Seasonal Variations reveal hidden faces of the Gauquelin Effect and some Statistical Significance.

By Graham Douglas

Abstract: The Gauquelin professional data has been analysed after dividing it into 4 seasons. Many variations in the strength of the Gauquelin Effect are apparent visually and some of those for JU and VE are statistically significant by a Contingency Test. A new Gauquelin JU Effect is found for Writers in the Autumn and Winter only, and minor key sectors are found to be seasonally important. The case for solar involvement is strengthened.

In my last article (Douglas 2010) on the CURA site I showed that there is statistically significant evidence for the ancient category of Sect, for a number of planets by analysing the Gauquelin database. Now I want to consider the patterns of planetary distributions across the Gauquelin sectors which emerge when the same data are separated into four seasons. In each case a control was used derived from the amalgamated professional data (N = 15,934) by first shuffling in such a way as to maintain the time, place and year of birth while allowing the day and month to be swapped randomly. This is the same control that was used in the study of sect.

The seasonal subsets were selected according to the zodiacal position of the sun in each birth, so that spring was taken to be from 15 Aquarius to 14 Taurus; summer from 15 Taurus to 14 Leo etc. This does not match the usual way of counting the beginning of Spring as March 21st or the first degree of Aries, but it was chosen so that the *middle* of each season was at one of the four key points of the solar cycle: the 2 equinoxes and the 2 solstices. In many publications on geomagnetic research the year is divided into 3 periods of 4 months each, known as the Lloyd Seasons (Douglas 2008b: 52 and Fig. 11), the summer solstice (M,J,J,A) the winter solstice (N,D,J,F) and the 2 equinoctial periods combined (M,A,S,O).

In all the graphs presented below the ordinate is the Fractional Deviation (FD) calculated as:

FD = (Observed Frequency – Control Frequency)/Control Frequency, for each of the 12 sectors, as in the Sect article. The control frequency is equal to that in the control group after scaling it to the total number of births in the sample being studied. A control group for each season was obtained by selecting subsets from the shuffled professional data according to the ranges of sun signs just described. However it was suggested that a better control would be obtained from by shuffling the data set being studied rather than the whole professional data [1]. Each professional data set is much smaller than the total of course, so the procedure was repeated and each new shuffled set was then merged until the total accumulated was at least N = 15,000. The resulting distributions did not differ significantly from the previous one for SA, by the Xi^2 test (Df = 11), but for JU there were some significant differences, while a different problem arose with the MA data.

The following colour code is used in all the graphs to distinguish the seasons without the need for labels, which take up too much space :

Spring = Green

Summer = Red

Autumn = Gold

Winter = Blue

We shall see that some unexpected features emerge, including seasonal changes in the profile of deviations across the sectors, and the emergence of a new Gauquelin Effect which only appears in one season.

Statistical Analysis

In this case we have two tools available, which are less affected by the complications of Day/Night variations. Firstly, in the tables, the seasonal fraction of the total annual deviation of birth frequencies for a given profession with the characteristic planet in KS1 and KS4 is a measure of the way the Gauquelin Effect changes with season. It is also reflected in the Xi^2 values of the deviations in these sectors from the expected values in the control. Secondly, in order to measure the significance of this correlation with season we can use the Xi^2 Contingency test. This is done with 4 rows in the contingency table, one for each of the seasons and will then lead to a Chi^2 value with Df = 3.

The standard method applied in this case to determine whether the frequencies of births at which a given planet occupies key sectors varies between

[1] I am grateful to Ken Irving for some discussion of this issue.

day and night births is to calculate a value of Xi^2 from a so-called Contingency Table, such as shown below:

Key Sector	Other Sectors summed	No. of births per Season
a	**b**	N(Spring)
c	**d**	N(Summer)
e	**f**	N(Autumn)
g	**h**	N(Winter)
$\sum a$	$\sum b$	Totals

The letters **a** to **j** are the frequencies of births in the professional dataset being analyzed, in which the planet of interest occurs under each of eight possible conditions. The expected frequencies are then calculated as weighted means on the assumption that there is no influence of the day or night condition on the frequencies in different Gauquelin Sectors. So for the first cell of the table the expected value of **a** would be: E(**a**) = (**a** + **b**)*(**a** + **c** + **e** + **g**)/N, where N = **a** + **b** + **c** + **d** + **e** + **f** + **g** + **h**.

However it needs to be recognized that the standard way of using the Contingency Test assumes that expected values can be calculated as weighted means in this way. But we know that the correlation of geocentric planetary longitudes with that of the sun may cause a significant seasonal deviation of the expected values from simple weighted means, so these expected frequencies must first be known in order to assess whether the observed frequencies differ from them. This can be determined by examining the distribution of each planet in Gauquelin sectors *in the control groups* and it was found that seasonal variations are very small for MO, JU and SA, when the controls were derived from the professional data as a whole, but become significant for MA and VE so that a modified technique is required for the latter two planets. In the case of JU the fractions of births in the controls derived from the amalgamated professions were all between 0.164 and 0.169, so that the contingency test could be used without significant error. However when the samples themselves were used to generate controls the range increased, so that for the Military the fractions were: Spring 0.164, Summer 0.177, Autumn 0.181, Winter 0.159, and the mean of 0.170 was slightly higher than 0.166 for the amalgamated data. The value 0.167 is the fraction 1/6, expected if there were no longitude correlations with the sun.

The procedure adopted to calculate the expected frequencies in these cases was to divide the total number of births in the professional dataset in each column of the table (such as the term **a** + **c** + **e** + **g** in this example) *in the proportion observed in the control group for the same sectors*. Thus In the formula for E(a) given above the second bracket remains the same but the term (**a** + **b**)/N is replaced by the fraction :

(*frequency in KS in control group for spring*)/(*total in KS in control group for year*).

