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Does planets' position in zodiac constellations drive the occurrence of human wars?

A retrospective test of non-natal astrology

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Abstract

The lack of descriptive and predictive effectiveness of natal astrology revealed thus far does not rule out the possibility that the position of planets in specific areas of the background sky influences human behavior regardless of birth date. This study compiled a list of war events that occurred throughout the twentieth century, which were used as proxies for a state of violence in the global human community at particular moments in time. Ecliptic longitude values of Mercury, Venus, Mars, Jupiter, Saturn, and the Moon at the beginning day of each war were distributed across 12 sections of the ecliptic of 30° span each. East longitude boundary of Aries was set starting at 23° from the vernal equinox in agreement with sidereal astrology. A total of 210 war events were collected for the analysis. The observed and expected war counts when planets were transiting through each zodiacal constellation were statistically similar in all cases (P values from 0.076 to 0.658). In addition, the occurrence of wars when two planets were in conjunction in specific zodiac constellations was in agreement with their expected positions according to regular planetary movement. Independently of astrology beliefs and planetary dynamics, wars showed a weak trend, though significant, towards occurring more frequently later than earlier in a year (slope: 0.78 [95% CI: 0.12, 1.48]; $r^2=0.408$; $P=0.025$). In conclusion, even though the study design favored the astrological theses, no relationship between war triggering and the positions of planets transiting through zodiacal constellations was found.

Keywords: astrology, zodiac, sidereal, constellation, war, violence

1. Introduction

According to natal astrology, the position of the Sun, Moon, and planets at the time of birth can be used to determine the personality, temperament, and behavior of a subject [1]. The location of celestial bodies in predefined categories (zodiac signs) across the ecliptic determines the natal chart, which constitutes the cornerstone of natal astrology.

Although scientific tests aimed at verifying the postulates of natal astrology have repeatedly failed [2-6], horoscopes, an

astrologer's interpretation of natal charts, are still extremely popular. This holds even after the strongest evidence against natal astrology to date was provided in a double-blind study by Carlson in 1985 [7]. Not only were the professional astrologers actively involved in the design of Carlson's study unable to describe the psychological profiles of participants based on their natal charts, but participants were also unable to recognize their own profiles at a level higher than chance.

In addition to human personality traits, astrology throughout history has also addressed the correspondence

between celestial observations and terrestrial events with predictive aims, again with poor accuracy [8]. For example, predictions of wars have been historically attempted by astrologers, based on the horoscopes of not only people but also cities and states [9].

Among the numerous aspects of human behavior, violence throughout human history, particularly its socially organized expression in the form of warfare, has been extensively addressed by scholars [10-12]. War is typically considered a state of armed conflict between two or more countries or human groups within a country that begins as a sort of dispute that turns violent. There is a multitude of causes, mechanisms, and developments that lead to war, including misdirected aggressive impulses [13, 14]. Ultimately, in most cases, a war begins with a leader's decision to act consciously or unconsciously, driven by the surrounding circumstances [15].

It is generally accepted that environmental factors at birth are associated with psychological and psychiatric phenomena and have an impact on personality. For instance, the season of birth can influence an individual's early development [16]. In contrast, one of the main scientific criticisms of natal astrology is their inability to provide a consistent rationale for how planets and stars can imprint certain characteristics of individuals at birth. However, it could still be possible that the human brain and the consequent routine human behavior could somehow be influenced by the specific positions of planets, as they appear in the background sky from the observer's perspective on Earth at any given time. This point, viewed as an astrological effect independent of the birth date, has not been empirically refuted as it was convincingly done with natal astrology [7].

With this background, the present study explored whether there was a link between planets and the Moon positions across specific zodiac constellations and a key aspect of human behavior such as violence, the latter represented by its manifestation in warfare.

2. Methods

2.1 Study design and objectives

The incidence of wars worldwide within a defined set of conditions was deemed a quantifiable, verifiable, and objective proxy for a certain state of violence in the global human community at particular moments in time.

The defined set of conditions was the location of the five planets classically relevant to astrology (i.e., those that can be observed with the naked eye: Mercury, Venus, Mars, Jupiter, and Saturn) plus the Moon, within predefined sections of the ecliptic corresponding to zodiacal constellations.

The primary objective of this study was to determine the association between the incidence of wars and the location of planets or the Moon within zodiacal constellations. To achieve this objective, a database of war events was compiled. The

number of wars that began when a planet or the Moon was transiting through each of the zodiacal constellations was compared with the number expected in the absence of any influence (i.e., by chance). The possible higher-than-expected occurrence of wars when two planets were found concomitantly (i.e., in conjunction) in specific zodiac constellations was also assessed.

A secondary objective was to analyze the possible association of war incidence with other variables that were available in the collected data but unrelated to astrology and the celestial bodies. To this aim, the observed distribution of wars across the twelve months of the year was compared to the distribution expected by chance, considering their geographical context.

2.2 Wars data collection

A list of war events that occurred during the twentieth century (from January 1st, 1901 to December 31st, 2000) was prepared. This recent period of 100 years was deemed to contain a sufficient sample size of authenticated war events for the study analysis, whereas earlier conflicts were considered relatively poorly registered and documented.

Data on war events were collected from several online sources [17-20]. To get a consistent list of events from the variety of armed conflicts included in the sources, only those that met the following inclusion criteria were gathered: i) events that were unequivocally defined as "war" or "invasion"; ii) events that were defined as "armed conflict" but the term was used interchangeably with "war" elsewhere; and iii) events with a known beginning date. The cases where the month but not the beginning day was documented were considered for the secondary objective only.

