Ten million marriages: A test of astrological 'love signs'

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Introduction

Astrology is commonly seen as a source of entertainment rather than practical or spiritual enlightenment. Nevertheless the notion that signs of the zodiac provide some information about personality is widespread in folk belief. A related idea is that romantic compatibility is influenced by the individuals' signs in combination. This paper reports on a test of that hypothesis using census data from England and Wales. Based on more than ten million marriages (and hence in excess of twenty million people), it is the largest test of astrology ever undertaken.

Astrologers maintain that our lives and characters are influenced by the configuration of the solar system at the time we were born. A complete horoscope, or natal chart, includes information about where the sun, moon and planets would have been observed relative to each other and to the constellations of the zodiac at the time and place of the subject's birth. Popular astrology in the West focuses on one key element in this chart: the 'sun sign' (or 'star sign' in colloquial parlance), which is determined by the position of the earth in its annual revolution around the sun.

People born during the month-long periods defined by a particular sun sign are supposed to share certain dispositions, for example to be generous or sensitive or stubborn. These tendencies affect personal relationships, and according to common astrological belief, people of different signs have varying degrees of compatibility. A branch of astrology called synastry deals with assessing how individuals will relate to each other based on a comparison of their horoscopes.

Astrology thus maintains that people may be more or less suitable romantic partners depending on their combination of signs. Popular astrology (as represented for example in the work of the late Linda Goodman, whose bestsellers *Sun Signs* and

Love Signs did much to popularise this approach) tends to focus exclusively on sun signs. Astrologers who prepare full horoscopes for their clients assert that sun sign is only one element in the overall analysis, but they typically acknowledge that certain pairings are generally favourable or otherwise.

People are not infallible judges of their own best interests; they may enter relationships with others who seem unsuited to them by any standard. Nevertheless, it is reasonable to expect that personal compatibility, whatever its source and nature, will have some influence on the formation of partnerships. We know from everyday experience as well as a mass of social scientific data that people who are similar in age, education, social class, religion, ethnicity and so on are far more likely to marry than those who are different in these respects. Couples are regarded as being well or poorly matched on the basis of appearance or personality. If astrological compatibility exists, its effects should be observable.

Birth data on people who marry would provide a test: with a sufficiently large sample we should be able to detect any tendency for some signs to attract or repel each other. An even better test might be to consider people who *stay* married. In the long run one might expect that those who were 'meant' to be with each other will continue to be couples, while others will separate.

Devising a test

In order to test a belief, it is necessary to specify what the belief is. Ideally we would start from a prediction of which sun sign combinations should be more or less frequently paired with each other. After all, astrologers claim not merely that we are influenced by the heavens, but that they can describe the effects. Unfortunately there is no great consistency among astrologers, and a survey of books and websites reveals a considerable variety of views concerning propitious pairings.

In the absence of a theory on which astrologers agree, I propose to test the lowest common denominator of astrological belief: the claim that sun signs make a difference to individuals and hence to couples. In this research I look for evidence that *any* combination of signs is found more or less often than would be expected to occur by chance.

According to many sources it makes no difference whether the woman is sign A and the man is sign B or vice versa: it is the combination that matters. If the statistics reveal more female A – male B combinations than expected, the evidence would not be especially impressive unless

1) an excess was also found in the number of male A – female B couples, or

2) the specific affinities depending on sex were specified in advance.

Again, however, we can make every possible allowance for astrology by looking for *any* effects, even if not symmetrical between men and women.

In testing hypotheses we generally start with some idea of the size of the expected effect. When we compare the actual distribution of sun sign combinations with what would be produced if men and women were paired at random, will the differences amount to 50% of the total, 5%, 0.5%, or less? The most cautious position is to assert only that there will be *some* discernible difference, but this very modest claim is at odds with sweeping statements about astrological influences. In order to accept that sun signs are generally associated with certain characteristics and compatibilities, we would need good evidence of effects that are broad and deep. Influences that were barely detectable would be intriguing to scientists but would offer no real clues to human behaviour.

In any event our test will not be stringent: we will look for *any* deviation from the expected number of couples with each combination of signs. Although our scientific aim is to investigate any effect, however small, for practical purposes astrology would be of little interest unless the influence of the heavens is appreciable. When people discuss popular astrology, they presumably suppose that astral compatibility will explain at least one marriage in a thousand.

