New Patterns in Gauquelin Data

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Introduction

How data were collected and sorted

Birth data in Archives Gauquelin (as published on the CURA web site[1]) can be split into three portions:
1. Professional groups
2. Hereditary experiments data
3. Disorder groups data in Series D (murderers, mental patients, alcoholics), miscellaneous data in Series F.

Unlike some other studies[2][3], all professional groups with at least 600 persons were considered:
 4716 scientists and medical doctors;
 4482 military men;
 2886 sportsmen;
 9878 persons - this set contains all other professional groups, with 672...1778 records: executives, journalists, musicians, painters, writers, actors, and politicians.
69 persons belonging to professional groups were not included, because the groups are too small (see Series D, vol.10 and Series E, vol.3 for more details).
Also, liberation fighters (Series F, vol.2) were not considered a professional group, but army professionals from vol.F2 were included as military men.

72.5% of birth data (15932 of 21962 records) are from Series A, which has the following codes for professions[4]:
C = sport Champion (vol. 1)
S = Scientist (vol. 2)
M = Military man (vol. 3)
P = Painter (vol. 4)
M = Musician (vol. 4)
A = Actor (vol. 5)
PT = Politician (vol. 5)
W = Writer (vol. 6)
J = Journalist (vol. 6)
Similar codes are used in this report: SMD, MM, SPC, and code TEN for the biggest set with seven smaller groups.

Almost all persons were born in Western Europe, only 1370 of 21962 were born in the USA. Birth dates are between and 30.8.1600 and 5.11.1963. Only four persons were born before 1794 (one before 1771), all four are actors.
All birth data were converted to the following format:
name and/or code ;date ;time ;time zone ;unused data and comments
for example
PO 37 Ariyoshi George ;12.3.1926 ;05:00 ;-10:30 ;21N19 157W52 Honolulu, HI

All databases and computer programs created and used are downloadable[5][6]. The database with Nobel Prize laureates is the same as in [14]. Only Gauquelin data are complete: time of birth is present. Data are incomplete in the other three databases mentioned in this report: time of birth is not known, and it is set to noon, 12:00:00, in each record.

How planet positions and angles between planets are computed

The ecliptic coordinate system is a celestial coordinate system that uses the ecliptic for its fundamental plane. The ecliptic is the projection of the Earth's orbital plane onto the celestial sphere. The latitudinal angle is called the ecliptic latitude, measured positive towards the north.

The longitudinal angle is called the ecliptic longitude, measured eastwards from 0° to 360°. This coordinate system is particularly useful for charting solar system objects. Most planets (except Mercury), and many small solar system bodies have orbits with small inclinations to the ecliptic plane, therefore their ecliptic latitude is always small. Because of the planets' small deviation from the plane of the ecliptic, ecliptic coordinates were used historically to compute their positions. Only ecliptic longitudes in the geocentric system are used as objects' positions in this study, latitudes and distances to objects are not used. The origin for ecliptic longitude is the vernal equinox, but this makes no difference, because Sun signs were ignored in this study, we explored only angles between planets (plus Sun and Moon).
An aspect is an angle two objects make to each other. The aspects are measured by the angular distance along the ecliptic in degrees and minutes of celestial longitude between two points, as viewed from the earth.
According to the European astrological tradition[7][8], "major" aspects are:
360°/1 = 360° or 0°
360°/2 = 180°
360°/3 = 120°
360°/4 = 90°
360°/6 = 60°
All other aspects are "minor" aspects, they are traditionally considered to be of relatively secondary importance. Only five major aspects were utilized in this study (except for the last table).
The difference between the exact aspect and the actual aspect is called the orb. 6° allowed orbs are used in this study for all objects and all major aspects.
In addition to Sun, Moon and seven big planets, three biggest main belt asteroids[9] – Ceres, Pallas, and Vesta – and ten biggest Trans-Neptunian objects[10] were examined in this study *(seven of these ten TNOs are bigger than Ceres; one of them, 2005 QU182, does not have orbital parameters determined precisely enough, as of December 2010)*.

Single-object criteria take a moment of time as input and return one bit of data as output (indicating if this moment satisfies the criterion or not).
They are written as Object1.aspect+–orb.Object2, for example Moon.60+–6.Mars.
Multiple-object criteria can be written as Object0.aspect+–orb.Object1,Object2,Object3,Object4,...
For example, Quaoar.90+–6.Sun,Moon,Venus,Jupiter (four aspecting objects in this example).

How expected values and standard deviations are computed

When applying a criterion to a group of birth data records, we first build control groups using random moments of time. If the group under experiment has N birth records, each control group for this group also has N records, because for each record with moment D, a random moment from the range [D–R, D+R days] is selected by the function using random data generator. Both the expected value and the standard deviation vary only slightly after first 100,000 control groups.

