Is Pisces More Likely to Have Heart Problems? A Replication of a Dismissed Result but with an Important Medical Astrology Twist

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Abstract

*Researchers use statistically significant results involving astrology as examples of Type I errors where the techniques make chance results appear significant. In this paper, I examine two such studies and I replicate a result involving Pisces and heart disease using a different set of data, a result first found significant in the previous study by a chi square test but then deemed insignificant using Monte Carlo methods, and in the new data set the result is found significant using Fisher's exact test (*p = *.0028). However, a closer examination of this data reveals that the significant result that suggests an association between Pisces and heart problems is better explained within astrology not by having Sun in Pisces but by the presence of medical astrology factors that might temporarily make Pisces people more susceptible to heart difficulties.*

Introduction

"Astrology doesn't work! How do we know this? Simple! Since we don't have a complete understanding of how it works, it clearly doesn't work!" Of course, we can also conclude by this same logic that quantum physics, conscious awareness, dark matter and dark energy, gravity, anaesthesia, and sleep are also bogus since, like astrology, we do not have a complete understanding of the mechanisms that make each one operate. However, I might take issue with the last item in my list because I am pretty certain what causes sleep. Mathematics causes sleep! I know this because I have spent countless years watching students fall asleep during my mathematics lectures. Additionally, do not people often help themselves to fall asleep by counting sheep? Counting as in mathematics? Well, you get the point. Just because we don't fully understand how something works is not proof that it doesn't. Nonetheless, this is an argument that scientists who are sceptical of astrology have used for years. Simply because they can't imagine how astrology could work, many automatically assume that it doesn't work. Furthermore, many studies that some might think disprove astrology do nothing of the sort. Instead, they merely assume that astrology doesn't work and then try to give explanations as to how and why statistically significant results were observed despite astrology's lack of validity. In part, I sympathise with these researchers since they are only trying to apply Occam's razor to a worldview that excludes astrology. Their mistake, in my opinion, is the assumption without adequate proof that astrology doesn't work. But in all fairness, they will see the assumption that astrology does work as the mistake that I am making. Thus, before proceeding further, let's examine the plausibility that astrological effects exist.

By an astrological effect I mean any correspondence between a celestial event and a terrestrial event that is repeatable under the same relevant conditions, and such a correspondence can be either causal or acausal. Now do such correspondences exist? The answer to this question should be a resounding yes! For instance, do not the majority of us go to sleep at some point during the nighttime when the Sun is below the horizon

and become more active the following day when the Sun is above the horizon? Do we not plant and harvest in sync with the changes of the seasons that are marked by the solstices and equinoxes, and are not the ocean's tides caused by the gravitational pull of the Moon? These are all, by the above definition, observable astrological effects. Hence, the question now is not if astrological effects exist, but rather how extensive are such effects, can we find causal mechanisms for specific effects, and how many tenets of traditional astrology are, indeed, valid statements of astrological effects?

Based on work in the fields of chronobiology, helio-biology, and circadian rhythms, the Sun and the Moon are often *zeitgebers* (time-givers) that help regulate many biological processes, and in many instances causal mechanisms involving light, gravity, or ocean tides have been indicated. For example, it has been shown that full moonlight entrains circadian rhythms in *Coffea arabica* (Breitler et al., 2020), and it has also been shown that biological organisms can respond directly to lunar gravity (Barlow, 2015). This latter result is important since some critics of astrology have maintained that only gravity could account for any traditional astrological effects and that this can be discounted since the person standing next to you exerts a stronger gravitational pull on you than, for instance, the Moon. For an example of a biological activity regulated by ocean tides, one need look no further than the lowly flatworm that rises to the surface during low tides and burrows underground again prior to the arrival of high tides (Morgan, 2001). Astrological effects have also been observed with respect to changes in the rates at which certain radioactive substances decay (Fischbach et al., 2009) and with respect to the formation of sunspots (Alcock, 1973, and Abreau et al., 2012). Additionally, modern statistical studies confirm (Ali et al., 2008, and Cajochen et al., 2013, and Sitar, 1990) the ancient Babylonian dictum (Pinches, 1919) that the new, quarter, and full moons can be stressful times. Furthermore, studies on circadian rhythms (Van Drunen et al., 2024) show that these rhythms can occur even at the cellular level. And lastly, researchers have found that certain diseases occur more or less frequently depending upon which month of the year that one is born in (Foster et al., 2008). This latter comes very close to a form of "Sun sign astrology," and some helio-biology researchers have speculated the existence of heliogeophysical imprinting (Deryapa et al., 1989 and Semenenia, 1995) upon the fetus while it is still within the womb.