We need to recognise three factors that may affect the results. The first is the operation of chance. In every hand of cards, the balance between suits will usually be uneven. The larger the number of cards dealt the smaller will be the relative discrepancies, but some variation is inevitable. Secondly, and even more importantly, we can never measure anything with perfect precision and total accuracy. Date of birth is one of the most basic pieces of personal information, but it may not be recorded correctly. Some people do not know their birthdays. A person completing a form on behalf of somebody else may not know when he or she was born. People make mistakes, especially when providing multiple dates. Handwriting can be hard to decipher. Some people will decline to respond; others lie. It is possible through

careful checks to estimate the extent of these errors, but we need to remember their existence in trying to measure small deviations from an expected value.

Finally, some combinations of signs may occur more frequently than expected if a substantial number of people seek these matches and avoid others. If even a modest number of people choose partners at least partly with signs in mind, then some patterns may appear. (The Thomas theorem in sociology holds that if people 'define situations as real, they are real in their consequences.') One would then have the task of trying to distinguish these effects from genuine astrological ones, for example by including only people who do not have the relevant knowledge or beliefs.

Data

A census of population is carried out every ten years in the United Kingdom. This study uses data gathered by the Office for National Statistics (ONS) for the 2001 census in England and Wales. (Figures for Scotland and Northern Ireland, which have their own statistical agencies, are not included.) The census is an invaluable resource: it aims to cover 100% of the population, and participation is legally required. Post-census surveys and quality checks provide information about non-response and response error.

Every household receives a census form containing a number of general questions about housing type, number of rooms and so on, and then further pages for information on each individual resident. The relationships between the various members of the household are stated and hence it is possible to identify married couples. The form requests the day, month and year of birth for every person in the household. The census therefore records the birthdays of all husbands and wives living together in England and Wales, a total of more than twenty million people.

The quality of the data is very good, but there are inevitably instances where dates of birth are missing or illegible. In these cases (some 0.5% of the total) dates of birth were filled in using an automated system of 'imputation' discussed in more detail below. Errors are also introduced as a result of mistakes made in completing the form.

In England, the form was addressed 'To the Householder, Joint Householders or members of the household aged 16 or over'. The instructions read: 'What you have

to do: Your household should complete this form … Answer the questions about your accommodation … Complete the relationship question … Answer the remaining questions for every member of your household. Sign the Declaration …' This wording implies that it was not merely permissible but even expected that the person answering the household questions would also complete the sections describing other individuals resident. Carelessness or ignorance would result in some of those answers being incorrect.

The ONS publishes a set of more than a hundred standard tables providing much of the most frequently used data from the census. Organisations or individuals may also commission special tables including any of the data collected, subject to the usual considerations of data protection. Once a table has been created it becomes publicly available.

Although age is a common variable in the published tables, the specific month and day of birth do not feature in the standard output. Two relevant tables have been commissioned, however: the first (C0694) cross-tabulates the sun signs of married partners, while the second (C0792) provides the full distribution of couples by day and month of birth, with a further breakdown into broad age group (of the husband).

Analysis

Table C0694 – which had been commissioned by someone else – appeared to show a very small but significant tendency for people to marry partners of the same sign. A slight 'spillover' effect was also detectable, with some apparent affinity between neighbouring signs, especially where the wife's sign immediately followed the husband's. These are not necessarily the principal kinds of attraction that would have been predicted by astrologers. Nevertheless, the table implied the existence of about 22,100 more same-sign couples than would have been expected by chance, or an excess of about 26,900 if adjacent signs are included. This figure is still only a quarter of one percent of the total number of married couples, but it is large enough to present a puzzle worth investigating. (See Tables 1 and 2 below.)

I therefore commissioned a table providing a full breakdown of husbands and wives by day and month of birth in order to determine whether the underlying pattern was in fact associated with sun sign periods or something else. I specified husband's

age as a third variable, to explore whether the effect was a generational phenomenon and also to provide distinct subsamples if needed. The result was a table (designated C0792) containing counts for nearly 670,000 combinations of birthdays (366 days x 366 days, for all married couples plus four age subsets). In addition, I asked the ONS for details of the imputation procedure followed where a date of birth was indecipherable or not recorded.

The benefit of having data by day and month of birth is that no prior assumptions need be made about the significance of any particular groupings of birthdays. When these figures were aggregated by month, for example, the apparent 'month effect' was slightly larger than the 'sign effect' observed initially. There are about 23,450 more spouses with the same month of birth than expected; see Tables 3 and 4 below.