2.3 Planetary position calculations

The ecliptic coordinates of Mercury, Venus, Mars, Jupiter, and Saturn on the first day of eligible war events were obtained using Casio's Keisan Online Calculator (<https://keisan.casio.com/exec/system/1224748262>). The Moon's ecliptic coordinates were obtained using Jens T. Satre's online Sun & Moon Position Calculator (<https://www.satellite-calculations.com/Satellite/suncalc.htm>). For all calculations, the daytime was subjectively set to 12:00 UT. In this study, only ecliptic longitude was relevant.

The values of ecliptic longitude in degrees were distributed across 12 sections of the ecliptic of 30° span each, concurring approximately with the boundaries of the Zodiac constellations. Because of the precession of the equinoxes, the vernal equinox slowly shifts westward by approximately 1° every 72 years. Thus, the East longitude boundary of Aries established by the International Astronomical Union (IAU) is approximately 28.7° from the vernal equinox in standard epoch J2000.0 (27.4° in epoch J1900.0) [21]. However, in sidereal astrology, the limit between Aries and Pisces is

located approximately 23° to 24° from the vernal equinox [22]. In addition, boundaries between constellations are arbitrary, and the IAU and astrological boundaries generally do not coincide. Given the purpose of this study, the Aries East longitude boundary at 23° of sidereal astrology was preferred to the IAU value. The ranges for the distribution of ecliptic longitude values across the zodiac constellations were set as listed in Table 1.

Table 1. Ranges for the distribution of ecliptic longitude values across the constellations according to the sidereal zodiac

Constellation	Ecliptic longitude range (degree)
Aries	≥ 23° to < 53°
Taurus	≥ 53° to < 83°
Gemini	≥ 83° to < 113°
Cancer	≥ 113° to < 143°
Leo	≥ 143° to < 173°
Virgo	≥ 173° to < 203°
Libra	≥ 203° to < 233°
Scorpius	≥ 233° to < 263°
Sagittarius	≥ 263° to < 293°
Capricornus	≥ 293° to < 323°
Aquarius	≥ 323° to < 353°
Pisces	≥ 353° to < 360° / ≥ 0° to < 23°

To derive the number of war events expected in the absence of any astrological influence, it was determined that such a number should be proportional to the actual time that each planet remained in each zodiac constellation during the 100 years studied. However, because of the apparent retrograde motion of planets relative to the background stars (see Table 2), the time spent by a planet transiting through each of the 12 zodiacal constellations during its synodic period is not proportional to 1/12. This was not the case with the Moon, in which time spent in each zodiacal constellation is very close to 1/12 proportion.

To calculate these times, the daily ecliptic longitude values of each planet from January 1st, 1901 to December 31st, 2000 (36,525 days), were obtained using the NASA Horizons Web Application (<https://ssd.jpl.nasa.gov/horizons/app.html#/>). The ecliptic longitude values were distributed according to the ranges listed in Table 1. To obtain the expected values, the proportion of each range with respect to the total number of observed war events was calculated.

2.4 Planetary conjunction assessments

To analyze the occurrence of wars during planetary conjunctions, charts of paired planets were prepared. The

ecliptic longitude value of both planets (one planet in each axis) at each war beginning day was plotted. The obtained pattern was qualitatively analyzed and compared with their expected positions according to regular planetary movement dynamics (same plot corresponding to planets' positions during the entire 20th Century).

Table 2. Orbital and synodic periods of the Moon and planets and their retrogradation times

Body	Orbital period (days)	Synodic period (days)	Days in retrogradation	% of days in retrogradation
Moon	27	29.5	No	No
Mercury	88	116	21*	18.1%*
Venus	225	584	41	7.0%
Mars	687	780	72	9.2%
Jupiter	4332 (12 years)	399	121	30.3%
Saturn	10759 (29 years)	378	138	36.5%

* On average

2.5 Monthly and geographic distribution

Wars were categorized according to their month of beginning. The expected monthly war count was calculated as the total number of wars observed during the study period divided by 12 (i.e., the monthly average).

To provide a geographic contextualization to interpret the distribution in time, war events were classified, first, according to the geopolitical region where the countries or human groups involved were located: Western world, Eastern European, Latin American and Caribbean, African, and Asia and the Pacific [23]; second, according to Earth hemisphere: Northern vs Southern; and third, according to Earth climatic zone: tropical (i.e., between latitudes 23°27' north and south) vs non-tropical (subtropical and temperate).

2.6 Statistical analysis

The goodness of fit test was used to calculate the minimum sample size to gain a minimum power of 0.8 at a significance level $\alpha=0.05$, with a medium effect size (Cohen's $w=0.3$) for a chi-square comparison with 12 categories [24]. These baseline data determined the minimum sample size for $N=187$ events.

Contingency tables and radar graphs were prepared for each planet and the Moon. The observed and expected numbers of wars that started when the planet was found transiting through each of the twelve zodiacal constellations were compared using chi-square tests. Statistical significance

was set at $P < 0.05$, after applying the Benjamini-Hochberg procedure to correct the false discovery rate associated with multiple comparisons [25].

A linear regression model was used to conduct an additional trend analysis of the distribution of wars across the months of the year. The regression line with a 95% confidence interval (CI) and goodness of fit (r^2) were calculated. The

F-test was used to determine a non-zero slope at a significance level of $P < 0.05$.

SPSS Statistics (IBM, Armonk, NY, U.S.), Microsoft Excel (Microsoft Corporation, Redmond, WA, U.S.), and GraphPad Prism (GraphPad Software Inc, San Diego, CA, U.S.) were used for the calculations and charting.