All of the above are examples of astrological effects that have been observed by non-astrologers. Furthermore, today there are mathematicians and statisticians working within astrology to either confirm or fail to confirm various traditional interpretations of astrology. For example, Vincent Godbout (Godbout, 2020) has developed software that automates the process of matching horoscope descriptions with written biographies, and it is able to do such matching with an accuracy that is highly significant ($p < .0005$). Also confirmed statistically by astrologers are certain techniques of classical synastry (Tarvainen, 2021) and the connections between outer planet conjunctions and oppositions and world events (Holt, 2022, and Currey, 2023). More significant results can also be found in an extensive evidence list compiled by Robert Currey (Currey, 2022). The bottom line is that there is currently such a preponderance of evidence of connections between celestial and terrestrial events by both astrologers and non-astrologers that it is now foolish to automatically dismiss the entirety of traditional astrology as a fallacy, and it is time to look upon the astrological research of past centuries not as easily dismissed anecdotal evidence, but as what many of these instances of research actually are – in depth case studies.

Now let's look at two papers by Peter C. Austin where he appears to assume that astrology doesn't work and then proceeds to explain why his initial results were, nonetheless, statistically significant.

The Peter C. Austin Papers

Peter C. Austin is a superb researcher for ICES (formerly known as the Institute for Clinical Evaluative Sciences) in Ontario, Canada. He has Master of Science degrees in both mathematics and statistics and a

PhD degree in mathematics. He is a senior scientist in the Cardiovascular Research Program and Chronic Disease and Pharmacotherapy Research Program and a full professor at the Institute of Health Policy. His credentials are impeccable. Nonetheless, he has published two papers on cardiovascular health and astrology, and it is with those two papers that I disagree with some of his conclusions.

The first paper is titled "*Testing multiple statistical hypotheses resulted in spurious associations: a study of astrological signs and health*" (Austin et al., 2006) which I will refer to as *paper-1*. The title of this paper is something of a misnomer since it suggests that the paper disproves astrology when it actually does nothing of the sort. Instead, it seems to assume that astrology doesn't work and then proceeds to explain how some initially significant results are likely a consequence of inflating the alpha[1], thus increasing the probability of making a Type I error[2] (rejecting a true null hypothesis[3]).

As a researcher for ICES, Austin has access, for research purposes, to medical records for all 10,674,945 residents of Ontario between 18 and 100 years of age in 2000. This group was randomly split into two to create a derivation cohort of 5,337,472 residents and a validation cohort of 5,337,473 residents. The derivation cohort was then subdivided by astrological Sun sign, and the frequency of 223 medical diagnoses were studied for significance by Sun sign for patients who had emergent and urgent hospitalizations between 1st January 2000 and 31st December 2001. In instances where statistical significance was found in the derivation cohort, the tests were replicated on the validation cohort, and only the associations between Leo and gastrointestinal haemorrhage and Sagittarius and fractures of the humerus were significant in both cohorts.

For those with Sun in Pisces, significance was found in the derivation cohort for the clinical diagnoses of "heart failure" and "other acute and subacute forms of ischemic heart disease," but the Sun-in-Pisces hypothesis obtained in the derivation cohort was not confirmed in the validation cohort.

Austin's conclusion seems to be that all of the significant results were due to a phenomenon known as "inflating the alpha" (see endnote 1) where the probability of making a Type I error increases as a result of performing multiple tests, and after adjusting the value for alpha downward, the statistical significance disappeared.

The next paper I want to discuss by Austin is titled "*Pisces did not have increased heart failure: data-driven comparisons of binary proportions between levels of a categorical variable can result in incorrect statistical significance levels*" (Austin et al., 2007), and I will refer to this paper as *paper-2*. Again, the title of this paper is misleading as it suggests that the author is refuting an astrological claim, when, in fact, he is comparing statistical methods assuming that astrological results can be used as a random control group. In this paper, Austin shows that if you take a nominal variable with several levels (such as Sun sign) and if you collapse all of the levels but one down to a single binary format (such as Pisces versus not-Pisces) and if you then do a chi-square test to see if there is a significant difference between the two proportions, then this procedure also inflates the alpha.

