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Biased Data Selection in Mars Effect Research

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Abstract — An earlier study (Ertel, 1988) showed that original evidence for Gauquelin's Mars effect with eminent athletes (Gauquelin and Gauqelin 1970) was based on an incomplete data sample. When athletes initially discarded by Gauquelin were included the Mars effect declined. The present study bears on a more subtle effect of the same bias. Gauquelin's original definition of planetary effects was based on birth frequences obtained in a "narrow" zone of the planet's daily circle (G-sector zone). After accumulating results over decades of research, he found that the area just preceding his narrow zone indicated initial planetary effects; he therefore proposed to include initial sectors in an "extende d G-sector zone definition. Assuming that these initial G-sectors had been ignored prior to 1984, the authors suspected that an unbiased proportion of births for these sectors in Gauquelin's exempted data should contrast with the biased proportion known to exist in the "narrow-zone" sectors. This idea gave rise to a new bias detector (IMQ, initial vs. main sector quotient), whose validity was confirmed with the biased Gauquelin data. Selection bias for Gauquelin turned up in his athletes study only; the IMQ did not indicate like anomalies for six other professional investigations conducted by Gauquelin.

The IMQ was also applied to three athlete samples collected by skeptic organizations. Among them, the CSICOP data for U.S. athletes revealed an anomalous IMQ similar to Gauquelin's unpublished athletes. The results therefore suggest that a certain proportion of U.S. athletes with unwelcome positions might have been exempted from analysis ($p = 0.01$). Support for this suspicion is provided by complementary evidence indicating biased admissions of less eminent athletes to the U.S. sample while the preference for most eminent athletes was required. Thus an avoidance of G-sector cases, consistent with this bent, cannot be disavowed. Nevertheless the authors refrain from firm conclusions as this case is circumstantial. It is suggested to merely disregard the CSICOP's negative result of their study in future discussions of the Mars effect as long as appropriate steps to convincingly resolve remaining ambiguities have not been not made.

1. Evidence for a Mars Effect Despite Biased Sampling

Considerable evidence has been provided in favor of Michel Gauquelin's claim of a Mars effect (Ertel, 1988, 1992): Gauquelin claimed that athletes were born more frequently than would be expected by chance with Mars rising above the earth's horizon or culminating on its daily circle (*i.e.,* when Mars was crossing "G-sectors"). Furthermore, he maintained that the percentage of births with Mars in G-sectors (G%) was more pronounced with eminent than with mediocre athletes, thus an eminence effect was claimed as a specification of the Mars effect.

Support for the Gauquelin claims resulted when citation counts were introduced as an improved procedure (Ertel, 1988). An athlete's eminence was objectively defined by the number of sports reference sources among a standard set of such sources (N = 18) in which the athlete was referred to at least once. The Mars–sports eminence connection attained convincing strength when it was operationalized in this way by numbers of citations.

These conclusions were confirmed by scrutinizing Gauquelin's unpublished data. Gauquelin had occasionally referred to his exempting low-eminence athletes from analysis, which is a legitimate procedure in principle, if done without awareness of planetary positions. Ertel suspected, however, that on occasion Gauquelin might have been aware of Mars positions when he decided whether an athlete was or was not eminent enough to be added to the final sample. With Gauquelin's permission, Ertel searched out and analyzed this unpublished data, finding that indeed Gauquelin had tended not to exclude marginal athletes from his high-eminence sample when Mars at their births was in either the rising or culminating zones. In other words, he tended to rank Mars G-sector cases among low-eminence athletes more favorably than non-G sector cases.