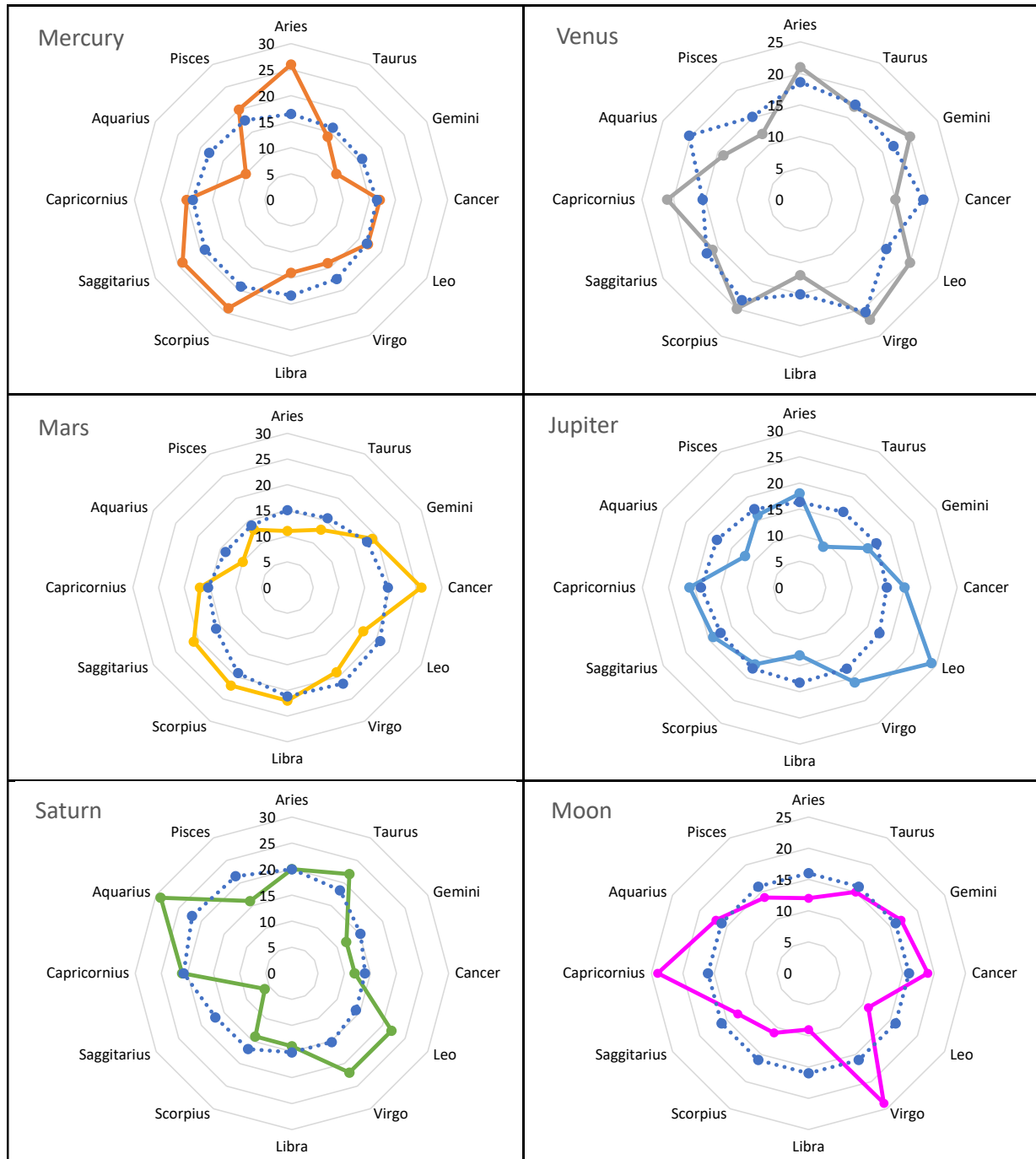


Figure 1. Radar charts of the observed (straight lines) and expected (dotted lines) war counts (N= 204) when the five studied planets and the Moon were transiting through each of the 12 zodiacal constellations (in 30° sky sections, with East ecliptic longitude boundary of Aries starting at 23° from the vernal equinox)

3. Results

A total of 210 war events that met the inclusion criteria were collected from the sources. The first war event started on November 1st, 1901 (Anglo-Aro War) and the last event started on June 5th, 2000 (Six-Day War between Uganda and Rwanda). In only six cases (2.9%), the precise starting day of the war was not documented. This left a total of 204 war events for the primary objective analysis. This value was well above the minimum sample size required (N= 187). A complete list of wars and dates is provided in Supplementary Table S1.

3.1 War occurrence according to single planetary positions

The observed and expected war counts when planets and the Moon were transiting through each of the twelve zodiacal constellations (in 30° sky sections; see Table 1) are represented as radar charts in Figure 1. The graphs showed irregular shapes, whose count values were not statistically different from the expected counts (P= 0.389 for Mercury, P= 0.728 for Venus, P= 0.658 for Mars, P= 0.312 for Jupiter, P= 0.076 for Saturn, and P= 0.370 for the Moon).

3.2 War occurrence according to planetary conjunctions

The ecliptic longitude plots for paired planets corresponding to their positions at the beginning day of each war event are shown in Figure 2. Dots showed no clustering in the same specific ranges of ecliptic longitude values for two paired planets, which would have meant that wars occurred more frequently during a planetary conjunction.

Mercury and Venus showed a strong positional concomitance when wars occurred, never being observed farther than two constellations apart. This corresponds to their condition as inferior planets (i.e., they orbit the Sun within Earth's orbit), whose apparent distance as viewed from Earth never exceeds 28°.