Next in *paper-2*, Austin again turns to astrology, which he appears to believe doesn't work, and using the entire set of Ontario health data from *paper-1*, he found using a chi-square test that Ontario residents with Sun in Pisces were more likely ($p = .026$) to be admitted to the hospital and diagnosed with congestive heart failure when compared to all other astrological signs combined. Austin again attributes this statistically significant result to an inflated alpha. Furthermore, he determines empirically with Monte Carlo simulations that the use of the chi-square distribution is incorrect, and using the software program R, he shows that the real probability of getting the result he observed is .1523. Additionally, he includes the coding he did in R in an appendix at the end of his paper.

There are several comments I would now make on Austin's papers.

First, the most common way to adjust for inflating the alpha when doing multiple, independent tests is by performing what is known as the *Bonferroni correction* where a new value for alpha is often created by dividing the former value by the number of tests performed. Here is the logic behind this procedure. If, for example, you are doing a statistical test on a true null hypothesis using a level of significance (called *alpha*) of .05, then there will be a 5% likelihood of getting a statistically significant result purely by chance, resulting in an erroneous rejection of the null hypothesis. This is what is known as a Type I error. Correspondingly, there is a 95% chance that you won't make a Type I error and that you will correctly accept the null hypothesis. If one now performs *n* independent tests, then the probability of not making any Type I errors becomes $.95^n$ and, hence, the probability of making at least one Type I error is now inflated from the original .05 to 1 - $.95^n$ $1 - .95^n$.

In Austin's *paper-1*, he did 24 tests which changed the overall probability of making one or more Type I errors from 5% to 1 - $.95^{24}$ = 70.8% (approximately). This appears to almost guarantee getting at least one significant result purely by chance if his null hypothesis is indeed true. The *Bonferroni correction* would have us deal with this situation by changing the cutoff point for significance in all the tests to .05/24 = .00208 (approximately). In his paper, though, Austin used a slightly less conservative value for significance of .00213, and with this adjustment, none of the tests performed on the validation cohort were significant.

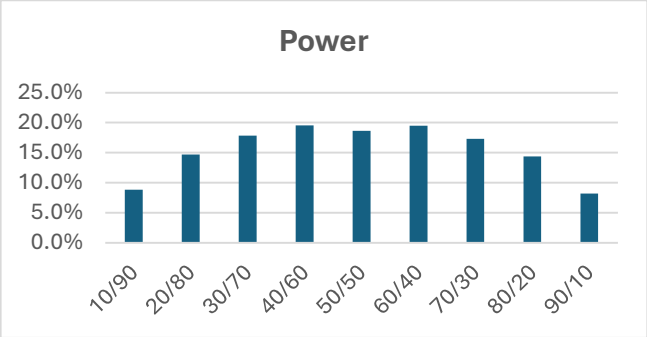
For my second comment, when it comes to collapsing several levels into one so that a binary comparison can be made between two remaining levels, I suspect that what matters here is not how many levels you start with but the difference in the sizes of the two final levels. For instance, let's suppose that *level 1* contains 10 people while *level 2* consists of 100 people. Then it is well known that samples drawn from our population for *level 1* will exhibit more variability in the number of "successes" observed while the samples drawn for *level 2* will demonstrate less such variability because variability decreases in the observed results as sample size increases. Hence, I am not surprised that the greater variability in *level 1* might result in an increase in Type I errors (getting a significant result only by chance). The statistical measures of *level 2* will be more stable than those of *level 1*, and this makes it easier for a significant difference between the two samples to occur by chance,

Interestingly, a simple experiment using G*Power 3.1 software (Faul et al., 2009) to do a post hoc power analysis for Fisher's exact test[4] suggests that statistical power also has a tendency to decrease as the ratio between the two samples sizes deviates from 1, and this suggests that binary comparisons where one sample is much larger than the other can also increase the likelihood of making a Type II error. This is the error that occurs when you accept a false null hypothesis, and the probability of making a Type II error is $1 - power$. The results of my experiment are shown below in Table 1.

Table 1

The Impact of Contrasting Sample Sizes on Statistical Power

n1	n2	n1/n2	Power
10	90	10/90	8.8%
20	80	20/80	14.7%
30	70	30/70	17.8%
40	60	40/60	19.6%
50	50	50/50	18.6%
60	40	60/40	19.5%
70	30	70/30	17.3%
80	20	80/20	14.4%
90	10	90/10	8.2%



In this table I take two samples with sample sizes n1 and n2, respectively, and I assume (1) that the proportion of "successes" in sample 1 is 50% and that the same proportion in sample 2 is only 40%, (2) that the sum n1+n2 is always equal to 100, and (3) that $\alpha = .05$. Based on these parameters, one can then see that for Fisher's exact test a post hoc analysis of power, using G*Power 3.1 software, indicates that the power generally increases as n1/n2 approaches 1.