Second, we build a model of this process assuming the random data generator is perfect, and the number of control groups runs to infinity. When the input file is processed, the expected value and the probability array are updated after each new record is read from the file. After all records are read, we compute the standard deviation using the expected value and the probability array. The latter contains probabilities that exactly L records (of M records already processed) satisfy the criterion. Initially the probability is 1 that zero records satisfy the criterion. Next, after the first record is read, and all (2R+1) control points are tested, we know that y1 of them satisfy the criterion, and n1 of them don't, so if the random data generator is perfect, a random moment chosen for the control group satisfies the criterion with probability Y1=y1/(2R+1), and does not satisfy with probability N1=n1/(2R+1), so the probability array contains {N1, Y1}, i.e. probability that zero records satisfy the criterion is N1, probability that one record satisfies is Y1. After the second record is read, the probability array contains { N1*N2, N1*Y2+Y1*N2, Y1*Y2 } after update, and so on. After J records the contents are { C0, C1, ..., Ci }, and after one more record is added, two arrays { C0*Nk, C1*Nk, ..., Ci*Nk, 0 } and { 0, C0*Yk, C1*Yk, ..., Ci*Yk } are summed up to form the updated probability array (Yk and Nk are the Y and N probabilities for the latest

(J+1)th data record). Please read the C source code[6] for more details.

As a rule, the value R=1095 days was used for experiments in this study. Other values (and other steps, e.g. 1/8 of a day instead of 1 day) were only tested for cases with deviation outside the range [–3, +3] standard deviations.

How the season anomaly prevention is implemented

Because some months have more births than others, Sun is more likely to be in certain sectors and less likely to be in other sectors. For criteria with Sun and slow objects, e.g. Sun.0.Neptune, the season anomaly can easily become the main reason of the observed anomaly. To prevent the season anomaly influence, we do the following:

1. When reading the birth data file for the first time, we calculate* the frequencies of Sun in 6-degree sectors: N1...N60.
2. For each control point, we detect in which sector the Sun is located and assume that Nk persons were born at this moment (here k is the sector of Sun).
3. When forming the control group, the random data generator chooses a person at random, and then we detect at which moment this person was born, using this (random) person number. All control points are still in the range [D–R, D+R].

For example, we have 579 persons in our database, 456 of them were born in April and 123 in September. With R=1095 days (3 years), there are 2191 control points for each person, but much more hypothetical persons: approximately 456*K born in April, plus around 123*K born in September, where K depends on range and step, K=6*30 in case range=3 years and step=1 day. First, the random data generator chooses a number between 1 and 180*579, this is the person number. Then the algorithm finds out to which of the 2191 control points this hypothetical person belongs.

*For smaller groups (let's say, with less than 600 birth records) an external table with frequencies of Sun in 6-degree sectors should be used. This is defined as the *Season Anomaly Prevention Version 2* in the C source code[6].

Why Quaoar is special

As of December 2010, Quaoar is believed to be one of the eleven biggest Trans-Neptunian objects. It is special among 17 (or more) biggest Trans-Neptunian objects, because it has the following four characteristics:
– the smallest aphelion distance
– the smallest orbital eccentricity
– the smallest orbital inclination
– the biggest density

Each of these four characteristics makes Quaoar more similar to regular planets[16] than other TNOs, table 1 shows more details.

Name or code	Aphelion AU	e	Inclin.	Density g/cm^3	Radius km
Eris	97.583	0.434	43.8	2.25	1170
Pluto	49.320	0.248	17.1	2	1153
Sedna	981	0.856	11.9	2	745
Makemake	52.790	0.164	29.0	2	710
2007 OR10	101	0.500	30.7	2	600
Haumea	51.501	0.198	28.2	3	575
2002 TC302	72.048	0.295	35.0	2	573
2005 UQ513	49.727	0.142	25.7	2	462
2005 QU182	191	0.675	14.0	2	460
2003 AZ84	46.479	0.178	13.6	2	455
Quaoar	**45.026**	**0.039**	**8.0**	**4.2**	445
2007 UK126	110	0.491	23.4	2	439

Orcus	48.079	0.227	20.6	1.5	425
2003 MW12	52.349	0.145	21.5	2	419
2006 QH181	97.269	0.437	19.2	2	382
2004 XR190	63.702	0.106	46.6	2	375
Chaos	50.753	0.106	12.0	2	372
planets:					
MERCURY	**0.459**	**0.205**	**7.0**	**5.427**	**2439**
VENUS	**0.716**	**0.007**	**3.4**	**5.243**	**6052**
EARTH	**1**	**0.017**	**0.0**	**5.515**	**6378**
MARS	**1.64**	**0.094**	**1.9**	**3.933**	**3396**
JUPITER	**5.37**	**0.049**	**1.3**	**1.326**	**71492**
SATURN	**9.96**	**0.057**	**2.5**	**0.687**	**60268**
URANUS	**19.75**	**0.046**	**0.8**	**1.270**	**25559**
NEPTUNE	**29.89**	**0.011**	**1.8**	**1.638**	**24764**

Table 1. Seventeen biggest Trans-Neptunian objects and regular planets.