This can be seen in Figure 1, by first noting that the Mars G% levels of all athletes in Gauquelin's samples (circles and a solid trend line) increase along with the citation ranks. Gauquelin's unpublished athletes (triangles and the lower dashed line) are predominantly those with few citations (see the respective numbers). This is as it should be, but at the same time the Mars G% levels of unpublished low rank athletes (triangles) are much lower overall than the Mars G% levels of published low-rank athletes (squares), and even at most points below the line of mean expectancy. This indicates that Gauquelin must have been aware, to a certain degree, of Mars sector positions when he selected individual cases for his sample. Note, however, that when Gauquelin's unpublished cases are added to the pool of published athletes (solid line), the correlation between eminence and Mars G% is not diminished as it should have been if the Mars effect were simply a product of Gauquelin's selection bias. Instead, the correlation increases (the line becomes steeper) as it should if the effect is genuine. Hence, the idea that Gauquelin's planetary claim was due to biased selection was clearly refuted.

In what follows, a more subtle effect of Gauquelin's selection bias will be investigated as it might provide helpful cues at assessing the objectivity of birth data samples. A new bias indicator (IMQ) is derived and its validity is first tested with the Gauquelin data as already known to have been influenced by bias. It will then be applied to other professions for which Gauquelin claimed a Mars effect in order to find out whether his bias affected more of his samples. The bias probe will also be applied to data collected by organized skeptics who have tested Gauquelin's Mars effect claim for sports champions. These groups include the

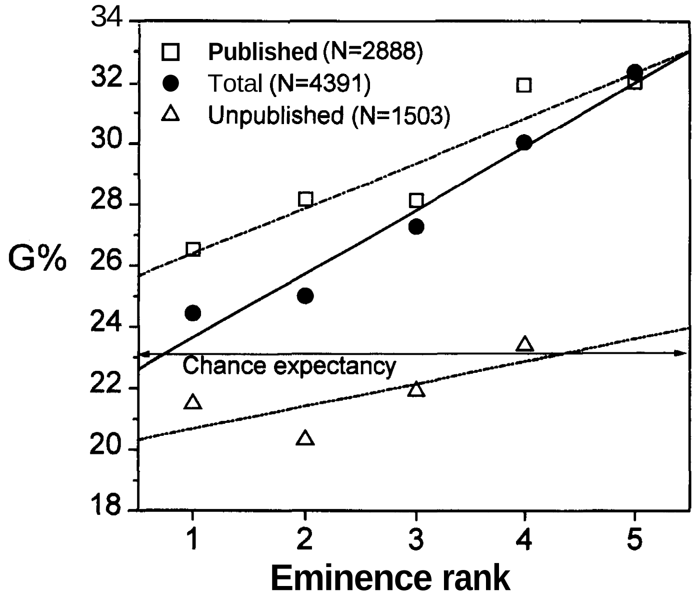

Fig. 1. G-sector percentages of athletes for five citation ranks, separately for Gauquelin's published, unpublished samples, and total. Absolute frequencies for each citation rank. (Chance expectancy for Mars is generally abouve (8/36)*(100)= 22.2.

CP (Belgian skeptics, Comite Para, 1976), the CSICOP (U.S. skeptics, Kurtz, Zelen, and Abell, 1979/80), and the CFEPP (French skeptics, CFEPP, 1990). These studies engendered controversy both inside and outside the organizations which carried them out (Curry, 1982; Lippard, 1993; Irving, 1995), and the possibility of biased data selection was one of several matters at issue. If the IMQ reliably indicates Gauquelin's selection bias with his unpublished data, then it might also indicate whether the skeptics' published data suffer from the same type of deflection.'

2. Defining IMQ, A New Bias Indicator

12 Sector vs. 36 Sector Definitions

For each birth in his sample, Gauquelin determined planetary positions on a scale representing the diurnal circle by 36 sectors. In his first report (Gauquelin, 1955) he generally summed birth frequencies for three adjacent sectors resulting in 3613 = 12 frequencies for each sample. In the same publication, he alternatively summed frequencies for 18 adjacent sectors (resulting in 18 frequencies),