The pattern of war occurrence observed in the paired Jupiter and Saturn positions correspond to their condition as the farthest superior planets with long orbital periods and very similar synodic periods (see Table 2).

In all cases, the charted patterns did not qualitatively differ from their expected positions according to regular planetary movement dynamics (Figure 2).

3.3 War occurrences according to month and geographic context

The distribution of wars by month of the year showed a minimum value in January (n= 8) and a maximum of approximately three times that value in November and December (n= 24 and n= 23, respectively). Detailed monthly

war counts are shown in Figure 3. The chi-square test showed no statistically significant differences in counts per month with respect to expected values (average:17.5 wars per month). However, the chi-square analysis was not powered to detect a trend. This was performed using linear regression, which demonstrated a statistically significant (P= 0.027) positive non-zero slope of 0.755 (95% CI: 0.106, 1.405) with remarkable goodness of fit ($r^2= 0.402$).

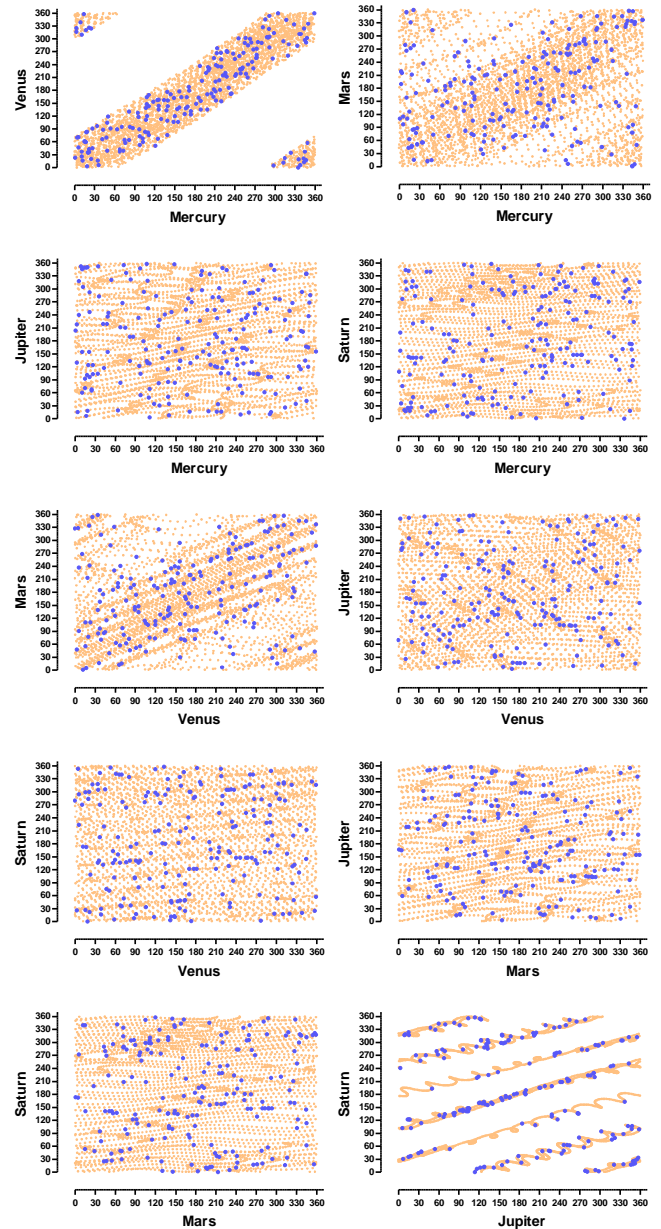


Figure 2. Plots of ecliptic longitude values for paired planets (one planet in each axis, all combinations of the five studied planets are shown) corresponding to their positions at the beginning of each of the 204 war events studied (blue dots) and to their positions during the entire 20th Century in 10-day span between successive positions (orange dots). See Table 1 for the ecliptic longitude range that corresponds to each zodiac constellation

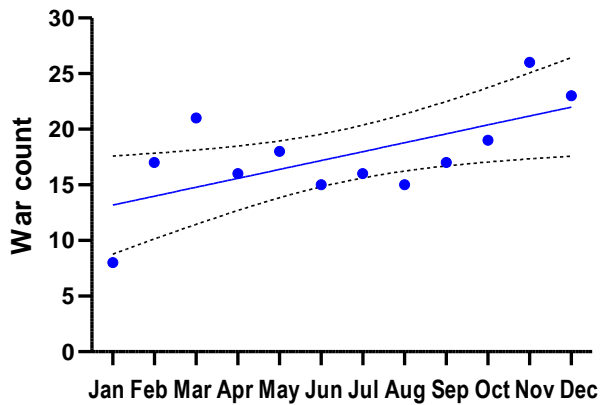


Figure 3. Distribution of the 210 war events according to the month of the year (dots: count per month). Linear regression (straight line) with 95% confidence interval (dashed lines) are shown (slope: 0.78 [95% CI: 0.12, 1.48]; $P=0.025$; $r^2=0.408$)

Regarding the geographic context of war events, all geopolitical regions were well represented: 13.0% of wars involved the Western world, 18.8% Eastern Europe, 13.4% Latin America and the Caribbean, 21.3% Africa, and 33.5% Asia and the Pacific. Most wars occurred in the Northern Hemisphere: 84.8% vs. 15.5%, in the Southern Hemisphere, as expected from the emerged landmasses distribution. The percentage of wars occurring inside and outside the tropical belt was similar: 44.3% and 55.7%, respectively.