This report contains four sections

1. We discuss the seven-object criterion and the Quaoar Criterion, and test the hypothesis proposed during discussion on the web forum [11]: the percentage of persons satisfying the Quaoar Criterion must be significantly lower than the expected value for the military men.
2. We discuss the difference between single-bit criteria and summing criteria and then introduce the improved summing seven-object criterion (the ISSO Criterion).
3. The Quaoar Criterion, the ISSO Criterion, and 54 similar criteria are applied to all four Gauquelin data sets. Here we test the hypothesis which is quite similar to Gauquelin's own findings[12]: every planet introduces a unique influence (or correlation), therefore similar criteria containing different planets can be used to distinguish between professional groups (three groups in this study: sportsmen, military men, scientists plus medical doctors).
4. We try to explore thoroughly all cases with deviation outside the range [–3, +3] standard deviations.

Section 1

The seven-object criteria are simple: **Object1.90+–6.Sun,Moon,Mercury,Venus,Mars,Jupiter,Saturn**.
Here 90° is the aspect considered the most disharmonious in the European astrological tradition, then the standard set of all "classical planets"[13] used by astrologers since ancient times is on the right-hand side. *Astrologer would say "Object1 has squares" or "Object1 has no squares", e.g. "No squares to Neptune in this chart".*
It was shown[14] that if Object1 is Quaoar, the deviation is +4.47 standard deviations when the criterion is applied to the set of all Nobel Prize laureates. This number is slightly lower, +4.34, if the season anomaly prevention is switched on, and R=1095:

```
True mean=274.8762 = 37.8617%,  True standard deviation=12.9440
Score on the criterion: 331 of 726, 45.5923%, that's  4.34  standard dev-s
Probability that score is 331 or more if you poke at random: 1/95192.123
```

Deviation is much higher if only four objects with the biggest gravitational influence on Earth are included, criterion **Quaoar.90+–6.Sun,Moon,Venus,Jupiter** :

```
True mean=179.1411 = 24.6751%,  True standard deviation=11.5736
Score on the criterion: 243 of 726, 33.4711%, that's  5.52  standard dev-s
Probability that score is 243 or more if you poke at random: 1/17204650.725
```

This criterion was called the **Quaoar Criterion** (and another study on it was conducted[15]).
If five Nobel Prize categories are considered separately:

Chemistry:	42/152	27.63%
Literature:	36/105	34.28%
Medicine:	72/192	37.50%
Peace:	40/94	42.55%
Physics:	53/183	28.96%

```
All five jointly: 243/726   33.47% of persons satisfy the Quaoar
Criterion.
```

Because the highest percentage is among Nobel Peace Prize laureates, the hypothesis was formulated[11]: "if the percentage is significantly higher among laureates of various peace prizes, can it be observed that it's significantly lower among those who enjoy military service?"
If we apply the Quaoar Criterion to the group of 4482 military men from Gauquelin's archives, we see the following:

```
  True mean=1075.0386 = 23.9857%,  True standard deviation=28.5002
  Score on the criterion: 983 of 4482, 21.9322%, that's  -3.23  standard dev-s
  Probability that score is 983 or less if you poke at random: 1/1680.359
```

Thus, it looks like military men from Gauquelin's archives confirm the Quaoar Criterion.
Deviation is slightly higher, –3.24 standard deviations, if R=1024 as in studies [14] and [15].
It is also higher, –3.30 stdev, if the season anomaly prevention is switched off (thus, the same Quaoar Criterion with the same parameters as in two earlier studies). Section 4 contains further exploratory tests.

It is worth noting that if we split all Nobel laureates in Literature to European and non-European authors, among 75 European authors (including Iceland and Israel, excluding Turkey and Russia) 29.33% satisfy the Quaoar Criterion, but among 30 non-European authors 46.67% satisfy. That is why it was decided to build a database with winners of three oldest world-wide literary awards:

Hans Christian Andersen Award for children's literature - since 1956
Jerusalem Prize - since 1963
Neustadt International Prize for Literature - since 1970

Applying the Quaoar Criterion to this new database:

```
  True mean=18.7177 = 25.2942%,  True standard deviation=3.7290
  Score on the criterion: 32 of 74, 43.2432%, that's  3.56  standard dev-s
  Probability that score is 32 or more if you poke at random: 1/1788.102
```

Section 2

All single-object criteria – **Object1.aspect+–orb.Object2** – are single-bit criteria, that is, returning 1 bit on output.
Multiple-object criteria – **Object0.aspect+–orb.Object1,Object2,...,ObjectN** – can be either single-bit or summing, i.e. we can count the number of aspects at the given moment of time (this count can be between 0 and N) instead of detecting whether there is at least one aspect or no aspects.

Because now we have four big enough databases that contribute to the Quaoar Criterion, we can check if summing criteria (both 7-object and 4-object) give higher deviation than single-bit criteria. From astrological point of view, it is not correct to remove Mercury, Mars and Saturn completely, and leave only Sun, Moon, Venus and Jupiter in the criterion. But while computing the sum, we can add bits coming from the latter four objects with bigger coefficients, and bits coming from Mercury, Mars and Saturn with relatively smaller coefficients. The simplest variant is the following: K=2 for Sun, Moon, Venus and Jupiter, K=1 for the remaining three planets.