The apparent tendency to prefer partners of the same sign or month of birth is actually explained in large part by matching *days* of birth. The number of couples for whom the same birthday was recorded for husband and wife is 41% higher than expected (about 39,800 rather than 28,300). Now while there may be some people who are drawn to each other because they share a birthday, the excess probably reflects response error for the most part. Census forms are typically completed by one member of the household, and that individual may – through carelessness or forgetfulness – write in his or her birthday when entering details for the spouse. Evidence that precisely this type of error occurred comes from the data validation study conducted by the ONS on what appeared to be same-sex partnerships. For around 10,900 couples, one person apparently assigned his or her own sex to the partner. If people can make mistakes about their spouse's sex, it is hardly surprising to find corresponding problems with birthdays. See http://www.statistics.gov.uk/census2001/data_validation_es.asp

The most commonly recorded birthday is January 1st (2,560 rather than the 77 one would expect from random assignment), with July 1st in second place (563). It seems likely that many people entered the first day of the year if an exact birthday was not known. (In personal communication, a member of ONS staff reported seeing some forms from old people's homes where that had been done systematically, and it also seemed to occur more frequently with people not born in the UK.)

In addition to the approximately 11,500 couples in excess of the number expected who are recorded as sharing the same birthday, many listed the same day

(but not month) of birth or the same month (but not day). The same day, different month phenomenon is not directly relevant to the analysis of sun signs, but it does illustrate the patterns that arise (presumably because of human error) in such data. Even excluding the first of the month – very common for reasons to be discussed shortly – there are still more than 7,000 couples in excess of expectation with shared days of birth but not identical birthdays.

Where husbands and wives are recorded as having the same birthdays, or the same day of birth in different months, response error is the natural explanation of higher than expected counts. Where only the same month is recorded, it again seems probable that mistakes will contribute to the excess, but we cannot rule out some kind of seasonal affinity. The question is whether this connection could be astrological.

The partial overlap between astrological signs and months of birth allows a crucial test. Each sign starts in one month and ends in the next, so that the first third of Aries, for example, falls at the end of March, with the balance being in April. Consider people born between March 23rd and 30th: are they more likely to be married to someone whose birthday falls during March 2nd-20th, or April 2nd-20th? In one case the spouse would have the same month of birth but a different sign, while in the other the spouse would have the same sign but a different month of birth. If the first situation is more frequent, then by accident or design month is more important. If the other is more common, then it would appear that sign really does make a difference (if only by choice).

The results were conclusive. The couples whose birthdays belonged to the same sign but fell in different months were no more numerous than chance would dictate. By contrast, there were more combinations of birthdays from different parts of the same month than expected. This excess in shared months of birth is probably the result of response error, but in any event sun sign is not a factor.

It only remains to explain the higher than expected counts for neighbouring months (or signs). We know from the ONS that 0.5 percent of census respondents supplied illegible dates of birth or none at all. These dates were imputed early in the course of data processing. All days were imputed as the first of the month, and the months were assigned in rotation. Thus if the dates of birth for both husband and wife needed to be filled in, one would be given the first of month m, and the other the first of month $m+1$ (assuming one partner followed the other on the census form). Because husbands are typically listed before wives on the form, most cases of double

imputation will assign women to the month following their spouses. This sex-linked effect – confirmed in Table 5 – is exactly what we observe in Tables 2 and 4.

As a result of the tendency mentioned earlier for people to give January 1st as a birthday, in conjunction with the fact that imputed dates were always the first of a month, two and a half times as many spouses as expected share that day of birth. The pattern is shown in Table 5.

We can take steps to remove these response artefacts from the raw data. First, any couples where one or both spouses were recorded as born on the first of the month are excluded; Table 6 shows the result. Next, the counts for each same-sign combination are adjusted to correct for the tendency of some respondents to supply the same birthday, or month of birth, for their spouses (Table 7). The outcome in Table 8 – a scatter of low values showing essentially random variation – is essentially what one would expect to occur by chance. (Further discussion can be found in the Technical Appendix.)

To recap, the curious patterns in Tables 1 and 2 arose because of response error and imputation of missing dates of birth. Of the 22,100 couples who at first glance seemed to be drawn together by sun sign, more than half are listed as having the same birthday. In the remaining cases it seems that people recorded (probably incorrectly) the same month of birth for both spouses. To complicate matters further, the imputation process created an apparent 'spillover' effect into adjacent signs.

