psychology* 105:243-47.

Notes

1. The Eysenck Personality Questionnaire (EPQ) is the latest version of the personality measures developed by the Eysencks. It includes the scales of the EPI and an additional scale labeled “psychoticism” or “tough-mindedness.”

2. One astrologer, Malcolm Dean (1980, pp. 260, 263) has gone so far as to state that the "world-views" of the experimenters are responsible for the negative results in most zodiac sign-personality studies. This would seem to be taking ad hockery and special pleading to unparalleled heights. It should be mentioned here that the data on which this study was based were not gathered with the testing of astrology in mind. The data were collected to examine achievement in New Zealand students.

3. Amazingly, Dean (1980, p. 260) argued that Wendt's hypothesis was, in fact, congruent with astrological claims! He stated:

[Wendt] suggested that the Mayo/Eysenck results were simply due to biological rhythms which many people experience with three crests each year. Other biological rhythms have been discovered with this pattern, he noted: Circulatory functions tend to peak in March, July, and November . . . But, his paper provided astrologers with a curious correlation with signs which they had overlooked. Blood is a fluid, and the heart is related in astrological tradition to the Sun (hence circulation). And by a strange "coincidence" in March, July, and November, the Sun moves from a water sign to a Fire sign!

But surely Wendt's hypothesis shows the astrological juggling to be superfluous. This is like someone arguing that a knock on your door proves the presence of a spirit. When you check and find a person there our spiritist argues that there is a person and a spirit knocking at the same time. But our initial reasoning, namely, that the person was responsible for the knocking, is more than adequate. If we have a hypothesis that is consistent with psychological theory why entertain an exotic one?

4. Mayo-White-Eysenck were not completely unaware of this alternative possibility. In their paper they wrote:

It is clear that the results are in good agreement with the hypotheses outlined at the beginning of this paper: Is there any alternative explanation to that suggested by astrology? The only alternative which occurred to us is that some of the Ss might have known about the connection between personality and zodiacal birth sign traditionally posited by astrologers, and that consequently they might have altered their questionnaire responses in agreement. There are two reasons for disbelieving this hypothesis. In the first instance, the relation between the water signs and emotion is much more widely known than that between extroversion-introversion and the odd-even numbered birth signs; yet the former hypothesis was much less strongly supported. Our alternative hypothesis would have led us to expect the opposite. In the second place, about one-third of the Ss had some knowledge of astrological principles, two-thirds did not. An analysis of the scores obtained from these two groups did not show any significant differences, suggesting that knowledge of astrological principles was not a causal factor. We cannot in the nature of things rule this alternative hypothesis out completely, but it does not seem to us to account for the facts. It is a weakness of the study that only Ss are included who requested astrological predictions from the senior author—i.e., who were not a random sample of the population. It is difficult to see how any selection along these lines could have produced the results obtained, however, and we do not believe that this constitutes a serious weakness of the experiment. (p. 234)

The later research by Eysenck and Nias showed it to be the best hypothesis after all.

5. There was a precedent in the psychological literature for this possibility. Delaney and Woodyard (1974) found that a prior reading of horoscopes influenced the self-concept of individuals, as measured by a personality test, even when the subjects were told that "the [personality] questionnaire was 'concerned with Your personality *not* that personality which was astrologically predicted'" (p. 1274). They did not determine, however, how enduring the influence of the horoscope reading was. ●