Austin's papers are valuable for clearly illustrating ways in which inflating the alpha, the probability of a significant result occurring by chance, can happen, and because of this inflation, he cautions against following up a main hypothesis test with additional tests on subgroups of one's data such as male versus female or young versus old. Nonetheless, there are problems associated with reducing the risk of a Type I error by manually changing the criteria for significance from .05 to something far smaller, and the biggest problem is that doing so increases the likelihood of making a Type II error (failing to detect a significant result and, thus, accepting a false null hypothesis).

A problem that can occur when you adjust your alpha downward in order to avoid a Type I error is that, at the same time, you decrease the power of your test which increases the likelihood of making a Type II error. Since *paper-1* does not report the specific values that Austin used in some of his tests, I have concocted an example that yields similar test results and that I can use to demonstrate how changes in the value for alpha affect the power of a statistical test. Thus, suppose that 445,905 people have Sun in Pisces, 4,883,433 people don't have Sun in Pisces, that 761 of the people with Sun in Pisces experience heart failure, and 7,374 people without Sun in Pisces also experience heart failure. Then the *p*-value associated with the proportion of Pisces people with heart failure being different from the proportion of non-Pisces people with heart failure, as indicated by a two-sided Fisher's exact test, is .0015 and the relative risk of having heart failure if you're a Pisces as opposed to having heart failure if you don't have Sun in Pisces is 1.13. These values are close to the values of .0013 and 1.13 that Austin reports in *paper 1*. Also, when this test is done with alpha equal to .05, the post hoc power of this test (Faul et al., 2009) is estimated to be 94%, but when done with alpha equal to .00213, the power of this test drops to only about 65% which is below the 80% minimum that Jacob Cohen recommends (Cohen, 1988, p. 56). Hence, it could be the case that the follow-up test with the lowered level for alpha simply lacked sufficient power to detect a genuine statistically significant result.

Fortunately, there is another way to verify the validity of statistical results and that is by replication. And after all, in both medicine and astrology, if a result does not replicate in both space (different samples from the same period) and time (different samples from different times), then what good is it[5]? In both fields what we want most is predictability and that the same treatments (inputs) will result in the same outcomes (outputs). Furthermore, replication by itself will also reduce the likelihood of consistently making a Type I error. For instance, if, in our attempt to replicate a result, one performed two tests, each at the .05 level of significance, that are independent of one another and that are significant each time, then the probability of

making a Type I error on both tests is (.05)(.05) = .0025. In other words, the more consistently a significant result repeats, the less likely it is that the result is an error.

Replication

In an attempt to replicate Austin's initially significant results on a link between Sun in Pisces and congestive heart failure, I turned to the Astrodatabank database (*https://www.astro.com/adb-searchI*). This free online database, which is continually being updated, contains over 60,000 horoscopes in general and over 50,000 horoscopes with a Rodden Rating[6] of AA, A, or B. These ratings guarantee that the birth data is certainly accurate enough to determine each individual's Sun sign. Additionally, Astrodatabank has a category labelled "heart disease/attack," and this category was used to see if a link could be found with people with Sun in Pisces. Furthermore, this category contained at the time that I culled the data 469 individuals whose births covered the span from 1900 to 1992. Most of the people with this classification at Astrodatabank died of a heart attack while a minority either died of heart disease or were survivors of either heart disease or a heart attack. Also, while the people in this category lived all over the world, two were found to have lived and died in Ontario. Furthermore, to form the control group, I also extracted from Astrodatabank 47,527 subjects whose births covered the span from 1900 to 1992 and who were not in the category labelled "heart disease/attack". It is quite possible that of the 47,527 people in our study who were not in the heart disease/attack category that a few might also reside in Ontario. However, since less than one-half of one percent of those with heart disease/attack were residents of Ontario, the Astrodatabank database is likely sufficiently different from Austin's Ontario database for one to be able to carry out an independent analysis. All the data used in the study was drawn from Astrodatabank on 23rd July 2024 except for the data in Table 4 which was extracted on 14th August 2024.

To analyse the data for statistical significance, I performed, as Austin did, a two-sided Fisher's exact test, and I used G*Power 3.1 software (Faul et al., 2009) to estimate the post hoc statistical power of each result. A contingency table and outcomes are shown in Table 2. In addition to showing results for statistical significance and power, I also computed the risk ratio for heart disease/attack and I computed the effect size (ES) using the absolute value of Cohen's *h* (Cohen, 1988, p. 187) where:

$$ES = |h| = \left|2sin^{-1}\left(\sqrt{proportion\ 1}\right) - 2sin^{-1}\left(\sqrt{proportion\ 2}\right)\right|$$

And I followed Cohen's guideline that an effect size of .2 is small, .5 is medium, and .8 is large (Cohen, 1988, pp. 184-185). Table 2 below shows the results of testing the null hypothesis that there is no difference between the proportion of people with Sun in Pisces who have the classification heart disease/attack and the proportion of those without Sun in Pisces who have the same.