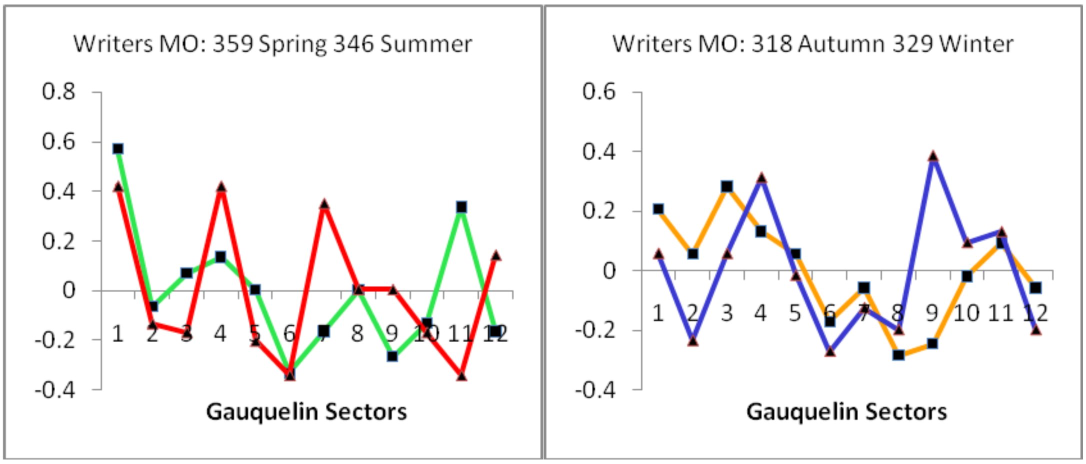
Thus a new set of expected values is generated which neutralizes the sun-planet correlations which are a feature of geocentric coordinates.

It should be noted that these new values if repeated for each sector will have a sum which is not exactly equal to that of the observed values for any given season. This violates a requirement of the Xi^2 test and a correction is required to make them equal, which was employed in my previous article on Sect. However in the present case only one or two key sectors (KS) are considered, so any difference was compensated by making the values in the second column of the contingency table equal to the total minus the values in the 1st column: **b** = N(Spring) – **a.** In this form it becomes a 1 –tailed Goodness of Fit Test and will be referred to as GoF from now on. To summarize: the SA and MO results have been analysed using the simple amalgamated control and a Contingency Test, while for JU the control was based on the sample under study, and a GoF Test. The MA results unexpectedly showed a barely significant total MA effect over the year, so and in any case showed no significant seasonal variation by the GoF Test, so it was decided to retain the simple controls, for both MA and VE.

MOON AND WRITERS, N = 1352.

Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	32.7	37.6	13.9	15.7	99.9
Xi^2 (Df = 1)	8.98	12.32	1.84	2.26	22.27
probability	< 0.003	< 0.0003	Not sig.	Not sig.	< 10^(-5)

Table 1. Showing the seasonal variations in the fraction of the total Gauquelin Effect (KS1 + KS4) for the Military, together with the Xi^2 values for the deviations from the seasonal control frequencies, and the probability values derived from them.

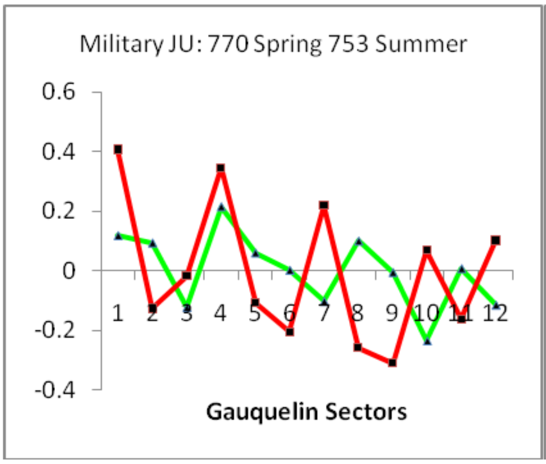


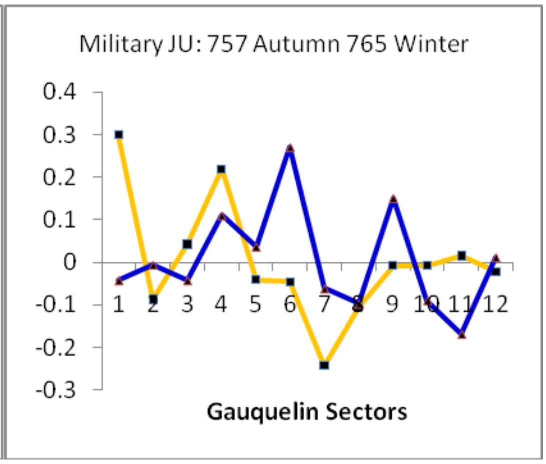
Graphs of FD across 12 Gauquelin Sectors for 4 seasons, for the Moon in Writers. All subsequent graphs follow this format.

It is immediately apparent that there are large seasonal variations in the fractional deviations (FDs) from the controls, and the spring and summer CONTAIN 70% of the annual effect. However when the two key sectors KS1 and KS4 are examined separately we see that KS1 decreases in the order spring > Summer > Autumn > Winter, while in KS4 it is Summer > Winter > Autumn > Spring. There are also important differences in the form of the graphs. Thus the autumn graph shows an FD in sector 3 which is larger than either of the key sectors, and in Winter there is a striking peak in sector 9 (Placidus house 4) which seems to indicate a strong 2nd harmonic factor, and the Contingency Test (Df = 3) Xi^2 = 8.61, $p < 0.025$. This result is interesting in view of the fact that second harmonics are typical of tidal influences and are prominent in the influence of the moon on the geomagnetic field, even though this is quite small in amplitude compared to the solar quiet day variation Sq, (see Douglas 2007, 2008 for discussion and references). However the Contingency test for key sectors shows nothing significant even with just 2 divisions of the year, by combining spring with summer and autumn with winter.