Conclusion

This research shows that astrological sign has no impact on the probability of marrying – and staying married to – someone of any other sign. For decades, popular astrologers have promoted the idea of 'love signs': compatibility between partners with certain combinations of birthdays. If the more than twenty million married people in England and Wales offer any indication, however, lonely hearts who worry about the zodiac are wasting their time.

This analysis of the birthdays of all the husbands and wives in England and Wales is the largest-scale test of astrology ever undertaken. If there is even the smallest tendency for Virgos to fancy Capricorns, or for Libras to like Leos, then we should see it in the statistics. Even if only one pair in a thousand is influenced by the

stars, then with a population of ten million couples, favoured combinations of signs would in total appear an extra ten thousand times. No such evidence can be found, though. After making allowances for response error and imputation, the distribution of spousal birthdays is what one would expect from a random distribution.

Astrologers are likely to complain that full birth charts are needed to predict personality accurately. There are two responses. First, to the extent that astrology has influenced everyday belief, it is almost entirely through the use of sun signs; if those were seen as useless when it comes to assessing personality and romantic compatibility, then astrology would lose its hold on the public imagination. Secondly, the basic signs are important even in professional charts. If they had any direct influence, however small, the giant magnifying glass of this huge sample would reveal it. No effects can be detected.

The only remaining defence is that sun signs mean nothing on their own, because only interactions between these signs and other features of the full natal chart (the ascendant or 'rising sign', the moon sign, etc.) have any significance. By implication if some Sagittarians have certain characteristics, then just as many have opposite ones: any tendency in favour of one trait rather than another would be detectable in a large sample. Such a claim would mean that no generalizations about sun signs could be true. Virtually all astrologers, however, make statements about the supposed influence of different elements of a chart, including the sun sign.

It does not appear that any of the ten million married couples in England and Wales were brought together by 'love signs'. Sceptics will not be surprised by this lack of evidence for astrology. What may be unexpected, though, is the implication that even astrological *belief* has no apparent influence on partner choice. The pervasiveness of the zodiac in popular culture might have induced some people to favour certain signs over others in considering possible mates. If enough people believed that signs matter and were prepared to act on those beliefs, then some combinations would appear more often than expected even if they had no bearing on compatibility. The fact that we see no such effects suggests that the number of true believers must be very small (unless the advice they read is random). In the final analysis, whether we fall in love seems to have nothing to do with the stars, or even what we might suppose they tell us.

Technical Appendix

The astrological year begins on 21 March, the vernal equinox. The exact dates separating signs of the zodiac will depend on the year and place concerned. Table C0694 was specified using the following date ranges for sun signs:

Aries	21 March - 20 April
Taurus	21 April - 21 May
Gemini	22 May - 21 June
Cancer	22 June - 22 July
Leo	23 July - 22 August
Virgo	23 August - 22 September
Libra	23 September - 22 October
Scorpio	23 October - 21 November
Sagittarius	22 November - 21 December
Capricorn	22 December - 20 January
Aquarius	21 January - 19 February
Pisces	20 February - 20 March

Categories that contain only a small number of cases give rise to concerns about disclosure of personal information. The ONS introduces small perturbations into such cell counts, with the result that the totals in the two commissioned tables discussed here (Tables 1 and 3) are very slightly different (10,317,649 vs. 10,317,673). The confidentiality issues arise because of the relative scarcity of 29 February as a birthday.

Birthdays are not spread evenly across the different months of the year. The seasonality of fertility varies in different parts of the world and over time; in Britain, births are more frequent in the spring than in the late autumn and winter. Scholars continue to debate the relative contribution of social, environmental and physiological factors. The expected frequencies of each marital combination of birth month or sun sign are therefore not assumed to be simply one twelfth times one twelfth.

Expected frequencies are calculated as the product of the two marginal totals divided by the grand total. Starting from Table 1, for example, the expected number of Aries-Aries combinations is (916,477 x 912,445)/ 10,317,649 = 81,049. The difference shown in Table 2 is thus 82,616 – 81,049 = 1,567 (which rounded and expressed in hundreds is 16). Similarly, using Table 3 the expected number of January-January combinations is (880,381 x 881,506)/ 10,317,673 = 75,217. The

difference shown in Table 4 is thus 79,287 – 75,217 = 4,070 (which rounded and expressed in hundreds is 41).