Table 2

The Impact of Sun in Pisces on Heart Disease/Attack

TWO-SIDED FISHER'S EXACT TEST				
1900-1992	**Heart disease/attack**	**No Heart disease/attack**	**Totals:**	**♥ %**
Sun in Pisces	60	4,099	4,159	1.44%
Sun not in Pisces	409	43,428	43,837	0.93%
Totals:	469	47,527		

p-*value* = .0028, *ES* = 0.047, *power* = 89%, ♥% *risk ratio* = 1.55

Above, I give a contingency table for the years 1900-1992 for heart disease/attack for those with Sun in Pisces and those without Sun in Pisces. In this table, I compute the percentages as 1.44% = 60/4,159 and 0.93% = 409/43,837. Beneath this table are the associated *p*-value (using a two-sided Fisher's exact test), effect size (ES using the absolute value of Cohen's h), a post hoc power estimate (using G*Power software), and a risk ratio, computed as 1.55 = 1.44%/0.93%, indicating the increased (or decreased) likelihood of having the classification heart disease/attack given that you have Sun in Pisces. We can see from the *p*-value that the result is quite significant, and we can see from the risk ratio that those in our sample with Sun in Pisces were 55% more likely to experience heart attack/disease. This data was extracted from Astrodatabank on 23rd July 2024.

At this point since significance was found when I used Fisher's exact test to replicate Austin's test of a link between Sun in Pisces and heart disease/attack, there might be a temptation to consider the issue resolved and move on to something else. After all, I've replicated a previous statistically significant result that was found and discounted by Austin in *paper 2* (Austin et al., 2007), and the *p*-value I found with the two-sided Fisher's exact test ($p = .0028$) is far below the *p*-value Austin found ($p = .026$) in *paper-2* using a chi-square test, so what is there left to do? Well, there are still some things that bother me.

One thing that bothers me is that if traditional astrological associations, as I understand them, are correct, then heart disease/attack is not an ailment that has usually been associated with Pisces, and another is that I really hadn't expected to find any significant result in the first place since past statistical research has shown that a single factor such as a Sun sign is notoriously weak when it comes to producing any strong astrological impact (Currey, 2022). Hence, I suspect that there is more than meets the eye regarding our statistically significant result, and as the ancient Talmudic rabbi, Ben Bag Bag, used to say, "Turn it over and over again[7]." Thus, I'll look at things a little more deeply, and I'll begin with a graph (Figure 1) that shows for 5-year intervals the proportions of heart disease/attack for those with Sun in Pisces and those without Sun in Pisces.

Figure 1

Heart Disease/Attack for Sun in Pisces and Sun not in Pisces

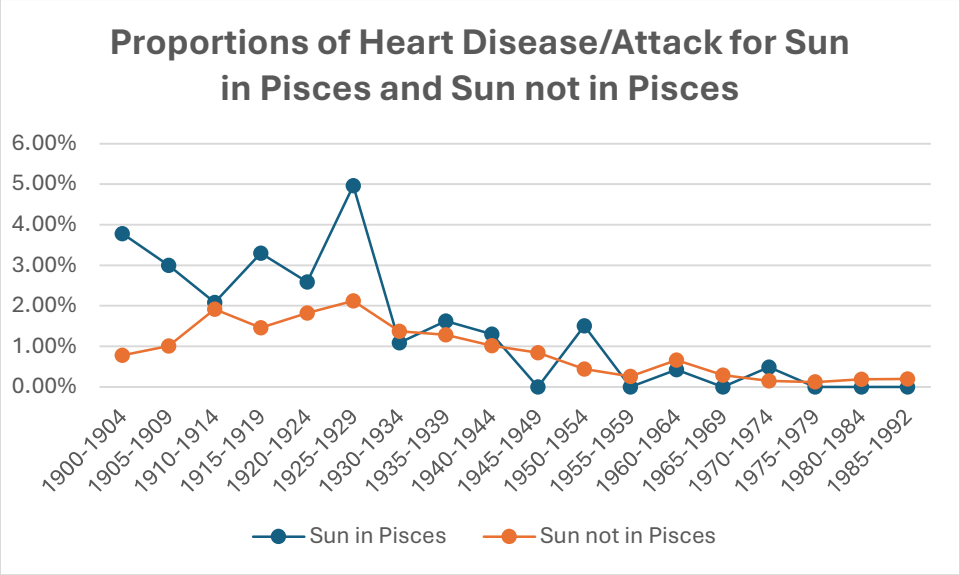


Figure 1 shows proportions of people from Astrodatabank with heart disease/attack with Sun in Pisces and those without Sun in Pisces from 1900 to1992. The data was extracted from Astrodatabank on 23rd July 2024.