Table 2 displays results (deviations, measured in standard deviations).
We see that among four-object criteria, the summing criterion does not give higher deviation on average, but among seven-object criteria, it does: deviation gets much higher in three cases out of four. Also, among summing criteria the one with coefficients K=2 or K=1 gives much higher deviation in all four cases. It will be referred to as the Improved Summing Seven-Object Criterion (the ISSO Criterion).

Nobel Prize	Second study[15]	Writers	Military men	Criterion
5.52	3.12	**3.56**	**-3.23**	**Four-object single-bit (the Quaoar Criterion)**
5.12	**3.60**	3.52	-2.97	Four-object summing

4.34	1.50	2.72	**-2.03**	Seven-object single-bit
4.82	2.75	2.56	-1.08	Seven-object summing
5.24	**3.30**	**3.16**	**-2.00**	**Seven-object summing, K=2 or K=1**
5.13	3.13	2.97	-1.67	Seven-object summing, K=3 or K=2

Table 2. Seven-object and summing criteria applied to four databases that contribute to the Quaoar Criterion.

Algorithms for summing criteria are similar to those for single-bit criteria, the main difference is that not two arrays are summed up while the probability array is updated, but (M+1) arrays, where M is the maximal possible score for the criterion. M=7 if seven-object criterion has K=1 for all objects, M=11 if K=2 for Sun, Moon, Venus, and Jupiter.
Another advantage of summing criteria is that coefficients may depend on other parameters, e.g. aspect precisions. For example, if the angle between Object1 and Object2 is 91.7°, then the aspect is 90°, and precision is 1.7°. Precision is always less then the orb.

Section 3

It was decided to apply the Quaoar Criterion, the ISSO Criterion and single-object criteria to all four databases with Gauquelin data. Also, criteria with other major aspects in place of 90°, as in studies [14] and [15]. Results are in table 3. All programs were run with option "-50000". Although columns "TEN" and "Nobel Prize" are displayed, we actually search for criteria to distinguish between SPC, MM and SMD.

SPC	**MM**	**SMD**	TEN	NobPr	Program	Criterion
-1.61	**-3.23***	-0.12	-0.46	**5.52**	multo4m1	**Quaoar.90+-6.Sun,Moon,Ven,Jup**
-0.95	-2.00	-0.88	-0.13	**5.24**	multo7m11	**Quaoar.90+-6.(seven objects)**
-0.55	-0.69	-0.82	-0.80	2.05	sun090m1	Quaoar.90+-6.Sun
-1.53	-0.57	-0.60	0.67	2.03	moo090m1	Quaoar.90+-6.Moon
0.34	-2.62	0.57	-0.73	2.98	ven090m1	Quaoar.90+-6.Venus
-1.29	-2.08	-0.20	0.37	3.21	jup090m1	Quaoar.90+-6.Jupiter
-0.02	-1.12	1.10	1.56	2.27	multo4m1_180	Quaoar.180+-6.(four objects)
0.33	-0.45	0.91	0.78	2.56	multo7m11_180	Quaoar.180+-6.(seven objects)
-0.30	-0.18	1.26	-0.40	1.41	sun180m1	Quaoar.180+-6.Sun
0.15	0.12	1.12	2.06	1.60	moo180m1	Quaoar.180+-6.Moon
0.57	0.60	0.31	0.20	1.75	ven180m1	Quaoar.180+-6.Venus
0.23	-2.40	-0.67	0.94	0.47	jup180m1	Quaoar.180+-6.Jupiter
-0.06	-0.09	-0.30	1.35	1.28	multo4m1_0	Quaoar.0+-6.Sun,Moon,Ven,Jup
0.06	-1.13	-0.44	0.47	0.45	multo7m11_0	Quaoar.0+-6.(seven objects)
0.95	-0.41	1.67	1.70	0.85	sun000m1	Quaoar.0+-6.Sun
1.76	0.81	-2.13	1.10	0.14	moo000m1	Quaoar.0+-6.Moon
-1.11	-0.53	-0.39	-0.75	0.74	ven000m1	Quaoar.0+-6.Venus
-0.85	-0.07	0.26	0.26	0.43	jup000m1	Quaoar.0+-6.Jupiter
2.71	1.37	0.04	0.06	0.24	multo4m1_60	Quaoar.60+-6.Sun,Moon,Ven,Jup
2.19	1.83	0.18	0.04	-0.29	multo7m11_60	Quaoar.60+-6.(seven objects)
0.48	1.98	0.11	-0.13	-0.25	sun060m1	Quaoar.60+-6.Sun
3.34*	-0.10	-0.25	1.11	0.24	moo060m1	**Quaoar.60+-6.Moon**
-0.03	0.17	0.47	-1.74	0.14	ven060m1	Quaoar.60+-6.Venus
1.13	1.02	0.54	-0.23	-0.40	jup060m1	Quaoar.60+-6.Jupiter
-0.88	0.37	0.39	1.28	-1.92	multo4m1_120	Quaoar.120+-6.(four objects)
-0.61	0.61	0.90	1.09	-2.04	multo7m11_120	Quaoar.120+-6.(seven objects)
0.46	0.42	1.16	-0.12	-1.12	sun120m1	Quaoar.120+-6.Sun
-1.31	0.80	-0.15	0.79	-1.40	moo120m1	Quaoar.120+-6.Moon
-0.16	-0.07	-0.54	0.72	-1.35	ven120m1	Quaoar.120+-6.Venus
-0.52	0.35	0.56	1.40	-0.52	jup120m1	Quaoar.120+-6.Jupiter

Table 3. All sets with Gauquelin data, 30 most prospective multiple-object and single-object

criteria.