A few different options are available for calculating the expected number of couples with a shared birthday. One straightforward option is to divide the total (10,317,673) by the number of days in the year (365.25), which gives 28,248. Because of the seasonality of births, however, this estimate may not be completely accurate. One could apply the standard formula to day of birth (men born on a specific day times women born that day divided by the total), but we know that the counts for the first of the month are inflated. The method adopted here was to divide the expected number of couples sharing each month of birth by the number of days in that month; the total comes to 28,295.

Similarly, one can divide the marginal totals in Table 3 by the number of days in the month to produce estimates for the first of the month. These values were then used to calculate the expected numbers of couples who were each born on the first (of the same or different months). Table 5 shows the difference between the actual counts and those expected figures. All of the values are positive because (as a result of response error and imputation) there are many more people recorded as having birthdays on the first than would be produced by chance.

Table 6 represents the first stage in removing the inaccuracies from Table 1. Nearly 800,000 couples for whom the husband or wife was born on the first of the month are excluded. (For most days of birth the total would be closer to 660,000.) The marginal totals in Table 6 were used to generate expected counts. As argued in the text, the differences between the observed and expected figures along the main diagonal represent the effects of response error (where the same birthday or month of birth was entered for both husband and wife). The excess same-sign values were subtracted from the corresponding figures in Table 6, producing Table 7. New expected counts for each combination were calculated; the actual minus expected figures are given in Table 8. Cells adjacent to the main diagonal are virtually all positive, which probably reflects a residual excess of same-month responses not removed through the same-sign correction.

The distribution in Table 7 is as close to random as one is likely to find in a real-world situation. Despite the prevalence of systematic response error and the very approximate nature of the correction method, the discrepancies revealed in Table 8 are only slightly larger than would be generated by a wholly random process. With a

total of 9,500,000 distributed across a 12x12 table, cell values can vary by up to 450 above or below expectation without causing the hypothesis that the row and column variables are independent to be rejected at the 0.05 level. Most of the values in Table 8 are within that range, but a scattering of exceptions (from a minimum of -680 to a maximum of 631) leads to a chi-square test result that is significant at the 0.01 level.

In view of the enormous sample size and the imperfections in the data, this statistical outcome has no substantive significance. The difficulty with small samples is that nothing is statistically significant, even when genuine effects are at work; the problem with very large samples is that everything is statistically significant, even when the background is merely noise. The deviations are tiny relative to the number of couples with each combination of signs; from the 144 pairs, the largest gap between the actual count and what one would expect is barely 1%.

The nature of commissioned table C0792 makes it possible to carry out at least two further types of test. First, one can compare sets of birthdays defined not only by sun sign or month, but on any basis at all. Unless the discrepancies between the actual and expected counts are larger and more systematic when using sun sign rather than other groupings, there is no evidence to support their alleged influence. Secondly, C0792 provides a full breakdown of spousal dates of birth by age of husband. There are four broad age groups of roughly similar size: under 40, 40-49, 50-64, and 65 and over. Only if the pattern of deviations (as shown in Table 8) is the same in all four groups would it suggest that the discrepancies are non-random. (With sun signs, we will still find dependence adjacent to the main diagonal because the adjustment method used to produce Table 7 does not fully eliminate all month effects.)

Table 1
Census Commissioned Table C0694
Married couples in England and Wales, 2001: Sun signs of wives by sun signs of husbands