In the graph in Figure 1, there seems to be a clear difference between the two groups over the period from 1900-1929, but this difference largely disappears over the period from 1930-1992. Thus, I'll repeat the statistical test for each of these time periods. The results are shown below in Table 3.

Table 3

The Impact of Sun in Pisces on Heart Disease/Attack Over Two Discrete Time Periods

TWO-SIDED FISHER'S EXACT TEST				
1900-1929	**Heart disease/attack**	**No Heart disease/attack**	**Totals:**	**♥ %**
Sun in Pisces	42	1,211	1,253	3.35%
Sun not in Pisces	216	13,161	13,377	1.61%
Totals:	258	14,372		

p-*value* = .0000441, *ES* = 0.113, *power* = 98%, ♥% *risk ratio* = 2.08

TWO-SIDED FISHER'S EXACT TEST				
1930-1992	**Heart disease/attack**	**No Heart disease/attack**	**Totals:**	**♥ %**
Sun in Pisces	18	2,888	2,906	0.62%
Sun not in Pisces	193	30,267	30,460	0.63%
Totals:	211	33,155		

p-*value* = 1, *ES* = 0.0018, *power* = 5%, ♥% *risk ratio* = 0.98

Above I give a contingency table for the years 1900-1929 for heart disease/attack for those with Sun in Pisces and those without Sun in Pisces, and I follow this with a similar contingency table covering 1930-1992. Beneath each table is the associated *p*-value (using a two-sided Fisher's exact test), effect size (ES using Cohen's h), post hoc power estimate (using G*Power software), and a risk ratio showing the increased (or decreased) likelihood of heart disease/attack given that one has Sun in Pisces. Both results correspond to very small effect sizes, but the result for the period 1900-1929 is highly significant with large power and a large risk ratio while the result for the period 1930-1992 is extremely insignificant and has very low power and an unimpressive risk ratio. The data for these tests was extracted from Astrodatabank on 23rd July 2024.

The results shown in Table 3 are very interesting because they represent such a contrast between significance and insignificance, between very high power and very low power, and between a high-risk ratio and a low-risk ratio. Clearly something seems to be going on that links Sun in Pisces with heart disease/attack, but it is not a consistent association. These differences could be related to changing conditions in the physical world such as, for example, mass changes in lifestyle or improvements in medication. For instance, suppose that there is an association between Sun in Gemini and polio. Then it is natural to expect such an association to dwindle once a polio vaccine becomes available, and something of this sort might account for the differences in the results for 1900-1929 as compared to the period 1930-1992. But on the other hand, the stark difference in the results could also be a consequence of changing astrological conditions. Thus, I'll take a look at a tenet of modern medical astrology.

Admittedly, I am not an expert on traditional medical astrology, and what I do know has often seemed overly simplistic to me. After all, modern Western medicine is very complex while Western medical

astrology begins with statements like Aries rules the head, Taurus rules the neck, and so on down the body until we reach Pisces as the ruler of the feet. Additionally, heart attacks and heart disease are not traditionally associated with Pisces. Instead, the heart is said to be ruled by Leo.

However, many of the above qualms can be set aside if one learns to think in terms of systems. Thus, just as Western medicine organises a complex body of knowledge around a small number of systems like the nervous system, the cardiovascular system, and the digestive system; to name a few, so can one think of each astrological sign as also representing a different system when that astrological sign is applied to health and medicine. Furthermore, the following passage from *A Handbook of Medical Astrology* by Jane Ridder-Patrick (Ridder-Patrick, 1990) will be relevant to my analysis:

> *As well as being linked with the anatomical areas associated with its signs, and the activities that go on in these areas, each of the three crosses[8] focuses on certain interrelated groups of physiological functions. The signs in these crosses seem to work together reflexly. There may, for instance, be problems in one particular area of the body, but in the chart there are no planets in the sign associated with it. It is almost guaranteed that a planet in one of the other signs of the cross will be the culprit. Most often, though not always, it is in the opposite sign. <u>There is a strong link between body areas ruled by signs in opposition and/or square to one another</u>.*