'The skeptics' data (computer printouts) was kindly provided on request by Professor Jean Dommanget (CP data in 1986) and by Professor Paul Kurtz (CSICOP data in 1986, CFEPP data in 1994). Analyses of CSICOP data in chronological order (three successive batches) were provided by D. Rawlins in 1993). Mars sector positions in these lists were based on the 12 sector scale with decimal precision (range 1–12.99). CSICOP's sector numbers (S12') were obtained by rounding decimal values (S12) down: S12' = Int (S12). Transformation to 36 scale precision was obtained by S36 = Int ((S12)(3)-2)).

but in subsequent publications he generally restricted analysis to 12 units (Gauquelin, 1960, see Figure 2). The Mars effect was thus defined by significant deviations from chance of birth frequencies for sectors 1 and 4 of the 12-sector scale. These were labeled "significant" or "sensitive" or "key" sectors.

After three decades of planetary research, Gauquelin, assisted by Thomas Shanks, who provided programming expertise, subjected his entire data base to computer calculation, reconsidering the problem of sector zone definition. His conclusion: "...the two significant zones of the sky...begin about 10 degrees before the rise or the upper culmination; extend through the ends of sectors 1 and 4 (in the 12 sector mapping) and even slightly beyond, then rapidly lose their prominence. Since the significant zones somewhat exceed the sector 1 and 4 boundaries, I now speak of 'enlarged key sectors' or 'plus' zones. In the 36-sector arrangement these comprise four sectors surrounding the rise (nos. 36, 1, 2 and 3) and four at the upper culmination (nos. 9, 10, 11 and 12), respectively" (Gauquelin, 1988[a], p. 38, citing Gauquelin, 1984). Mean birth frequencies for samples for which Gauquelin claimed positive planetary effects indeed show that frequencies of births begin to increase in sectors 36 (preceding the rise of the planet) and 9 (preceding its culmination) (see Figure 3).[2]

Terminological changes over several decades of dealing with planetary sectors ("sensitive," "key," "plus" etc.) are likely to cause confusion, so Mueller and Ertel have suggested "G-sectors" as a standardized label, with "G-percentage" for the percentage of subjects with a given planet in G-sectors and "G-effects" for the general presence of a significant effect involving these sectors.[3] Note that Gauquelin's "enlarged" G-sector calculation deviates from the "narrower" calculation by simply adding the frequencies for the initial sectors no. 36 (preceding the rise of the planet) and no. 9 (preceding its culmination) to the main sector frequencies (see Figure 2).

IMQ: The Indicator

At the time the Gauquelin athlete data were published (M. and F Gauquelin, 1970), Gauquelin based G% on the narrow zone, not yet considering the initial

[2]Even though Gauquelin had surmised that planetary effects for professionals might include an area just before rise and culmination as early as 1955 (See Gauquelin, 1988b), all work on planetary effects for professionals by Gauquelin was done within the "narrow" 12-sector framework until 1982 (Gauquelin's study on American data) when he used the extended mode of analysis for the first time alongside with his narrow prcedure. Gauquelin, Michel (1988b). Planetary Heredity. San Diego, CA: ACS Publications, p. 74.

[3]As the terminology became confusing, I agreed with Mueller (Mueller and Ertel, 1994) — Gauquelin died in 1991 — to refer to riselculmination zone as "G-zones" irrespective of their precise definition, the latter may be indicated by subscripts as given by the following examples:

${}_{MA}G_{12}$: sectors 1 and 4 of Mars' diurnal circle divided into 12 sector units
$f_{MA}G_{12}$: frequencies of births for Mars summed over ${}_{MA}G_{12}$ sectors
N : the sample's total
${}_{MA}G_{12}\%$: $(f_{MA}G_{12})/(N)\ (100)$
${}_{MA}G_{36}$: sectors 36, 1, 2, 3, 9, 10, 11, 12 of Mars' diurnal circle divided 36 units
$f_{MA}G_{36}$: frequencies of births for Mars summed over MAG36 sectors
N : the sample's total
${}_{MA}G_{36}\%$: $(f_{MA}G_{36})/(N)\ (100)$