JUPITER (controls derived from samples unless stated otherwise)

Military





In the case of JU with the Military when sectors KS1 and KS4 were combined the Xi^2 Contingency test with Df = 3 gives 14.87, $p < 0.005$, and by the GoF test (Df = 3, 1-tailed) it was 8.3, $p < 0.025$. It is striking that a total of 76.7 % of the Gauquelin Effect is concentrated in Summer and Autumn, while the Winter season shows a very small deviation in the key sectors.

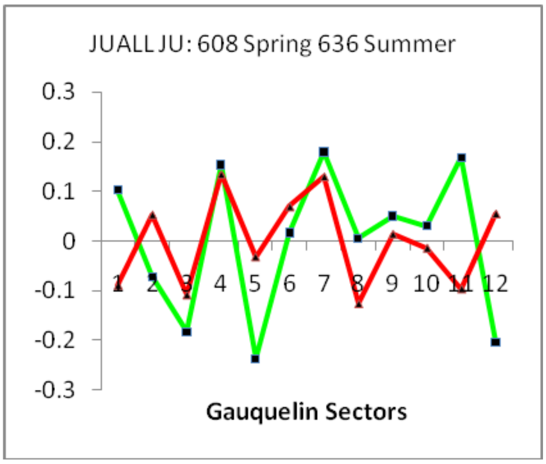
Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	19.5	46.5	30.2	3.8	100
Xi^2 (Df = 1)	4.16	22.8	9.96	0.16	27.2
probability	0.05	< 10^(-5)	< 0.002	Not Sig.	< 10^(-6)

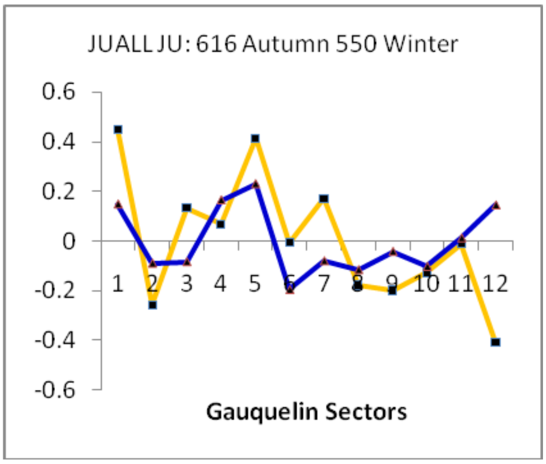
Table 2. As previous. Note the very small Winter deviation and the peak in Summer.

JUALL (Actors and Politicians, N = 2410))

Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	24.2	4.8	45.1	25.9	100
Xi^2 (Df = 1)	2.11	0.08	7.37	2.75	9.09
probability	Not sig.	Not sig.	0.005	> 0.1	< 0.002

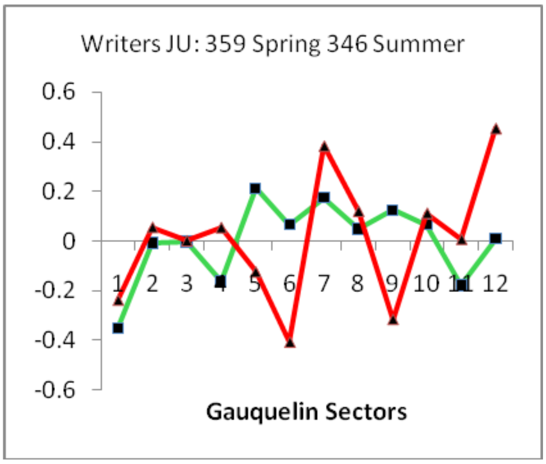
Table 3. As above for JUALL, showing biggest effect in Autumn while summer only contributes 4.8% of the annual total.

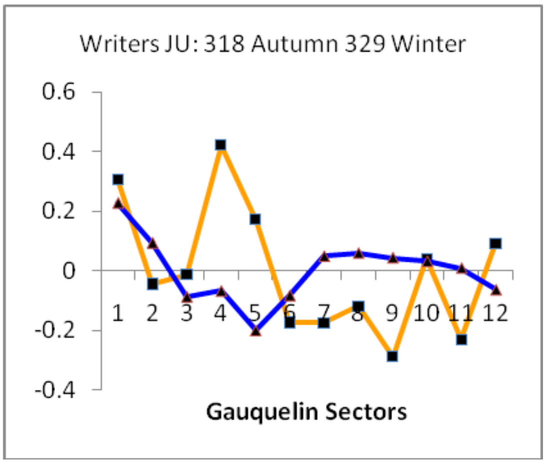




In the JUALL case the two key sectors are again affected differently: while the overall effect and both individually peak in the autumn as shown in Table 3, KS1 ranges from +0.45 to -0.1, but KS4 remains between +0.05 to 0.2. The Contingency and GoF tests are not significant however.

Writers (N = 1352).