4. Discussion

The fact that natal astrology lacks both descriptive and predictive power does not rule out the possibility that the positions of celestial bodies in specific parts of the background sky had an impact on routine human behavior unrelated to birth date. In this study, a non-natal approach was used to objectively examine the effect of planets and the Moon on human actions, namely activities related to violence and war. Such an approach could be relevant to electoral astrology (also known as inceptional, katarchic, or event astrology), a branch of astrology in which the relative positions of stars, planets, and other celestial bodies respond to human intention and initiative [26].

The following assumptions were made in this study to support the astrological theses as much as possible while maintaining a scientific framework:

First, it is known that celestial bodies have objectively quantifiable effects on Earth as a whole, such as gravity and radiation [27, 28]. Therefore, any detectable potential astrological effect would be expected to act unselectively on our planet's inhabitants, independently of a subject's physical surroundings and their local environment.

Second, because the type and intensity of deep-sky radiation that reaches the Earth are not uniformly distributed [29], any other effect that may be emitted from sky sections

spanning the ecliptic (i.e., zodiac constellations) should also be diverse. Therefore, a measurable astrological influence of planets transiting through these sky sections may mix synergistically and may differ from one section to another.

Third, the ecliptic longitude boundaries of the zodiac constellations used in this study were in close agreement with those of sidereal astrology which takes the precession into account [22], to the detriment of IAU boundaries.

Fourth, any unknown but quantifiable astrological effect caused by a planet transitioning through a zodiac constellation should be detected gradually rather than suddenly before and after the constellation limits.

And fifth, the human brain is an extremely complex organ, and the ultimate mechanisms governing consciousness and volition are not well understood. Even quantum effects have been postulated to play a role in its operation at the neurotubule level [30]. Therefore, it was deemed plausible that the human brain could be affected by forces of cosmic origin with quantifiable repercussions on human behavior.

Despite these astrology-favoring assumptions, the findings of this study demonstrated that occurrences of wars, defined as acts of violence resulting from human decisions, were unaffected by the position that planets from Mercury to Saturn or the Moon occupied in relation to zodiac constellations at the time the conflicts began. Remarkably, Saturn, the farthest planet with the *a priori* weakest influence, showed the P value closest to significance ($P=0.076$). This fact, together with the irregular shapes of the obtained radar graphs, is consistent with random statistical fluctuations.

Planetary conjunctions are relevant events in both natal and non-natal astrology, since it is believed that the astrological influence of the two bodies is amplified [31, 32]. However, the results of this study demonstrated that, when two planets were simultaneously transiting specific zodiac constellations, wars occurred frequently as expected from the planets' regular orbital movements, which means in agreement with chance. Conjunctions of a planet with the Moon were not evaluated in this study because these are not singular but very frequent short-term events. The Moon's short synodic period of about one-month (29.5 days; see Table 2) results in this body being in conjunction with each one of the planets every month approximately.

The only seemingly consistent study to date that found a purportedly astrological effect on human activities was a so-called "Mars effect" described by Michel Gauquelin, in which sports champions were reported to be born when Mars had just risen or culminated [33]. However, independent investigators could not replicate these results, raising doubts regarding whether the original birth dates were unbiased. Curiously enough, this effect was unrelated to Mars's position concerning zodiac constellations, but to its position relative to the horizon, which depends on Earth's rotation. Rather than

bolstering astrology, Gauquelin's findings highlight the inconsistency of astrology itself.

Beyond planets' positions and astrology beliefs, the correlation of war occurrences with months of the year found in this study is intriguing. In the social sciences, a value of $r^2 > 0.30$ is usually regarded as significant [34]. As the maximum variation was detected between January and December, two months with similar weather, climatic influence is unlikely to have played a role. Furthermore, wars considered in this study took place in both the Northern and Southern Hemispheres, which have opposing hot-cold seasons that typically last three months, as well as wars in countries of the tropical belt, which have dry-rainy seasons that last six months (typically from December through June and June through November, respectively) [35]. Finally, wars happened in all geopolitical regions and their associated cultural domains. All these factors point to the results being attributed to mind-rooted societal causes associated with end-of-year and new-year aims, perhaps analogous to the psychologically explained higher incidence of crimes committed on full-moon days [36].

The limitations of this study include restrictions on the inclusion criteria for data homogeneity. Thus, only armed conflicts, defined as wars or invasions, were analyzed. Other violent events, such as single battles, uprisings, revolts, rebellions, insurrections, or *coups d'état*, were not considered. In addition, there is no guarantee that the sources of information employed are complete or unbiased. Finally, other variables not addressed in this study, such as crime and delinquency, can be used to analyze human violence and aggression. It should also be noted that this study operated with the sidereal zodiac. Other astrologies may use different zodiacal constellations with different boundaries [31, 37]. However, it is highly unlikely that the calculation of war occurrences using other ecliptic longitude values would result in outcomes not compatible with chance as it happened in the present study.

5. Conclusions

This study avoided astrology's reliance on natal charts, which is its scientifically weakest point, to give a chance of success to astrology's potential strongest point: the assumption that celestial bodies, such as planets and the Moon transiting through zodiacal constellations, can somehow influence human affairs globally. As an issue historically addressed by astrologers, war triggering was taken as a documented, measurable, and reliable characteristic of violent human behavior susceptible to such an influence. However, no such relationship was observed.

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Statements and Declarations

This study received no funding. The author declares no competing interests. All data supporting the findings of this study are available within the article and/or its supplementary materials.