A similar principle is found, too, in *Medical Astrology* by Eileen Nauman (Nauman, 1993):

> *<u>Those people with planets in Aries may suffer from frequent headaches caused by clogged or sluggish kidneys (Libra) that have a reflex action to the head, digestive disturbances (Cancer), resulting in headaches and sluggish gallbladders (Capricorn)</u>.*

Based on the above passages where I have underlined the pertinent parts, I now formulate a hypothesis that if Neptune, the modern ruler of Pisces, is in Leo or another fixed sign, or if Neptune is, by sign, either conjunct, square, or in opposition to Pluto (modern ruler of Scorpio) or Uranus (modern ruler of Aquarius), then people with Sun in Pisces might, as a result of a resonance with Neptune, be at heightened risk for diseases associated with any of these fixed signs and from heart disease/attack, in particular. Note that I have left out Venus, the ruler of Taurus, and the Sun, ruler of Leo, because they both likely move too swiftly for one to easily measure the effect I am looking for[9]. Also, I will examine only years from 1900 to 1954 because from 1955 onward there are only two cases of heart disease/attack recorded among those with Sun in Pisces. Not nearly enough for a definitive analysis!

To test my hypothesis, I'll next associate each year with one of the following labels: Aspect – Neptune in Leo or another fixed sign, or Neptune, by sign, either conjunct, square, or in opposition to Pluto or Uranus for the entire year; No Aspect – the opposite of the conditions of "Aspect" for the entire year; Transition – the condition of being Aspect for part of the year and No Aspect for the rest of the year. Based on these criteria, I was able to label each of the years from 1990 through 1954 as follows:

Aspect	Transition	No Aspect
1900	1901-1902	1903
1905-1911	1904	1930-1940
1915-1927	1912-1914	1944-1947
1950-1954	1928-1929	
	1941-1943	
	1948-1949	

Additionally, during the years from 1900-1954, the only aspects (as defined above) that were in effect were Neptune in Leo, Neptune conjunct (by sign) Pluto, and Neptune opposite or square (by sign) Uranus.

When examined separately using Fisher's exact test, the *p*-value for Aspect was $p = .00286$ and the *p*-value for Transition was $p = .0265$ while the *p*-value for No Aspect was $p = .874$ which is not significant at the .05 level of significance. Also, because both Aspect and Transition were found to be significant, I decided to combine these two categories in Table 4 which also includes the results for No Aspect.

Table 4

The Impact of Sun in Pisces on Heart Disease/Attack Based on "Aspect or Transition" Versus "No Aspect".

TWO-SIDED FISHER'S EXACT TEST				
In Aspect or Transition	**Heart disease/attack**	**No Heart disease/attack**	**Totals:**	**♥ %**
Sun in Pisces	48	1,805	1,853	2.59%
Sun not in Pisces	255	19,413	19,668	1.30%
Totals:	303	21,218		

p-*value* = .0000451, *ES* = 0.095, *power* = 98%, ♥% *risk ratio* = 2.00

TWO-SIDED FISHER'S EXACT TEST				
No Aspect	**Heart disease/attack**	**No Heart disease/attack**	**Totals:**	**♥ %**
Sun in Pisces	10	929	939	1.06%
Sun not in Pisces	113	9,323	9,436	1.20%
Totals:	123	10,252		

p-*value* = .874, *ES* = 0.013, *power* = 6%, ♥% *risk ratio* = 0.89

The contingency tables above show the results of two-sided Fisher's exact tests for the levels of "Aspect or Transition" and "No Aspect." The result is that if a person has Sun in Pisces and they were born in a year with Neptune in Leo or with Neptune conjunct Pluto or opposite or square Uranus by sign, then they are more likely to be classified as heart disease/attack at Astrodatabank during the years 1900-1954. This result is significant at p = .0000451, and the risk ratio indicates that those categorised as "In Aspect or Transition" were twice as likely to be classified as heart disease/attack. In contrast to this, No Aspect was found not significant with p = .874. However, the post hoc analysis of the power for the test of No Aspect indicated a power of only 6% which means that the second test likely lacks sufficient power to detect a significant result. The data was extracted from Astrodatabank on 14th August 2024.