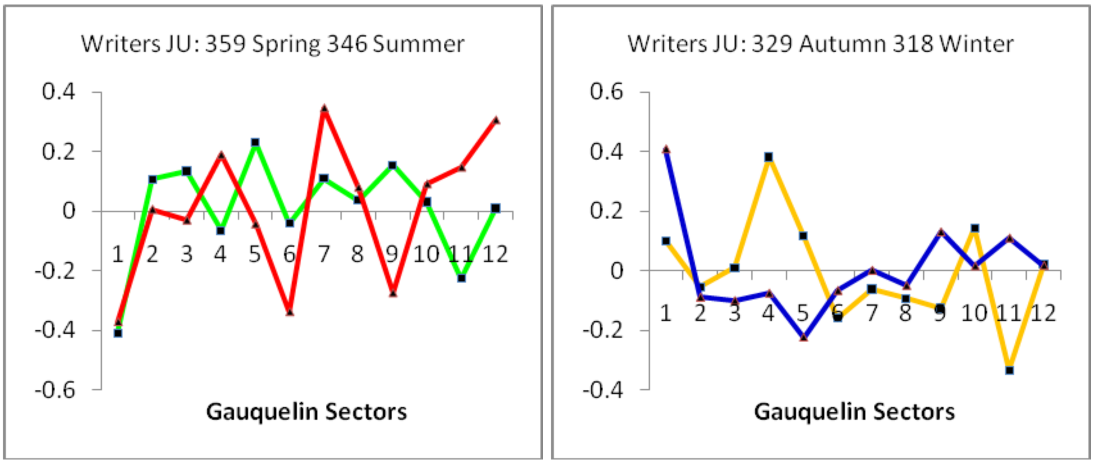




The Writers group offers a surprising picture, where a Gauquelin Effect for JU emerges *only* in the autumn (when the simple control is used), while being hidden in the overall distribution. We can note that like JUALL the strongest effect is in the autumn. The Xi^2 test gives $p < 0.01$, and a

Contingency test is highly significant, Xi^2 (Df = 3) = 13.24, p almost 0.005. So while the overall Gauquelin Effect for JU is practically zero, this masks a highly significant effect in the autumn compensated with a significant negative deviation in the spring and a smaller one in the summer.

In view of the potential importance of this result it is useful to compare what happens when the control derived from the sample itself is used, as shown below:



The most obvious difference is that KS1 is now stronger than KS4 in the Winter while the reverse is true in Autumn. The Xi^2 results are shown in Table 4B. Although the autumn result is only just significant at p = 0.05, there are still two significant results among 4 tests, which is equivalent to p = 0.014 (Dean and Mather 1977: 110), even if they are in opposite directions. The GoF test is also significant at Xi^2 = 11.01, p < 0.005 1-tailed. It is hard to avoid the conclusion that there is a seasonal, and therefore solar, component to the Gauquelin Effect, and it is also interesting that in all three JU cases there is a strong effect in the autumn, followed by a weak or negative result in the winter.

Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	- 511	- 175	+ 637	+148	100
Xi^2 (Df = 1)	4.68	0.56	8.26	0.42	0.047
probability	< 0.05	Not Sig.	< 0.01	Not Sig.	Not Sig.

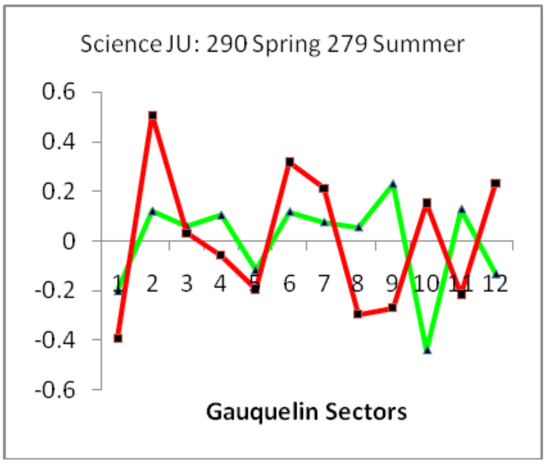
Table 4A Writers JU, using simple control. Note the Gauquelin Effect in the Autumn as well as the strongly negative deviation in Spring.

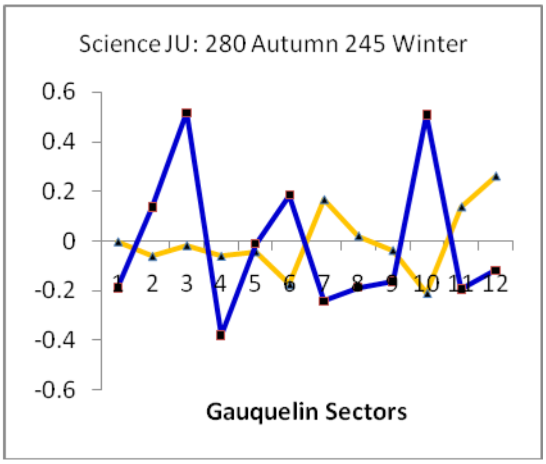
Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	- 790	- 431	+ 708	+ 412	-101
Xi^2 (Df = 1)	4.49	1.31	3.77	1.37	0.019
probability	< 0.05	Not Sig.	< 0.01	Not Sig.	Not Sig.

Table 4B. As 4A but using a control derived from the sample itself.

Given this unexpected result it is interesting to examine what happens when JU is plotted for a profession characterized by JU(-) and SA(+).

Science Only JU (N = 1094)





In this case the Autumn is of special interest, since if JU is generally strongest in this season in JU+ professions we might expect it to be especially weak in key sectors in the autumn in this sample. As the gold line shows this is so, with the deviation from expectation being negative in all the above-horizon sectors, and this is true for both control methods. There are some other interesting features as well, the minor key sector 7 is strongly positive in spring as is sector 10 in the winter, despite JU not being a key sector planet for science.