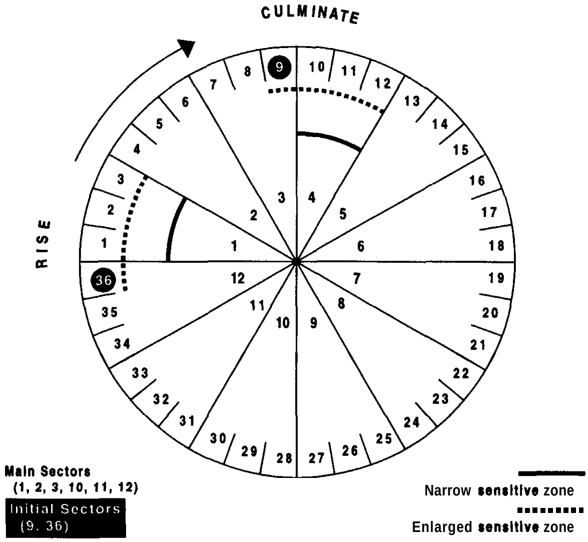

Fig. 2. Two sector divisions for the diurnal planetary circle: 12 and 36 sectors with "sensitive" zones. Note that with the 36 sector division, the sensitive zones include "initial" sectors 36 (before rise) and 9 (before culmination), which precede the "main" sectors that comprised the 12-sector division used in Gauguelin's work up until 1984.

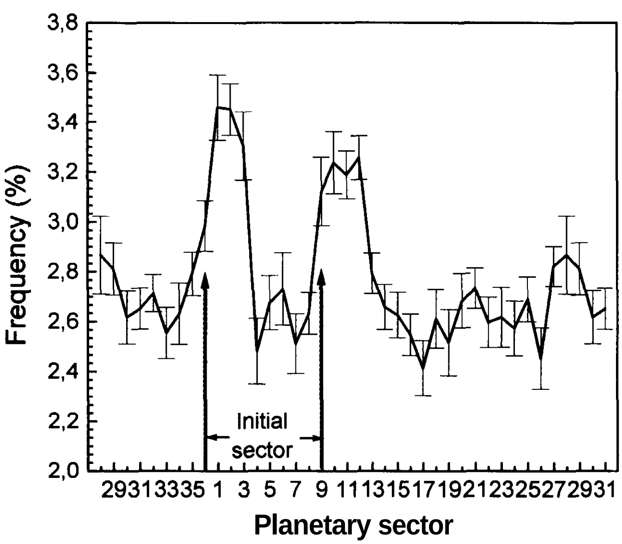

Fig. 3. Mean percent frequencies (a.m.) with standard errors (s.e.) of births across 14 professional samples for 36 planetary sectors (Gauquelin data), the samples being distinguished by significant positive planetary effects. Arrows at sectors no. 36 (preceeding rise) and no. 9 (preceeding culmination) point at regions of rising birth frequencies ("initial" sectors, see below). Samples: Actors (JU), athletes (MA), executives (MA), executives (JU), journalists (MA), military leaders (MA)(JU), musicians (VE), physicians (MA)(SA), politicians (MO)(JU), scientists (SA), writers (MO). (MO=Moon, VE=Venus, MA=Mars, JU=Jupiter, SA=Saturn). Total of percent frequencies across 36 sectors = 100%.