One of the single-object criteria shows high deviation, +3.34 standard deviations, when applied to the Sportsmen group. More details on this issue:

True mean=192.2860 = 6.6627%, True standard deviation=13.3965
Score on the criterion: 237 of 2886, 8.2121%, that's 3.34 standard dev-s
Probability that score is 237 or more if you poke at random: 1/1473.188

At this point it looks promising to try the Quaoar Criterion, the ISSO Criterion and the exclusive single-object criterion **with Sun, Moon and regular planets in place of Quaoar**. Results are in table 4.

SPC	**MM**	**SMD**	TEN	NobPr	Program option	Criterion
2.11	1.35	-2.08	-0.04	1.17	multo4m1 0	Sun,Moon,Ven,Jup.90+-6.Sun
2.78	0.18	-2.35	2.28	1.01	multo4m1 1	(4 objects).90+-6.Moon
0.37	-1.77	-2.78	0.74	0.04	multo4m1 2	(4 objects).90+-6.Mercury
1.13	1.57	-1.29	0.34	-0.73	multo4m1 3	(4 objects).90+-6.Venus
1.96	-0.54	0.48	-0.00	-0.07	multo4m1 4	(4 objects).90+-6.Mars
-0.32	0.61	-1.23	0.42	2.69	multo4m1 5	(4 objects).90+-6.Jupiter
1.10	-0.10	-0.53	-0.49	-0.19	multo4m1 6	(4 objects).90+-6.Saturn
2.29	0.03	-0.87	0.58	-0.00	multo4m1 7	(4 objects).90+-6.Uranus
-1.74	0.99	0.78	0.54	0.31	multo4m1 8	(4 objects).90+-6.Neptune
-1.61	**-3.23***	-0.12	-0.46	5.52	multo4m1 -50000	(4 objects).90+-6.Quaoar
2.91	1.04	-1.36	-0.23	1.11	multo7m11 0	(7 objects).90+-6.Sun
3.53*	-0.54	**-3.19***	2.00	0.85	multo7m11 1	(7 objects).90+-6.Moon
0.40	-1.30	-2.28	0.29	0.10	multo7m11 2	(7 objects).90+-6.Mercury
0.83	1.12	-0.60	0.37	-0.37	multo7m11 3	(7 objects).90+-6.Venus
2.14	-0.71	2.01	-0.15	-0.08	multo7m11 4	(7 objects).90+-6.Mars
-0.19	-0.41	-1.29	0.26	1.85	multo7m11 5	(7 objects).90+-6.Jupiter
0.58	0.40	-0.36	-0.17	-0.97	multo7m11 6	(7 objects).90+-6.Saturn
2.43	0.31	-0.77	-0.24	0.08	multo7m11 7	(7 objects).90+-6.Uranus
-1.87	0.95	1.56	0.60	-0.91	multo7m11 8	(7 objects).90+-6.Neptune
-0.95	-2.00	-0.88	-0.13	5.24	multo7m11 -50000	(7 objects).90+-6.Quaoar
1.54	1.82	-0.65	-0.54	0.81	moo060m1 0	Moon.60+-6.Sun
1.56	-0.53	-1.01	0.39	1.32	moo060m1 2	Moon.60+-6.Mercury
0.11	0.65	0.19	0.56	2.23	moo060m1 3	Moon.60+-6.Venus
-1.00	**3.64***	-1.03	-1.16	-0.63	moo060m1 4	Moon.60+-6.Mars
-0.67	-0.55	2.09	-0.21	-0.98	moo060m1 5	Moon.60+-6.Jupiter
-2.01	1.95	0.29	-1.52	0.92	moo060m1 6	Moon.60+-6.Saturn
-0.48	-0.46	-1.56	-0.68	-0.06	moo060m1 7	Moon.60+-6.Uranus
1.83	0.36	-0.15	2.38	0.41	moo060m1 8	Moon.60+-6.Neptune
3.34*	-0.10	-0.25	1.11	0.24	moo060m1 -50000	Moon.60+-6.Quaoar

Table 4. All sets with Gauquelin data, 3 most prospective criteria with Sun, Moon and planets in place of Quaoar.