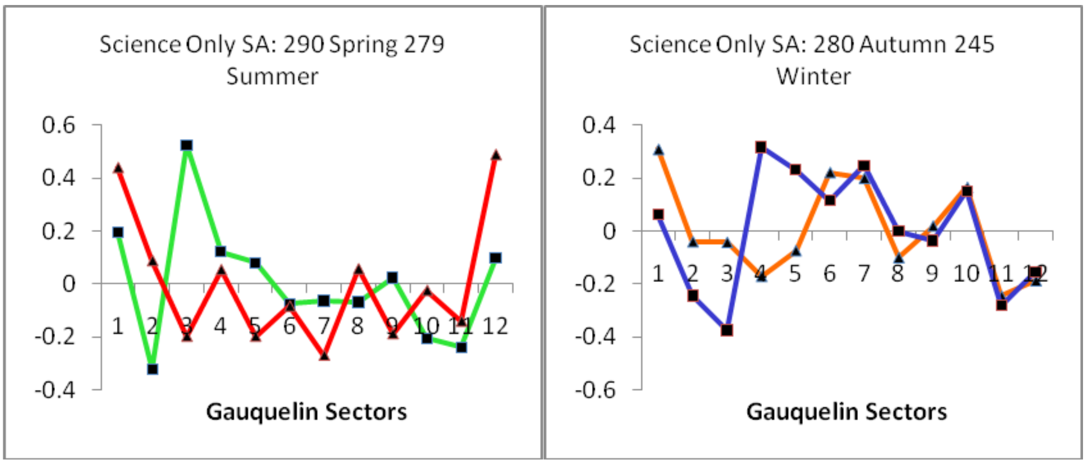
Sectors 2 and 3 are of prime interest when considering a planet opposite to the one which characterizes a profession and here they display large differences in FD. It was therefore decided to apply the Contingency Test calculation to the sum of birth frequencies in sectors 2 + 3, and the result is significant, Xi^2 = 10.41 (Df = 3), p < 0.02, almost entirely due to the autumn and winter seasons. The result when the second control method is used and a GoF test is applied falls to 3.75, which is not significant.

Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	5.9	32.0	18.7	43.1	99.7
Xi^2 (Df = 1)	0.084	2.53	0.88	5.21	6.37
probability	Not Sig.	Not Sig.	Not Sig.	< 0.05	0.01

Table 5 JU for Scientists. *All deviations are negative* as expected in KS1 and KS4, and summer and winter contain 75% of the deviation.

The data sets for Sportsmen and Painters and Musicians (VEALL) were also examined for seasonal variations in JU sector distributions. While the first showed nothing remarkable, the VEALL set showed some interesting variations in the minor key sectors 7 and 10, with deviations up to +0.25 in Summer and down to -0.20 in Autumn. The Contingency test was not significant however.

SATURN (amalgamated professional control used)

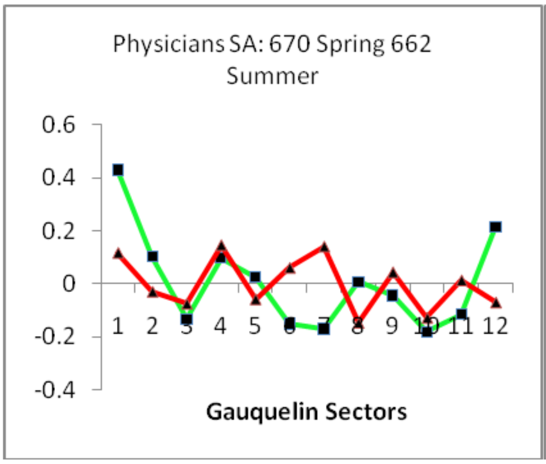


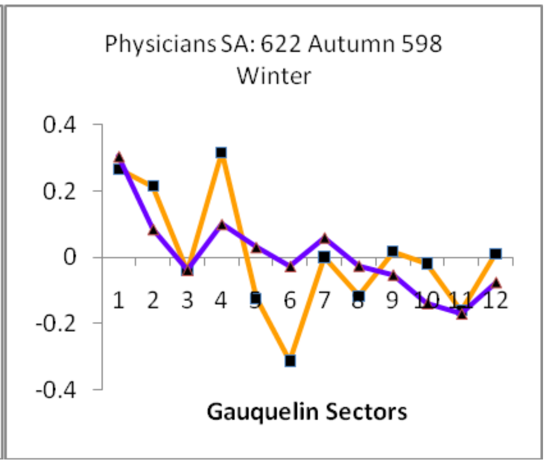
Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	25.3	39.4	8.9	26.4	100

Xi^2 (Df = 1)	1.31	3.18	0.17	1.70	5.37
probability	Not Sig.	< 0.1	Not Sig.	Not Sig.	< 0.03

Table 6 Science Only SA. Note the strong winter peak in KS4 and the spring peak in sector 3 not KS4. Another feature is the summer peak in sector 12.

The Contingency Test result is not significant for SA with Science.



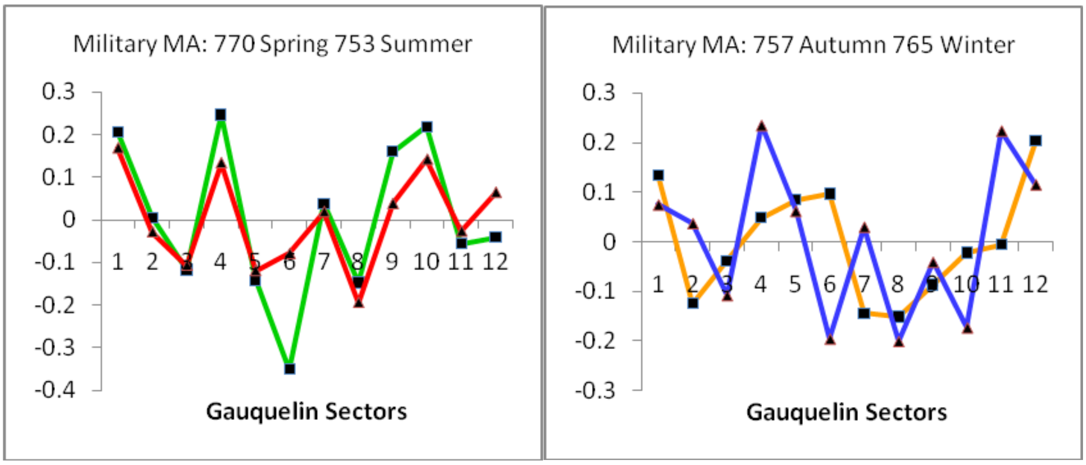


Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	30.1	16.3	32.6	20.9	99.9
Xi^2 (Df = 1)	7.79	2.22	9.81	4.23	22.32
probability	< 0.005	Not Sig.	< 0.005	< 0.025	< 10^(-6)