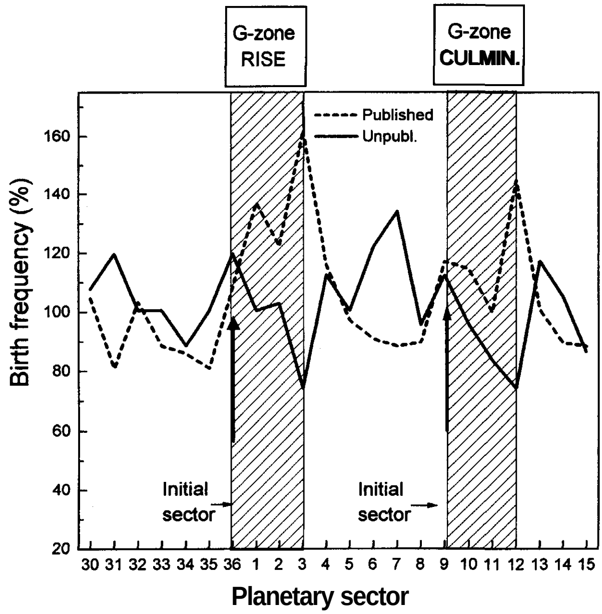

Fig. 4. Percent birth frequencies of Gauquelin's published (N=2,888) and unpublished (N=1,053) athletes across Mars sectors 30...36, 1...15. Arrows point at unbaised frequencies in the sample, for initial sectors only.

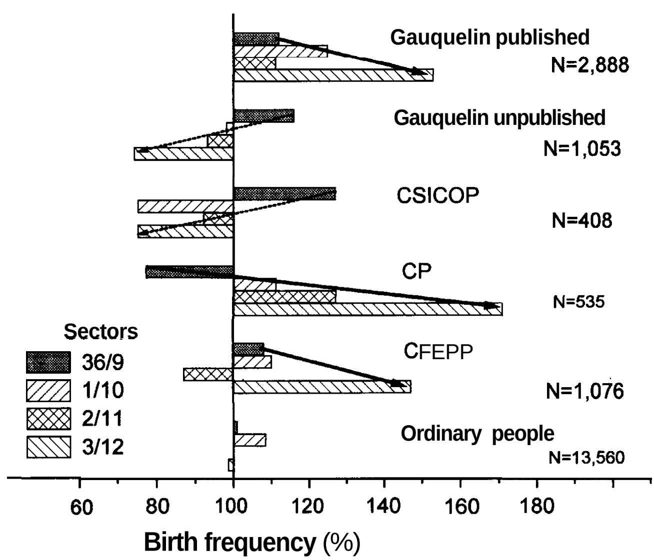

Fig. 5. Concise descriptive results of birth frequencies across initial sectors 36 and 9, and main sectos pairs 1 and 10, 2 and 11, and 3 and 12. Arrows pointing right (*e.g.* Gauquelin published) indicate either unbaised selections or baised selections with additive effect on G%. Arrows pointing left (*e.g.* Gauquelin unpublished) indicate known or suspected biased selections with subtractive effects on G%.

sectors nos. 36 and 9 of the later, enlarged definition. It is thus reasonable to assume that while Gauquelin tended to include low-eminence athletes born with Mars in main sectors in his published sample of champions, he would have treated low-eminence cases with Mars in initial sectors 36 and 9 in the same way as he treated low-eminence cases with Mars anywhere else outside the main sectors. Thus, among his unpublished athletes, initial sector cases would not be deficient.

In Figure 4, birth frequencies of Gauquelin's published and unpublished athletes are compared across sectors 30, 31...1...15. For main sectors, the difference is large, indicating biased selections, while for initial sectors there is almost no difference, as expected, indicating unbiased selections. It may be concluded that Gauquelin's wished-for cases in main sectors 1, 2, 3, 10, 11 and 12 tended to be admitted to the published sample, even when they were of lesser eminence. On the other hand, low-eminence cases with Mars in initial sectors 36 and 9, of whose numerical contribution to the Mars effect Gauquelin was still unaware, slipped into the unpublished sample as easily as ordinary non-G sector cases.

Initial and main sector results for Gauquelin's two samples are summarized by Figure 5, in the first two sections at the top. Each bar represents percent deviation from expectancy for either initial (solid) or main sectors (dashed). An arrow pointing to the right, as with Gauquelin's published athletes, indicates that birth frequencies rise from initial to main sectors, which is the direction of change for unbiased athletes samples. An arrow pointing to the left, as with Gauquelin's unpublished athletes, shows that birth frequencies drop from initial to main sectors, indicating a bias effect (*i.e.,* main sector cases have been subtracted while initial sector cases have been kept in the sample).