References

- [1] Zarka P. Astronomy and astrology. Proceedings of the International Astronomical Union. 2009;5:420-5.
- [2] Helgertz J, Scott K. The validity of astrological predictions on marriage and divorce: a longitudinal analysis of Swedish register data. *Genus*. 2020;76:34.
- [3] Komath M. Testing astrology. *Current Science*. 2009;96:1568-72.
- [4] Lower SK. Treating astrology's claims with all due gravity. *Nature*. 2007;447:528.
- [5] Narlikar JV, Kunte S, Dabholkar N, Ghatpande P. A statistical test of astrology. *Current Science*. 2009;96:641-3.
- [6] Silverman BI. Studies of Astrology. *The Journal of Psychology*. 1971;77:141-9.
- [7] Carlson S. A double-blind test of astrology. *Nature*. 1985;318:419-25.
- [8] Bennett JO, Donahue MO, Schneider N, Voit M. The cosmic perspective. 8th ed. San Francisco, CA: Pearson/Addison-Wesley; 2017.
- [9] deGrasse Tyson N, Lang A. *Accessory to War: The Unspoken Alliance Between Astrophysics and the Military*: W. W. Norton & Company; 2018.
- [10] Groebel J, Hinde RA. *Aggression and war: Their biological and social bases*. New York, NY, US: Cambridge University Press; 1989.
- [11] Rifkin AH. Violence in Human Behavior. *Science*. 1963;140:904-6.
- [12] Von Clausewitz C, Howard M, Paret P. *On war*: Princeton University Press; 2008.
- [13] Schake K. What Causes War? *Orbis*. 2017;61:449-62.
- [14] Waltz K. *Man, the state, and war: A theoretical analysis*. New York: Columbia University Press; 2001.
- [15] Levy JS. The causes of war and the conditions of peace. *Annual Review of Political Science*. 1998;1:139-65.
- [16] Lee H, Lee H-K, Lee K. Is personality linked to season of birth? *PloS one*. 2021;16:e0253815.
- [17] Brunberg J. The Polynational War Memorial. Wars since 1900 (https://www.war-memorial.net/wars_all.asp). Accessed 20 Feb 2022. 2013.
- [18] Wikipedia. List of wars: 1900–1944 (https://en.wikipedia.org/wiki/List_of_wars:_1900%E2%80%931944). Accessed 20 Feb 2022. 2022.
- [19] Wikipedia. List of wars: 1945–1989 (https://en.wikipedia.org/wiki/List_of_wars:_1945%E2%80%931989). Accessed 20 Feb 2022). 2022.

- [20] Wikipedia. List of wars: 1990–2002 (https://en.wikipedia.org/wiki/List_of_wars:_1990%E2%80%932002). Accessed 20 Feb 2022. 2022.
- [21] Karttunen H. Celestial Mechanics. In: Karttunen H, Kröger P, Oja H, Poutanen M, Donner KJ, editors. *Fundamental Astronomy*. 5th ed. Berlin Heidelberg: Springer-Verlag; 2007. p. 113-30.
- [22] Gontier N. Time: The Biggest Pattern in Natural History Research. *Evolutionary Biology*. 2016;4:604-37.
- [23] Ruder N, Nakano K, Aeschlimann J. *The GA Handbook: A practical guide to the United Nations General Assembly: Permanent Mission of Switzerland to the United Nations*; 2017.
- [24] Cohen J. Chi-Square Tests for Goodness of Fit and Contingency Tables. In: *Statistical Power Analysis for the Behavioural Sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers; 1988.
- [25] Benjamini Y, Hochberg Y. Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing. *Journal of the Royal Statistical Society: Series B (Methodological)*. 1995;57:289-300.
- [26] Hampar J. *Electional Astrology: The Art of Timing*. Woodbury, MN, United States: Llewellyn Publications; 2005.
- [27] Adamopoulos K, Koutsouris D, Zaravinos A, Lambrou GI. Gravitational Influence on Human Living Systems and the Evolution of Species on Earth. *Molecules*. 2021;26:2784.
- [28] Onorato G, Di Schiavi E, Di Cunto F. Understanding the Effects of Deep Space Radiation on Nervous System: The Role of Genetically Tractable Experimental Models. *Frontiers in Physics*. 2020;8:362.
- [29] Sarabhai V, Pai GL, Wada M. Anisotropy of Galactic Cosmic Rays and the Interplanetary Magnetic Field. *Nature*. 1965;206:703-4.
- [30] Hameroff S, Penrose R. Consciousness in the universe: A review of the ‘Orch OR’ theory. *Physics of Life Reviews*. 2014;11:39-78.
- [31] Shah S. *Planetary Conjunctions in Vedic Astrology: Saket Shah*; 2020.
- [32] Aston M. The Fiery Trigon Conjunction: An Elizabethan Astrological Prediction. *Isis*. 1970;61:159-87.
- [33] Gauquelin M. Is there really a Mars effect? Above & Below. *Journal of Astrological Studies*. 1988;11:4-7.
- [34] Lewis-Beck MS, Skalaban A. The R-Squared: Some Straight Talk. *Political Analysis*. 1990;2:153-71.
- [35] Kottek M, Grieser J, Beck C, Rudolf B, Rubel F. World Map of the Köppen-Geiger climate classification updated. *Meteorologische Zeitschrift*. 2006;15:259-63.
- [36] Rotton J, Kelly IW. Much ado about the full moon: a meta-analysis of lunar-lunacy research. *Psychological Bulletin*. 1985;97:286-306.
- [37] Kassell L. Stars, spirits, signs: towards a history of astrology 1100-1800. *Studies in history and philosophy of biological and biomedical sciences*. 2010;41:67-9.