Table 7. SA for Physicians showing largest Gauquelin Effects in Spring and Autumn.

The Contingency Test with Df = 3 shows no significant correlation for combined KS1+4 nor for KS4 alone for Physicians.

MARS (amalgamated controls used)

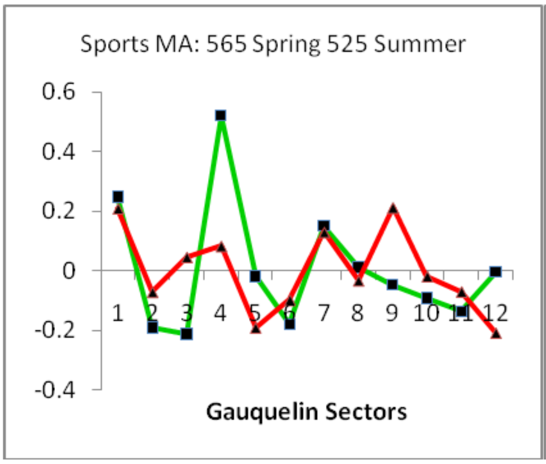


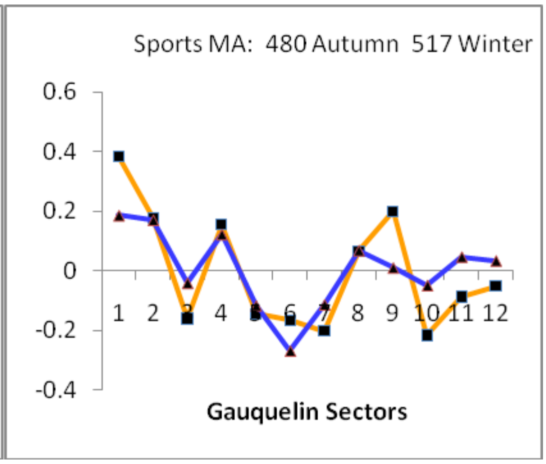
Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	35.7	27.7	14.8	21.8	100.0
Xi^2 (Df = 1)	7.74	4.17	1.34	3.19	15.09
probability	< 0.005	< 0.025	Not Sig.	< 0.05	< 0.0001

Table 8. MA for Military.

It was found that when a control was used for MA derived by shuffling the sample the seasonal patterns were broadly similar but the total annual Gauquelin Effect was reduced to about half its value, and Xi^2 thus fell from 15.09 to about 4.0. Since this was far from the established Gauquelin Effect values it was decided to retain the amalgmated controls for both MA and VE.

The deviations here are rather evenly distributed by season except for the low % in Autumn where the KS peaks are also less defined. For MA it is necessary to use the GoF Test since there is a greater departure from the expected values due to astronomical correlations of MA with the SO. The result was not significant.





Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	42.3	18.4	26.4	13.9	100
Xi^2 (Df = 1)	16.03	2.86	7.27	2.09	23.8
probability	< 0.0001	< 0.05	< 0.005	Not Sig.	< 10^(-6)

Table 9. MA for Sports Champions.

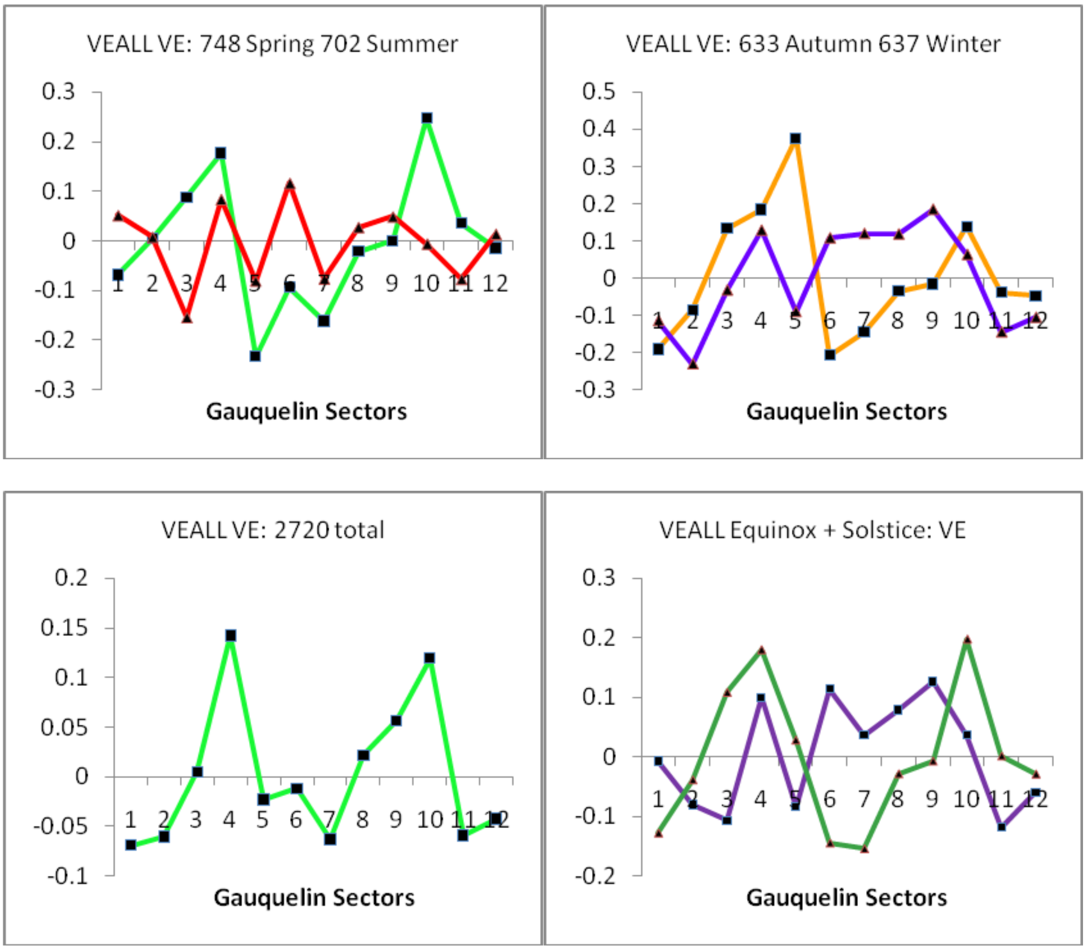
Despite the very prominent Gauquelin Effect in the Spring and the weak effects in summer and winter, the Sports Champions also show no significant correlation by the Goodness of Fit Test. Even when the stronger seasons are combined in a test with Df =1, the results are only 1.54 for Spring+Autumn and 1.33 for Summer + Winter, representing p about 0.1, since the test is 1-tailed.