Figure 5 also shows the three skeptics' samples underneath the Gauquelin results. Interestingly, the CSICOP results strongly resemble the result for Gauquelin's unpublished athletes (arrow pointing to the left). The CP's and the CFEPP's samples, on the other hand, do not show the Gauquelin pattern.[4]

The Gauquelin and CSICOP cases therefore deserve more scrutiny. As a quantitative indicator for possibly biased selections, the "initial vs. main sector quotient," or IMQ, is suggested: It is the ratio between the mean frequency for the initial sectors 36 and 9 (signified by IL) and the mean frequency for the main sectors 1, 2, 3 and 10, 11, 12 (denoted collectively by ML). Thus, IMQ = IL/ML. The IMQ under ordinary positive Mars effect conditions, observed in unbiased data, should be near unity, though generally somewhat less, since birth frequencies for initial sector positions do not attain the average frequency level of main sector positions — the effect is only beginning at that point, and has not yet reached the peak attained in the main sectors.

How is the IMQ affected by biased selection of data? Gauquelin's published and unpublished athlete samples serve as examples. If Gauquelin had used nothing but achievement criteria to divide his total sample into eminent (to be analyzed and published) and less eminent groups (not to be analyzed and not to be

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[4]CP's low initial sector frequency is most probably due to chance, as this deviation can hardly result from any biased selections (see also Discussion).

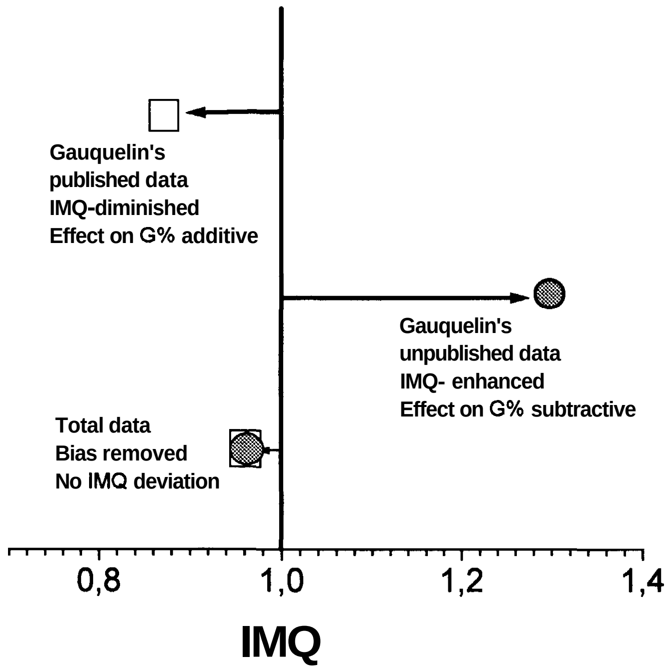

Fig. 6. Initial/main sectors qotient (IMQ) for Gauquelin's published/unpublished, and total samples.