	Husband												
	Aries	Taurus	Gemini	Cancer	Leo	Virgo	Libra	Scorpio	Sagittarius	Capricorn	Aquarius	Pisces	Total
Wife													
Aries	82,616	81,968	80,161	77,461	76,110	75,017	73,158	69,111	70,483	74,195	75,006	77,159	912,445
Taurus	82,417	84,994	80,890	79,279	76,282	76,512	74,263	69,576	70,472	75,475	75,777	78,106	924,043
Gemini	80,106	81,086	80,694	77,538	74,866	74,779	72,715	68,343	69,514	73,819	74,238	76,037	903,735
Cancer	77,855	79,261	77,310	77,198	73,246	72,999	70,569	66,826	68,000	71,428	72,258	73,901	880,851
Leo	76,118	76,490	74,411	73,589	72,007	71,054	68,381	64,637	66,068	69,569	70,552	72,152	855,028
Virgo	75,376	76,804	74,838	73,467	71,281	72,278	68,694	64,809	65,915	69,682	70,743	71,917	855,804
Libra	74,182	74,318	73,594	71,275	69,367	69,912	69,225	63,775	64,405	68,693	69,096	69,942	837,784
Scorpio	68,946	69,965	68,758	67,050	64,310	65,365	63,758	61,101	60,886	63,945	64,421	65,711	784,216
Sagittarius	71,299	70,551	69,560	67,711	66,245	65,739	64,684	60,615	63,344	65,492	65,516	66,246	797,002
Capricorn	74,615	75,303	73,250	71,513	69,267	69,735	67,781	63,995	65,354	73,662	69,692	71,131	845,298
Aquarius	75,425	76,076	74,808	72,541	70,323	70,185	68,863	63,906	66,082	70,572	72,199	71,668	852,648
Pisces	77,522	77,651	75,564	74,380	71,647	71,931	69,785	66,275	66,780	70,799	71,918	74,543	868,795
Total	916,477	924,467	903,838	883,002	854,951	855,506	831,876	782,969	797,303	847,331	851,416	868,513	10,317,649

Source: 2001 Census Commissioned Table.

Table 2
Observed minus expected frequencies for sun sign combinations (in hundreds)

	Husband											
	Aries	Taurus	Gemini	Cancer	Leo	Virgo	Libra	Scorpio	Sagittarius	Capricorn	Aquarius	Pisces
Wife												
Aries	16	2	2	-6	5	-6	-4	-1	0	-7	-3	4
Taurus	3	22	-1	2	-3	-1	-2	-5	-9	-4	-5	3
Gemini	-2	1	15	2	0	-2	-1	-2	-3	-4	-3	0
Cancer	-4	3	1	18	3	0	-5	0	-1	-9	-4	-2
Leo	2	-1	-5	4	12	2	-6	-2	0	-6	0	2
Virgo	-6	1	-1	2	4	13	-3	-1	-2	-6	1	-1
Libra	-2	-7	2	-4	-1	4	17	2	-3	-1	0	-6
Scorpio	-7	-3	1	-1	-7	3	5	16	3	-5	-3	-3
Sagittarius	5	-9	-3	-5	2	-3	4	1	18	0	-3	-8
Capricorn	-5	-4	-8	-8	-8	-4	-4	-2	0	42	-1	0
Aquarius	-3	-3	1	-4	-3	-5	1	-8	2	5	18	-1
Pisces	4	-2	-5	0	-3	-1	-3	3	-4	-6	2	14

Excess of same-sign couples: 22,093
Net excess where wife's sign follows husband's sign: 3,643
Net excess where husband's sign follows wife's sign: 1,162

Table 3
Calculated from Census Commissioned Table C0792
Married couples in England and Wales, 2001: Month of birth of wives by month of birth of husbands

	Husband												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
Wife													
January	79,287	69,588	78,582	75,144	78,257	73,867	74,053	71,915	71,933	70,662	66,801	71,417	881,506
February	70,311	66,415	73,120	70,340	72,819	68,678	69,225	66,842	66,991	65,457	62,153	65,798	818,149
March	78,214	73,229	84,187	79,520	81,742	78,016	77,737	75,697	75,026	74,200	70,247	74,119	921,934
April	74,940	69,892	79,107	78,133	79,328	74,940	74,620	72,774	72,539	70,436	67,182	70,828	884,719
May	77,476	72,880	81,851	79,414	83,678	77,402	78,218	74,865	75,417	73,937	69,517	73,768	918,423
June	73,672	68,567	77,869	74,793	78,065	74,993	73,540	71,448	71,552	70,296	65,643	70,118	870,556
July	73,803	68,902	77,952	74,770	77,703	73,894	76,028	72,055	71,251	69,911	66,510	70,198	872,977
August	72,184	67,084	76,345	72,883	75,255	71,237	72,298	70,867	69,438	67,687	64,239	68,304	847,821
September	71,938	67,024	75,594	73,039	75,524	71,561	71,893	69,973	71,526	68,307	64,824	68,431	849,634
October	71,005	65,996	74,325	71,604	73,829	70,344	70,854	68,691	69,004	69,472	63,926	67,385	836,435
November	66,644	61,943	69,734	67,091	69,582	66,649	66,728	64,087	64,637	63,675	61,381	63,099	785,250
December	70,907	65,527	73,862	71,335	73,332	69,637	69,974	67,801	68,061	67,366	63,445	69,022	830,269
Total	880,381	817,047	922,528	888,066	919,114	871,218	875,168	847,015	847,375	831,406	785,868	832,487	10,317,673

Source: 2001 Census Commissioned Table.