Supplemental material**Table S1.** War events during the 20th Century (1901-2000)

Event#	Beginning date	Name
1	Nov-1-1901	Anglo-Aro War
2	Feb-8-1904	Russo-Japanese War
3	May-23-1906	Ottoman invasion of Persia
4	Jun-11-1907	War of 1907
5	Apr-30-1909	Russian invasion of Tabriz
6	Jul-15-1911	Paraguayan Civil War
7	Sep-29-1911	Italo-Turkish War
8	Oct-10-1911	First Sino-Tibetan War
9	Dec-1911*	Dominican Civil War
10	Dec-28-1911	War of the Generals, civil War in Ecuador
11	Aug-29-1912	United States invasion of Nicaragua
12	Oct-8-1912	First Balkan War
13	Oct-1912*	Contestado War
14	Feb-2-1913	Sino-Mongolian War
15	Jun-29-1913	Second Balkan War
16	Nov-1913*	Urtatagai conflict
17	Mar-1914*	Bluff War
18	Apr-21-1914	United States invasion of Veracruz
19	May-31-1914	Truku War
20	Jul-28-1914	World War I
21	Jul-28-1915	United States invasion of Haiti
22	Nov-19-1915	Volta-Bani War
23	May-5-1916	United States invasion of the Dominican Republic
24	Mar-8-1917	Russian Civil War
25	Nov-8-1917	Ukrainian-Soviet War
26	Jan-27-1918	Finnish Civil War
27	Mar-30-1918	Armenian-Azerbaijani War
28	Jun-15-1918	Adubi War, between British Empire and rebels
29	Oct-25-1918	Hungarian Civil War
30	Nov-1-1918	Polish-Ukrainian War
31	Nov-23-1918	Austro-Slovene conflict in Carinthia
32	Nov-28-1918	Estonian War of Independence
33	Dec-5-1918	Latvian War of Independence
34	Dec-7-1918	Armeno-Georgian War
35	Dec-7-1918	Franco-Turkish War
36	Dec-12-1918	Lithuanian-Soviet War
37	Feb-14-1919	Polish-Soviet War
38	Mar-28-1919	Hungarian-Czechoslovak War
39	May-6-1919	Third Anglo-Afghan War
40	May-15-1919	Greco-Turkish War
41	May-19-1919	Turkish War of Independence
42	Dec-13-1919	Hungarian-Romanian War
43	Mar-8-1920	Franco-Syrian War
44	Jun-4-1920	Vlora War
45	Jul-14-1920	Zhili-Anhui War
46	Sep-24-1920	Turkish-Armenian War
47	Feb-15-1921	Russian invasion of Georgia
48	Feb-21-1921	Coto War
49	Nov-6-1921	Soviet-Finnish conflict
50	May-27-1922	Paraguayan Civil War

51	Mar-2-1923	Irish Civil War
52	Jun-28-1922	Posey War
53	Feb-2-1924	Second Honduran Civil War
54	Sep-15-1924	Second Zhili–Fengtian War
55	Mar-9-1925	Pink's War
56	Nov-22-1925	Anti-Fengtian War
57	Nov-27-1925	Urtagai conflict
58	May-2-1926	Nicaraguan Civil War
59	Aug-1-1927	Chinese Civil War
60	Nov-14-1928	Afghan Civil War
61	Mar-27-1929	Chiang-Gui War
62	Jul-22-1929	Sino-Soviet conflict
63	Mar-14-1930	Central Plains War
64	Sep-18-1931	Japan invades Manchuria
65	Mar-1-1932	Soviet-Japanese Border War
66	Aug-28-1932	Ecuadorian Civil War
67	Sep-9-1932	Chaco War between Bolivia and Paraguay
68	Feb-12-1934	Austrian Civil War
69	Jan-16-1934	Soviet invasion of Xinjiang
70	Mar-22-1934	Saudi–Yemeni War
71	Oct-3-1935	Second Italo-Abyssinian War
72	Jul-18-1936	Spanish Civil War
73	Jul-7-1937	Beginning of World War II in the Far East
74	Mar-14-1939	Hungary-Ukrainian War
75	Mar-23-1939	Slovak–Hungarian War
76	Apr-7-1939	Italian invasion of Albania
77	Sep-1-1939	World War II in Europe
78	Dec-7-1941	World War II in the Pacific
79	Sep-13-1945	War in Vietnam
80	Mar-30-1946	Greek Civil War
81	Dec-19-1946	First Indochina War
82	Mar-7-1947	Paraguayan Civil War
83	Aug-14-1947	First Indo-Pakistani War
84	Nov-30-1947	Civil War in Mandatory Palestine
85	Mar-12-1948	Costa Rican Civil War
86	Apr-2-1948	Civil War in Myanmar
87	May-15-1948	Arab–Israeli War
88	Jun-25-1950	Korean War
89	Aug-31-1952	Invasion of Hamasa
90	Oct-10-1954	Jebel Akhdar War in Oman
91	Nov-1-1954	Algerian War
92	Aug-18-1955	First Sudanese Civil War
93	Nov-1-1955	Vietnam War
94	Oct-23-1957	Ifni War
95	Dec-30-1958	Mexico–Guatemala conflict
96	Apr-24-1959	Cuban invasion of Panama
97	May-23-1959	Laotian Civil War
98	Jun-14-1959	Cuban invasion of Dominican Republic
99	Nov-13-1960	Guatemalan Civil War
100	Feb-4-1961	Angolan War of Independence
101	Apr-17-1961	United States invasion of Bay of Pigs
102	Sep-1-1961	Eritrean War of Independence
103	Sep-11-1961	First Iraqi–Kurdish War
104	Sep-26-1962	North Yemen Civil War
105	Oct-20-1962	Sino-Indian War