Three more cases with deviation outside the range [–3, +3] standard deviations.
Sportsmen and criterion Sun,Moon,Mercury,Venus,Mars,Jupiter,Saturn.90+–6.Moon:

True mean=1744.6019 = 60.4505%, True standard deviation=53.4322
Score on the criterion: 1933 of 2886, 66.9785%, that's 3.53 standard dev-s
Probability that score is 1933 or more if you poke at random: 1/3699.238

Scientists and medical doctors, the same criterion:

True mean=2851.8810 = 60.4725%, True standard deviation=68.2975
Score on the criterion: 2634 of 4716, 55.8524%, that's -3.19 standard dev-s
Probability that score is 2634 or less if you poke at random: 1/1570.365

Military men and criterion Moon.60+–6.Mars:

True mean=299.2378 = 6.6764%, True standard deviation=16.7107
Score on the criterion: 360 of 4482, 8.0321%, that's 3.64 standard dev-s

Probability that score is 360 or more if you poke at random: 1/4477.412

Seven investigative experiments are described in the next section.

Section 4

Because two of the five exclusive results are for criteria with Quaoar, it was decided to apply criteria with other biggest Trans-Neptunian objects, and three biggest 'regular' asteroids. Results are in table 5. No deviations outside the range [–2.41 , +2.41], in addition to the fact that there are no values outside the range [–2.38, +2.38] in column TEN in tables 3 and 4.

SPC	MM	SMD	TEN	NobPr	Program option	Criterion
1.03	-1.12	0.69	1.18	-0.36	multo4m1 -136199	(4 objects).90+-6.Eris
0.08	-0.69	-1.93	1.07	-1.27	multo4m1 9	(4 objects).90+-6.Pluto
2.16	-1.84	0.22	-0.39	-1.23	multo4m1 -90377	(4 objects).90+-6.Sedna
-0.90	-2.40	0.96	2.16	-1.46	multo4m1 -136472	(4 objects).90+-6.Makemake
0.19	-0.35	-0.94	0.17	-1.03	multo4m1 -225088	(4 objects).90+-6.2007_OR10
-0.93	0.06	-0.44	-0.44	1.01	multo4m1 -136108	(4 objects).90+-6.Haumea
-0.10	-1.49	-0.67	-0.04	-0.83	multo4m1 -84522	(4 objects).90+-6.2002_TC302
-1.60	0.06	-1.07	0.60	0.37	multo4m1 -202421	(4 objects).90+-6.2005_UQ513
1.83	1.64	-0.39	-0.32	0.49	multo4m1 -208996	(4 objects).90+-6.2003_AZ84
0.11	-0.46	0.46	0.27	1.41	multo4m1 17	(4 objects).90+-6.Ceres
0.01	0.95	0.00	0.37	1.16	multo4m1 18	(4 objects).90+-6.Pallas
1.13	0.02	1.36	-0.05	1.64	multo4m1 20	(4 objects).90+-6.Vesta
1.30	-1.63	0.69	1.07	-0.41	multo7m11 -136199	(7 objects).90+-6.Eris
-0.25	-0.77	-1.73	1.34	-1.07	multo7m11 9	(7 objects).90+-6.Pluto
1.95	-2.22	0.58	-0.91	-1.19	multo7m11 -90377	(7 objects).90+-6.Sedna
-0.83	-1.68	1.42	2.01	-0.94	multo7m11 -136472	(7 objects).90+-6.Makemake
-0.66	0.09	-1.13	0.77	-1.88	multo7m11 -225088	(7 objects).90+-6.2007_OR10
-1.35	1.05	0.63	-0.54	0.65	multo7m11 -136108	(7 objects).90+-6.Haumea
0.20	-1.82	-0.25	0.00	-0.53	multo7m11 -84522	(7 objects).90+-6.2002_TC302
-1.99	0.83	0.02	0.37	-0.06	multo7m11 -202421	(7 objects).90+-6.2005_UQ513
1.84	1.16	-0.48	-0.76	0.44	multo7m11 -208996	(7 objects).90+-6.2003_AZ84
-0.07	0.77	0.80	0.56	1.89	multo7m11 17	(7 objects).90+-6.Ceres
-0.62	0.42	0.44	0.56	1.43	multo7m11 18	(7 objects).90+-6.Pallas
1.14	-0.16	1.39	0.69	0.65	multo7m11 20	(7 objects).90+-6.Vesta
-0.27	-0.22	-0.61	0.56	0.07	moo060m1 -136199	Moon.60+-6.Eris
0.89	0.32	0.40	0.70	0.68	moo060m1 9	Moon.60+-6.Pluto
1.45	0.19	0.92	-0.45	0.67	moo060m1 -90377	Moon.60+-6.Sedna
0.18	0.12	1.50	-2.30	-0.35	moo060m1 -136472	Moon.60+-6.Makemake
-1.39	-0.06	0.21	0.78	-0.97	moo060m1 -225088	Moon.60+-6.2007_OR10
-1.29	0.12	0.06	-0.32	-1.41	moo060m1 -136108	Moon.60+-6.Haumea
-0.79	-0.69	0.49	1.27	-0.79	moo060m1 -84522	Moon.60+-6.2002_TC302
-1.01	-1.73	0.89	-1.02	-1.11	moo060m1 -202421	Moon.60+-6.2005_UQ513
-0.93	1.81	-0.15	1.01	-0.81	moo060m1 -208996	Moon.60+-6.2003_AZ84
-0.34	-0.71	-1.00	0.60	-1.67	moo060m1 17	Moon.60+-6.Ceres
-1.44	2.21	1.50	-1.86	**-2.41**	moo060m1 18	Moon.60+-6.Pallas
0.35	-0.07	-1.36	2.05	-0.24	moo060m1 20	Moon.60+-6.Vesta

Table 5. All sets with Gauquelin data, 3 exclusive types of criteria, biggest asteroids and Trans-Neptunians.