Table 4
Observed minus expected frequencies for month of birth combinations (in hundreds)

	Husband											
	January	February	March	April	May	June	July	August	September	October	November	December
Wife												
January	41	-2	-2	-7	-3	-6	-7	-5	-5	-4	-3	3
February	5	16	0	-1	-1	-4	-2	-3	-2	-5	-2	-2
March	-5	2	18	2	-4	2	-5	0	-7	-1	0	-3
April	-6	-2	0	20	5	2	-4	1	-1	-9	-2	-6
May	-9	2	-3	4	19	-1	3	-5	0	-1	-4	-3
June	-6	-4	0	-1	5	15	-3	0	1	1	-7	-1
July	-7	-2	-1	-4	-1	2	20	4	-4	-4	0	-2
August	-2	-1	5	-1	-3	-4	4	13	-2	-6	-3	-1
September	-6	-3	-4	-1	-2	-2	-2	2	17	-2	1	-1
October	-4	-2	-5	-4	-7	-3	-1	0	3	21	2	-1
November	-4	-2	-5	-5	-4	3	1	-4	1	4	16	-3
December	1	-2	-4	-1	-6	-5	-5	-4	-1	5	2	20

Excess of same-month couples: 23,449
Net excess where wife's month of birth follows husband's: 3,596
Net excess where husband's month of birth follows wife's: 41

Table 5
Observed minus expected frequencies for first day of birth month combinations (in hundreds)

	Husband											
	January	February	March	April	May	June	July	August	September	October	November	December
Wife												
January	248	25	18	17	16	14	22	15	15	17	10	34
February	46	8	8	6	5	7	6	6	5	6	6	7
March	17	31	8	11	7	5	6	6	6	4	4	5
April	14	9	29	9	10	7	5	6	5	6	3	5
May	16	10	4	27	7	11	7	5	5	5	6	5
June	15	4	4	8	26	18	13	7	5	5	6	5
July	20	8	7	6	7	29	49	8	4	5	5	4
August	13	5	6	6	7	6	27	8	6	5	4	5
September	10	14	4	5	6	7	9	30	6	9	2	4
October	14	7	6	4	5	7	6	4	25	9	5	3
November	12	4	6	6	4	4	5	4	5	27	8	6
December	17	4	6	2	5	6	5	3	4	4	27	6

Excess of same-first-of-month couples: 3,829
Net excess where wife's month of birth follows husband's: 3,558
Net excess where husband's month of birth follows wife's: 1,304

Table 6
Calculated from Census Commissioned Table C0792
Married couples in England and Wales, 2001 (excluding those with day of birth for one spouse or both recorded as the 1st)
Sun signs of wives by sun signs of husbands

	Husband												
	Aries	Taurus	Gemini	Cancer	Leo	Virgo	Libra	Scorpio	Sagittarius	Capricorn	Aquarius	Pisces	Total
Wife													
Aries	76,647	75,897	74,219	71,726	70,466	69,651	67,693	63,880	65,344	67,647	69,273	71,226	843,669
Taurus	76,094	78,629	74,810	73,411	70,620	71,081	68,561	64,286	65,322	68,929	69,823	72,216	853,782
Gemini	74,208	74,970	74,669	71,566	69,341	69,282	67,149	63,277	64,305	67,216	68,527	70,445	834,955
Cancer	72,278	73,401	71,251	71,159	67,834	67,854	65,032	61,941	62,806	65,271	66,796	68,440	814,063
Leo	70,513	70,824	68,986	68,095	66,753	66,044	63,259	59,850	61,110	63,614	65,197	66,770	791,015
Virgo	70,120	71,287	69,423	67,993	65,960	67,231	63,571	60,106	61,111	63,901	65,499	66,715	792,917
Libra	68,572	68,774	68,066	65,918	64,077	64,606	63,905	58,821	59,467	62,639	63,655	64,633	773,133
Scorpio	63,752	64,673	63,611	62,073	59,549	60,524	58,716	56,381	56,311	58,374	59,505	60,652	724,121
Sagittarius	66,099	65,343	64,333	62,745	61,340	61,085	59,926	55,906	58,734	59,812	60,545	61,361	737,229
Capricorn	68,012	68,515	66,572	65,133	63,126	63,777	61,636	58,151	59,392	63,853	63,381	64,551	766,099
Aquarius	69,662	70,387	69,103	66,985	65,085	64,947	63,487	59,024	61,057	63,722	66,489	66,286	786,234
Pisces	71,709	71,732	69,838	68,721	66,298	66,706	64,422	61,277	61,660	64,408	66,096	68,895	801,762
Total	847,666	854,432	834,881	815,525	790,449	792,788	767,357	722,900	736,619	769,386	784,786	802,190	9,518,979