Discussion

So, have I proven that people with Sun in Pisces are significantly more likely to experience a heart attack or heart disease? I seriously doubt I have done so despite the fact that I was able to replicate the result of a study by Austin (*paper-2*) that he dismissed as a Type I error. What I have done, though, by digging deeper into the data, is to unexpectedly find support for a tenet of modern medical astrology. However, as nice as the results are, they, too, are in need of replication on other databases. Additionally, the logic that led to my outcomes should also be tested in other situations. For example, when Neptune is in Virgo, will people born with Sun in Pisces experience more diseases associated with Virgo or the mutable cross (Gemini/Virgo/Sagittarius/Pisces)? And likewise for those Pisceans born with Neptune in Libra, will they experience more diseases associated with Libra or the cardinal cross (Aries/Cancer/Libra/Capricorn)? Or was the result observed originally with Sun in Pisces and Neptune in Leo due, in part, to the fact that the

two planets were in mutual reception? In other words, this research already raises new questions and new avenues for exploration, and those lines of inquiry need to be pursued.

This study also evokes advice for both astrologers and non-astrologers alike.

For astrologers with a background in data analysis, they need to be aware that not only can multiple hypothesis tests make it more likely that one will commit a Type I error, but also that doing binary comparisons where one sample is much larger than the other can additionally lead to an increased risk of Type I errors as well as Type II errors. Nonetheless, keep in mind that simply because there is a greater chance of making either a Type I or Type II error, that in no way means that one's result is indeed an error, and to automatically label it as such without further investigation is, itself, an error!

For readers unfamiliar with astrology who may readily dismiss connections between celestial and terrestrial events, I encourage a careful review of this paper's introduction. The examples presented highlight evidence suggesting the presence of measurable astrological effects. And those examples above are only the tip of the iceberg. But don't get me wrong. I'm not saying that everything any astrologer anywhere has ever said is valid, and it is undoubtedly not since different astrologers will sometimes hold conflicting points of view. Nonetheless, as statistical and scientific studies continue, we are beginning to get a better and better understanding of what works in traditional astrology and what doesn't (Tarvainen, 2012 & 2021 and Currey, 2022 [evidence list]). And simply because one may have shown that not all athletes are born with Sun in Aries and not all mathematicians are born with Sun in Gemini, don't think that this disproves astrology. Like many disciplines, astrology is a vast framework of real-world observations coupled with various theoretical frameworks, and just as the ideas and understandings of physics evolve over time, so, too, does astrology grow and evolve, and the discarding of a single thread does not invalidate the entire fabric. The bottom line is that for a scientist today to dismiss out of hand and without evidence the entire body of astrology is simply in itself utterly unscientific! There is already too much validation that astrological effects exist.

Limitations

This study has been an *observational*, *retrospective* study that used a *convenience sample* drawn from Astrodatabank, a database that is known to have some gaps in its data, particularly with respect to medical data. As such, there is always the possibility that the results observed here may fail to generalise to the population as a whole. Nonetheless, the fact that I was able to replicate the result that another researcher initially found significant on another database and that I was able to find support in the data for a tenet of modern medical astrology suggests otherwise.

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[1] Alpha is both the likelihood of an observed result or something more extreme occurring by chance and the condition one sets for determining statistical significance. In statistical tests, alpha is usually preset to .05, but if a procedure effectively increases this value by making a finding of statistical significance by chance (a Type I error) more likely, then that is called inflating the alpha.

[2] The probability of making a Type I error is always equal to the current value of alpha.

[3] In statistics, the null hypothesis is always our starting assumption that nothing significant is occurring. The hope in any statistical test, however, is that the results observed will be statistically significant in which case an alternative hypothesis is accepted over the null hypothesis.

[4] Like the chi square test, G-test, and the z-test for two proportions, Fisher's exact test can be used to compare proportions in a 2 x 2 contingency table. However, unlike many other tests, Fisher's exact test makes no assumptions about the distribution of the data, and under the assumption that row and column totals are fixed, it computes an exact probability using a hypergeometric distribution. Also, Fisher's exact test is generally considered to be more conservative than the chi square test in that it usually results in fewer Type I errors.

[5] Granted that in both medicine and astrology there can be once-in-a-lifetime events, such as pandemics, that sometimes occur, and analysis of those events can yield valuable case studies, but, nonetheless, it is replication that is the gold standard for validating our results.

[6] For formal definitions of the various Rodden ratings, see *https://www.astro.com/astro-databank/Help:RR#Formal_definitions_of_Rodden_Ratings*

[7] *Mishnah*, Pirkei Avot 5:22

[8] Cardinal, fixed, and mutable

[9] In particular, hard aspects between Neptune and the Sun or Venus will generally fade quickly and not last long enough to have a discernible affect upon a particular generation.