Because four of the five exclusive results are for criteria with Moon as the only aspecting object, it was decided to set birth time to 12:00 in each birth data record. Because Moon's position changes by more than 12.5 degrees within 24 hours, deviations must decrease. Also, other values for time of birth were tested: 3:00, 6:00 and 18:00. Results are in table 6. Deviations are actually smaller for all four criteria with single Moon. As for the Quaoar Criterion, this effect was noticed earlier in studies [14] and [15]: deviation is slightly higher if birth time is set to 3:00 or 6:00 instead of noon.

Next, it was decided to sort each database by date of birth, and split them to quarters with N/4 records in each quarter. Results are in table 7. In 19 of 20 cases, deviations have the same sign, and the only exception is little, 0.31 stdev.

3	6	12	18	Original	Group, criterion
-3.28	**-3.33**	-2.69	-2.55	-3.23	MM, Sun,Moon,Venus,Jupiter.90+-6.Quaoar
1.63	**2.36**	2.31	2.10	3.64	MM, Moon.60+-6.Mars
2.44	2.71	**2.88**	2.22	3.34	SPC, Moon.60+-6.Quaoar
2.44	**2.81**	1.78	1.82	3.53	SPC, Moon.90+-6.(seven objects)
-1.77	-2.35	-**3.07**	-2.09	-3.19	SMD, Moon.90+-6.(seven objects)

Table 6. Five exclusive criteria, each birth time is set to 3:00, 6:00, 12:00 or 18:00.

1/4	2/4	3/4	4/4	All 4	Group, criterion
0.31	-2.42	-1.27	-2.51	-3.23	MM, Sun,Moon,Venus,Jupiter.90+-6.Quaoar
1.32	1.79	2.62	1.43	3.64	MM, Moon.60+-6.Mars
2.97	2.14	1.16	0.41	3.34	SPC, Moon.60+-6.Quaoar
2.09	1.46	0.20	3.17	3.53	SPC, Moon.90+-6.(seven objects)
-1.81	-1.43	-0.97	-2.26	-3.19	SMD, Moon.90+-6.(seven objects)

Table 7. Five exclusive criteria, each group is sorted by birth date and then split to quarters.

Other variants of the season anomaly prevention implementation were tested, see table 8: 4° sectors instead of 6°, then 5°, 8°, no season anoma ly prevention, and the variant with external table of Sun-in-sectors frequencies (it was built merging all four groups with Gauquelin data, 21962 records). Only small variations.
Also, it was decided to try other values for the range of the random item R, and other values for the step, instead of 1 day: 1/5 of a day, 1/6, 1/7 and 1/8. Results are in tables 9 and 10. No variations or very small variations for **Moon.aspect.Object(s)** criteria, small variations for the Quaoar Criterion. Deviations of criteria **Object1.aspect.Object2** would depend more on R, if neither Object1 nor Object2 were Moon.

4°	5°	8°	No	v2	Group, criterion
-3.21	-3.22	-3.22	-3.29	-3.16	MM, Sun,Moon,Venus,Jupiter.90+-6.Quaoar
3.67	3.65	3.67	3.66	3.65	MM, Moon.60+-6.Mars
3.35	3.33	3.34	3.34	3.34	SPC, Moon.60+-6.Quaoar
3.54	3.49	3.54	3.52	3.52	SPC, Moon.90+-6.(seven objects)
-3.19	-3.17	-3.19	-3.17	-3.18	SMD, Moon.90+-6.(seven objects)

Table 8. Five exclusive criteria, other variants of the season anomaly prevention implementation.

1/5	1/6	1/7	1/8	1 day	Group, criterion
-3.23	-3.23	-3.23	-3.23	-3.23	MM, Sun,Moon,Venus,Jupiter.90+-6.Quaoar
3.64	3.64	3.64	3.64	3.64	MM, Moon.60+-6.Mars
3.34	3.34	3.34	3.34	3.34	SPC, Moon.60+-6.Quaoar
3.52	3.53	3.52	3.53	3.53	SPC, Moon.90+-6.(seven objects)
-3.19	-3.19	-3.19	-3.19	-3.19	SMD, Moon.90+-6.(seven objects)

Table 9. Five exclusive criteria, other values for step: 1/5 of a day, 1/6, 1/7, 1/8, the default value is 1 day.