Table 7
Calculated from Census Commissioned Table C0792
Married couples in England and Wales, 2001
Sun signs of wives by sun signs of husbands
(Excluding those with day of birth for one spouse or both recorded as the 1st and deducting same-sign excess)

	Husband												
	Aries	Taurus	Gemini	Cancer	Leo	Virgo	Libra	Scorpio	Sagittarius	Capricorn	Aquarius	Pisces	Total
Wife													
Aries	75,129	75,897	74,219	71,726	70,466	69,651	67,693	63,880	65,344	67,647	69,273	71,226	842,151
Taurus	76,094	76,636	74,810	73,411	70,620	71,081	68,561	64,286	65,322	68,929	69,823	72,216	851,789
Gemini	74,208	74,970	73,231	71,566	69,341	69,282	67,149	63,277	64,305	67,216	68,527	70,445	833,517
Cancer	72,278	73,401	71,251	69,744	67,834	67,854	65,032	61,941	62,806	65,271	66,796	68,440	812,648
Leo	70,513	70,824	68,986	68,095	65,685	66,044	63,259	59,850	61,110	63,614	65,197	66,770	789,947
Virgo	70,120	71,287	69,423	67,993	65,960	66,038	63,571	60,106	61,111	63,901	65,499	66,715	791,724
Libra	68,572	68,774	68,066	65,918	64,077	64,606	62,325	58,821	59,467	62,639	63,655	64,633	771,553
Scorpio	63,752	64,673	63,611	62,073	59,549	60,524	58,716	54,992	56,311	58,374	59,505	60,652	722,732
Sagittarius	66,099	65,343	64,333	62,745	61,340	61,085	59,926	55,906	57,050	59,812	60,545	61,361	735,545
Capricorn	68,012	68,515	66,572	65,133	63,126	63,777	61,636	58,151	59,392	61,921	63,381	64,551	764,167
Aquarius	69,662	70,387	69,103	66,985	65,085	64,947	63,487	59,024	61,057	63,722	64,821	66,286	784,566
Pisces	71,709	71,732	69,838	68,721	66,298	66,706	64,422	61,277	61,660	64,408	66,096	67,567	800,434
Total	846,148	852,439	833,443	814,110	789,381	791,595	765,777	721,511	734,935	767,454	783,118	800,862	9,500,773

Table 8
Observed minus expected frequencies for sun sign combinations (in hundreds)
(After excluding couples with day of birth for one spouse or both recorded as the 1st and deducting same-sign excess)

	Husband											
	Aries	Taurus	Gemini	Cancer	Leo	Virgo	Libra	Scorpio	Sagittarius	Capricorn	Aquarius	Pisces
Wife												
Aries	1	3	4	-4	5	-5	-2	-1	2	-4	-2	3
Taurus	2	2	1	4	-1	1	-1	-4	-6	1	-4	4
Gemini	0	2	1	2	1	-1	0	0	-2	-2	-2	2
Cancer	-1	5	0	1	4	2	-5	2	-1	-4	-2	0
Leo	2	-1	-3	4	1	3	-4	-1	0	-2	1	2
Virgo	-4	2	0	2	2	1	-3	0	-2	-1	2	0
Libra	-1	-5	4	-2	0	3	1	2	-2	3	0	-4
Scorpio	-6	-2	2	2	-5	3	5	1	4	0	-1	-3
Sagittarius	6	-7	-2	-3	3	-2	6	0	1	4	-1	-6
Capricorn	0	-1	-5	-3	-3	1	0	1	3	2	4	2
Aquarius	-2	0	3	-2	-1	-4	2	-6	3	3	1	2
Pisces	4	-1	-4	1	-2	0	-1	5	-3	-3	1	1