VENUS (amalgamated controls used)

VEALL (Painters and Musicians).

Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	43.1	71.5	- 17.8	2.1	98.9
Xi^2 (Df = 1)					1.05
probability	None Sig.				n.s.

Table 10. VE for VEALL (Painters and Musicians).

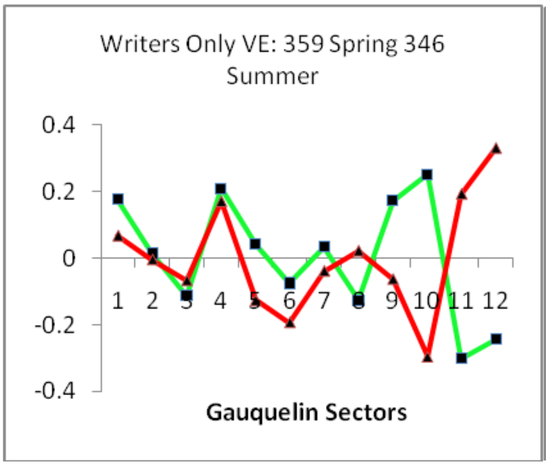


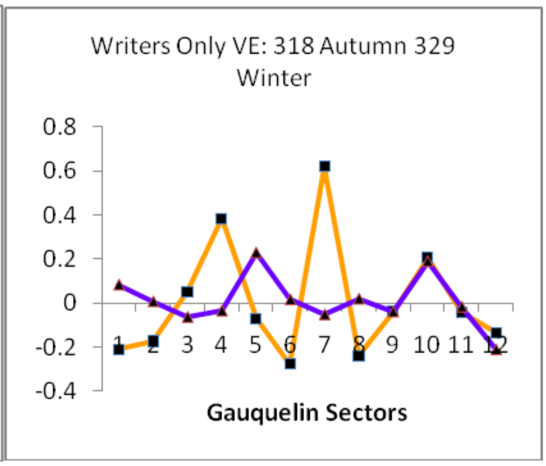
With VE for Painters and Musicians the graph for the data for the whole year is also shown, since the major feature is a second harmonic variation which many people are not aware of. Next to it I have plotted the seasons combined into Equinox (Spring + Autumn in dark green) and Solstice (Summer + Winter in purple), which shows that the 2nd harmonic effect is mainly confined to the Spring and Autumn seasons. A Xi^2 test (Df = 11) gave the value 16.7, p > 0.1, and when the data for sectors were paired (1+7, 2+8 etc) to reinforce the 2nd harmonic a Xi2 test with Df = 5 reached 15.03, very close to the value 15.1 for p = 0.01. This result is potentially interesting because the Equinoctial seasons have long been known to be those in which geomagnetic storms occur most frequently, as discussed with references in my earlier publications, (Douglas 2007, 2008). Second harmonics are also interesting because they are typical of tidal effects.

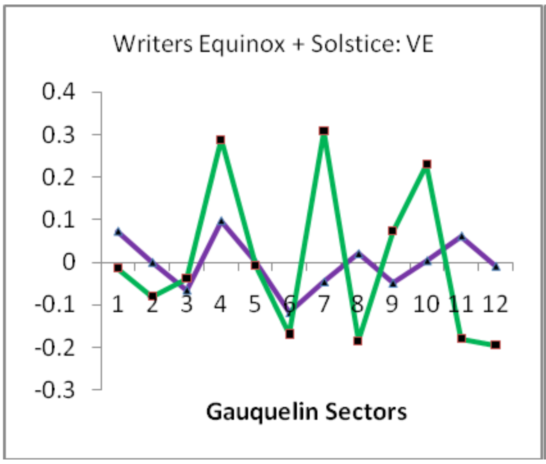
WRITERS.