106	Jan-23-1963	Guinea-Bissau War of Independence
107	Sep-25-1963	The Sand War
108	Nov-22-1963	Shifita War
109	Dec-27-1963	First Rwanda Civil War
110	Feb-6-1964	Ethiopian–Somali Border War
111	Jul-4-1964	Rhodesian Bush War
112	Sep-25-1964	Mozambique War of Independence
113	Apr-24-1965	Dominican Civil War
114	Aug-5-1965	Second Indo-Pakistani War
115	Nov-1-1965	Chadian Civil War
116	Aug-26-1966	South African Border War
117	Oct-5-1966	Second Korean War
118	Nov-3-1966	Nancahuazú Guerrilla War
119	Mar-11-1967	Cambodian Civil War
120	May-8-1967	Cuban invasion of Venezuela
121	Jun-5-1967	Six-Day War
122	Jul-1-1967	War of Attrition
123	Jul-6-1967	Nigerian Civil War
124	Sep-11-1967	Sino-Indian War
125	Aug-20-1968	Warsaw Pact invasion of Czechoslovakia
126	Mar-2-1969	Sino-Soviet border conflict
127	Jul-14-1969	Football War
128	Nov-27-1969	Al-Wadiah War
129	Mar-26-1971	Bangladesh Liberation War
130	Dec-3-1971	Third Indo-Pakistani War
131	Feb-1972*	First Eritrean Civil War
132	Sep-18-1972	Invasion of Uganda
133	Oct-6-1973	Yom Kippur War
134	Apr-1-1974	Second Iraqi–Kurdish War
135	Jul-20-1974	Turko Cypriot War
136	Sep-12-1974	Ethiopian Civil War
137	Apr-13-1975	Lebanese Civil War
138	Oct-30-1975	Western Sahara War
139	Nov-8-1975	Cabinda War
140	Nov-11-1975	Angolan Civil War
141	Dec-7-1975	Indonesian invasion of East Timor
142	Jul-13-1977	Ethio-Somali War
143	Jul-21-1977	Egyptian-Libyan War
144	Apr-27-1978	War in Afghanistan
145	Oct-9-1978	Uganda-Tanzania War
146	Dec-25-1978	Cambodian-Vietnamese War
147	Feb-17-1979	Sino-Vietnamese War
148	Feb-24-1979	Second Yemenite War
149	Oct-15-1979	Salvadoran Civil War
150	Dec-24-1979	Soviet-Afghan War
151	Feb-1980*	Second Eritrean Civil War
152	Jul-29-1980	Coconut War
153	Sep-22-1980	Iran-Iraq War
154	Oct-8-1980	Ugandan Bush War
155	Jan-25-1981	Paquisha War
156	Apr-2-1982	Falklands War
157	Jun-6-1982	Lebanon War - Operation Peace for Galilee
158	Jun-30-1982	Ethiopian-Somali Border War
159	Jun-5-1983	Second Sudanese Civil War
160	Jul-23-1983	Sri Lankan Civil War

161	Oct-25-1983	Invasion of Grenada
162	Apr-13-1984	Siachen War
163	Dec-25-1985	Agacher Strip War
164	Jan-12-1986	South Yemen Civil War
165	Nov-29-1986	Surinamese Interior War
166	Feb-20-1988	Nagorno-Karabakh War
167	Dec-1-1988	Bougainville Civil War
168	Feb-15-1989	Afghan Civil War
169	Apr-9-1989	Mauritania–Senegal Border War
170	Dec-20-1989	United States invasion of Panama
171	Dec-24-1989	First Liberian Civil War
172	Aug-2-1990	Gulf War
173	Oct-1-1990	Rwanda Civil War
174	Nov-2-1990	Transnistria War
175	Jan-5-1991	South Ossetia War
176	Mar-23-1991	Sierra Leone Civil War
177	Mar-31-1991	Croatian War of Independence
178	Jun-27-1991	Ten-Day War in Slovenia
179	Oct-31-1991	Djiboutian Civil War
180	Nov-1-1991	Chechen-Russian conflict
181	Dec-22-1991	Georgian Civil War
182	Dec-26-1991	Algerian Civil War
183	Apr-6-1992	Bosnian War begins
184	Apr-28-1992	Afghan Civil War
185	May-5-1992	Tajikistani Civil War
186	Aug-14-1992	War in Abkhazia
187	Oct-30-1992	Ossetian-Ingush conflict
188	Oct-21-1993	Burundian Civil War
189	May-1-1994	Iraqi Kurdish Civil War
190	May-4-1994	First Yemeni Civil War
191	Dec-11-1994	First Chechen War
192	Jan-28-1995	Cenepa War
193	Dec-15-1995	Hanish Islands conflict
194	Feb-13-1996	Nepalese Civil War
195	Sep-27-1996	Afghan Civil War
196	Oct-24-1996	First Congo War
197	Jan-16-1997	Albanian Civil War
198	Jun-5-1997	Republic of the Congo Civil War
199	Feb-28-1998	Kosovo War
200	May-1-1998	Saudi-Yemeni Border Conflict
201	May-6-1998	Eritrean–Ethiopian War
202	May-18-1998	War in Abkhazia
203	Jun-7-1998	Guinea-Bissau Civil War
204	Aug-2-1998	Second Congo War
205	Apr-21-1999	Second Liberian Civil War
206	May-3-1999	Fourth Indo-Pakistani War
207	Jul-3-1999	Batken Conflict
208	Aug-7-1999	War of Dagestan
209	Aug-26-1999	Second Chechen War
210	Jun-5-2000	Six-Day War between Uganda and Rwanda

* Undetermined beginning day