730	913	1278	1461	1717	Group, criterion
-3.26	-3.29	-3.15	-3.17	-3.32	MM, Sun,Moon,Venus,Jupiter.90+-6.Quaoar
3.64	3.63	3.64	3.64	3.64	MM, Moon.60+-6.Mars
3.35	3.34	3.34	3.34	3.33	SPC, Moon.60+-6.Quaoar
3.52	3.52	3.53	3.53	3.53	SPC, Moon.90+-6.(seven objects)
-3.19	-3.19	-3.19	-3.19	-3.19	SMD, Moon.90+-6.(seven objects)

Table 10. Five exclusive criteria, other R values: 2 years, 2.5, 3.5, 4, and 4.7 years. The default value 1095 days (3 years) - see column "1 day" in table 9.

Because areas 60°+–6° and 90°+–6° occupy only 1/15 of the full circle, there is yet another important question: is the distribution close to even in the remaining 14/15 of 360°? As before, only areas corresponding to major aspects were tested, see table 11. According to the European astrological tradition[8], 120° and 60° are benefic ial aspects, while 360/1, 360/2, 360/4, and 360/8 are not. For the criterion **Moon.0,180,90.Mars** applied to MM, deviation is –3.06 standard deviations. Thus it looks like in at least one of the five cases the distribution in the remaining

14/15 is not even.

0°	180°	120°	90°	60°	Group, criterion
-0.09	-1.12	0.37	**-3.23**	1.37	MM, Sun,Moon,Venus,Jupiter.aspect+-6.Quaoar
-1.28	-1.70	1.47	-2.02	**3.64**	MM, Moon.aspect+-6.Mars
1.76	0.15	-1.31	-1.53	**3.34**	SPC, Moon.aspect+-6.Quaoar
-1.46	-0.41	-0.44	**3.53**	0.14	SPC, Moon.aspect+-6.(seven objects)
0.77	1.84	-0.58	**-3.19**	0.37	SMD, Moon.aspect+-6.(seven objects)

Table 11. Five exclusive criteria, other major aspects.

It is worth mentioning that if we consider criteria **Moon.aspect+–orb.(seven objects)** with eight aspects 360°/N, N=1...8, there are deviations outside the range [–3, +3] standard deviations for all three groups: SPC, MM, and SMD, see table 12. These three deviations are higher on average if Sun and Moon are the two aspected objects, i.e. criteria are **Sun,Moon.aspect+–orb.Sun,Moon,Mercury,Venus,Mars,Jupiter,Saturn**. It is important that for minor aspects the orbs are much smaller than 6°, according to the European astrological tradition: "A separation of 45±2° is considered a semisquare... A separation of 72±2° is considered a quintile" [8].

SPC	**MM**	**SMD**	TEN	NobPr	Program	option	Criterion
-1.46	-0.86	0.77	-0.53	-1.97	moon7	1	(seven objects).360/1+-6.Moon
-0.41	1.07	1.84	0.54	1.22	moon7	2	(seven objects).360/2+-6.Moon
-0.44	0.01	-0.58	0.31	-0.48	moon7	3	(seven objects).360/3+-6.Moon
3.53	-0.54	**-3.19**	2.00	0.85	moon7	4	(seven objects).360/4+-6.Moon
-0.03	0.86	-0.62	-0.18	0.03	moon7	5	(seven objects).360/5+-2.Moon
0.14	2.23	0.37	-0.67	1.43	moon7	6	(seven objects).360/6+-6.Moon
-0.19	**3.09**	0.06	0.91	0.19	moon7	7	(seven objects).360/7+-2.Moon
0.52	-0.28	0.07	1.48	-0.79	moon7	8	(seven objects).360/8+-2.Moon
-1.06	-0.40	0.67	-0.27	-1.80	moonsun7	1	(seven objects).360/1+-6.Sun,Moon
-0.38	1.79	2.47	0.46	1.11	moonsun7	2	(seven objects).360/2+-6.Sun,Moon
-0.70	0.11	0.64	0.28	-0.13	moonsun7	3	(seven objects).360/3+-6.Sun,Moon
3.80	0.00	**-3.16**	1.28	1.61	moonsun7	4	(seven objects).360/4+-6.Sun,Moon
0.52	0.18	-0.79	-0.26	0.55	moonsun7	5	(seven objects).360/5+-2.Sun,Moon
0.04	1.74	0.14	-1.84	1.20	moonsun7	6	(seven objects).360/6+-6.Sun,Moon
0.25	**3.35**	0.10	0.63	0.70	moonsun7	7	(seven objects).360/7+-2.Sun,Moon
0.57	0.54	-0.21	2.29	0.47	moonsun7	8	(seven objects).360/8+-2.Sun,Moon

Table 12. Two most interesting criteria, eight aspects 360°/N, N=1...8.

Conclusion

Though the hypothesis tested in section 1 is confirmed on Gauquelin data, and though it looks like the hypothesis tested in section 3 is also confirmed, more research and more databases are needed to find the reason for the excess of results with high deviation, and to better predict deviations on other databases.

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