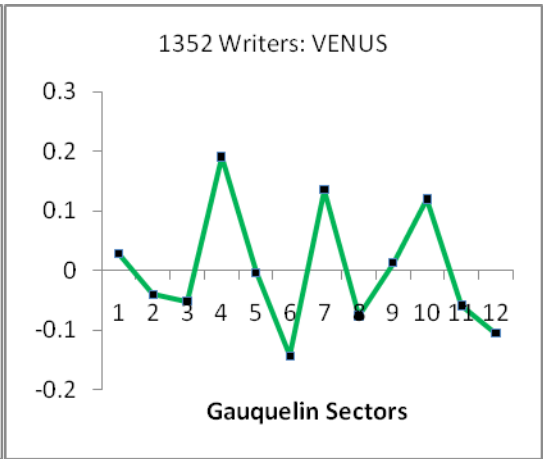
Season	Spring	Summer	Autumn	Winter	Total
% of Deviation	34.8	54.3	11.0	-0.4	99.7
Xi^2 (Df = 1)					0.60
probability	n.s.	n.s.	n.s.	n.s.	n.s.

Table 11. Writers: VE









Likewise it is not generally understood that the VE effect in key sectors is stronger for writers than for painters and musicians. In the graphs for the former there is a very strong positive deviation in sector 7 in the autumn, which shows a GoF test Xi^2 value (Df = 3) of 7.49, making p almost 0.025. This value increased slightly when the controls based on shuffling the VEALL data were used, but for the reasons given in the section on MA the amalgmated controls were used for the graphs. There are also signs of a strong 2nd harmonic in the spring and autumn seasons, but when the combined graphs are plotted 3 peaks appear in the Equinoctial seasons in sectors 4, 7 and 10. Once again it is the equinoctial seasons which contribute most to the total VE effect.

GENERAL CONCLUSIONS.

The seasonal effects shown graphically often seem quite striking, but with these sample sizes they often cannot be distinguished from chance variations by the contingency test. It is interesting that the JU Effect reaches the most convincing Xi^2 result by a contingency test (Df = 3) and it does so for 3 professions: the Military, Writers, and negatively for Scientists. With this in mind it was decided to amalgamate the different professions with the same Gauquelin planet and repeat the test. For JU (Military + Actors + Politicians + Journalists + Writers, N = 7481) the result was Xi^2 = 7.4, just slightly short of the 7.8 required to reach p = 0.05. This smaller result may be attributed to the fact that the deviations occur in different seasons for different professions. For the MA groups (Sports + Military + Science + Physicians, N = 8778) the result was very small. Likewise when KS4 was treated separately nothing more significant emerged.

It seems that seasonal effects are often too small to be reliably detected by statistical tests, with the consistent exception of JU, and in one case for VE. In the absence of larger samples further progress seems unlikely. There was also a problem with MA when controls derived from shuffling the MA profession were used, since the total annual MA Effect was much less, which does not accord with the large amount of research that his been devoted to this topic by the Gauquelins and Ertel.

However it has been established robustly that the Gauquelin Effect for JU is significantly dependent on season, using both sets of controls, and the most interesting result is the emergence of a previously unknown JU effect for writers which only occurs in the Autumn, or Autumn and Winter depending on the control used, and that Autumn seems to be the optimum season for JU in other professions.

Another feature is the occurence of significant deviations in the minor key sectors 7 and 10, such as JU for VEALL which does not show an efect in KS1 or KS4; and even in non-key sectors such as sector 9 for MO in Writers during Winter.

The VE Effect for Painters and Musicians has been shown to be dominated by a 2nd harmonic which originates in the Equinoctial seasons suggesting that geomagnetic storms may play a part.

The evidence presented further supports the argument that the Gauquelin Effect is mediated by a solar influence, although there are big variations in significance depending on the planet.

Note on Daylight Saving time and the Gauquelin data on the CURA website.

All the Gauquelin professional data used in this and the Sect study has been obtained from the CURA website, where it has been converted to local time. This means that some astrological software will still apply a correction for summer time even when it is not appropriate. Summer time was introduced first in Germany on April 30th 1916, and soon after in other European countries, although it was not uniformly adhered to at first. In the present work this problem did not arise because the data were imported with their zone time which was specified as the input for the computer chart calculation without reference to daylight saving.

Researchers may like to know that the professional data (N = 15934) includes 1627 births after April 30th 1916, or 10.2 %, so about half this number or 5 % will have birth times that have been calculated 1 hour earlier than they should have been, if the software does not allow time zones to be entered. It should also be noted that the number is not evenly distributed by profession, and 1036 of these births are sportsmen, almost 50 % of the sample. This of course means that the other professions are much less affected.

There is another potential error which may affect some programs, but again has not caused problems in the present case, which is the use of local times prior to the introduction of standard time zones at different dates after 1884. Almost all the professional data is composed of births within the range 0 to 15 degrees E, so the potential errors are in the range 0 to 1 hr if not controlled.

I would like to thank Jan Ruis and Kenneth Irving for helpful discussions at various points during the development of this study.

REFERENCES.

Dean, Geoffrey and Mather, Arthur (1977). *Recent Advances in Natal Astrology*. Subiaco: Interlogic.

Douglas, Graham (2007). Seasonal Cycles in the Gauquelin data follow geomagnetic influences: futher support for solar influences in professional data. Part 1. *Correlation*, 25(1): 35 – 50.

Douglas, Graham J. (2008). From Gauquelin to Classical Astrology. *Correlation* 26(1): 33-52.

Douglas, Graham (2008b). Part 2: Developing the Geophysical Perspective. *Correlation*, 25(2): 45 – 70.

Douglas, Graham (2010). Sect and the Gauquelin Database. Http://CURA.free.fr/09-10/1004doug6.pdf.

Graham Douglas: Seasonal Variations reveal hidden faces of the Gauquelin Effect and some Statistical Significance.

http://cura.free.fr/09-10/1005doug7.pdf