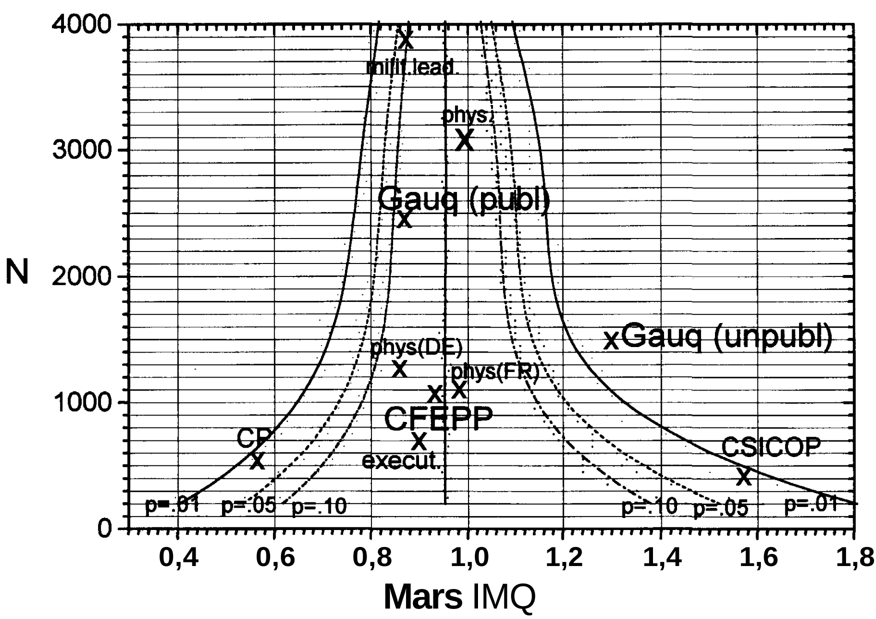

Fig. 7. Mean (=0.95) and confidence limits of IMQ (horizontal axis) for samples of varying size (vertical axis). Various empirical IMQs plotted.

published), the IMQs for the two subsamples would hardly differ. Apparently, however, his awareness of Mars sector positions influenced his decision to include certain low-rank athletes in the eminent (published) subsample and thus to exclude them from the less eminent (unpublished) subsample. In both cases the ratio IMQ is affected; it is raised for the sample from which he removed cases, and lowered for the sample to which he added cases. This is shown clearly in Figure 6, in which the IMQ for the latter sample (published data, G-cases added) is 0.83, while the IMQ for the former sample (unpublished data, G-cases removed) is noticeably high, at 1.31. When the two samples are combined, erasing any effect of shifting data from one to the other, the IMQ is 0.95 and no longer conspicuous.

Figure 5 above has shown that the anomalous pattern of the initial and main sectors for the CSICOP data resembles that of the Gauquelin unpublished subsample. The IMQ for the American skeptics' data, is 1.58 which is close to Gauquelin's IMQ of 1.31. Is CSICOP's anomalous IMQ explainable correspondingly? Have cases been eliminated before the data had been submitted to official calculation? This would imply that prior knowledge of Mars sector positions had been obtained. Alternatively, the effect might be explainable by random fluctuations. The question arises which is the more likely explanation, the underlying error probabilities are thus called for.

3. IMQ: Significance Tests

Which variation of IMQ, as shown in Figures 5 and 6, is due to mere chance and which not? A randomization test for the IMQ was devised using control samples drawn from Gauquelin's ordinary people (N = 13,650), which is lacking planetary effects and is therefore suitable for comparison. The test provides estimates of significance (confidence limits) of Mars IMQs for all possible sample sizes between 200 and 4000 cases, at intervals of 50 cases (see Figure 7). For each sample size N = 200, 250, 300...4000, one thousand samples were drawn at random from these ordinary people, and IMQs were determined in each case. Thus for each N, 1000 IMQs were obtained and they were rank-ordered upwards. Ranks 100 and 900 yield confidence limit $p = 0.10$, ranks 50 and 950 yield $p = 0.05$, ranks 10 and 990 determine $p = 0.01$. Figure 7 shows, as it should, that the distance of confidence lines from the mean (see the vertical line at IMQ = 0.95) decreases with increasing sample size.

As an example of how the probabilities apply, we determine the IMQ for Gauquelin's unpublished sample (N = 1,503 athletes, IMQ = 1.31). Is it larger than what might be expected by chance. We locate the intersection of 1.31 (vertical) and N = 1,503 (horizontal) and find that it lies beyond the confidence line $p = 0.01$; thus IMQ for Gauquelin's unpublished athletes is $p < 0.01$.[5] The IMQ for Gauquelin's published sample is within confidence limits, and the same is true for the IMQ of the CFEPP sample. Only CSCOP's IMQ is significantly

[5]See Appendix.

greater than expected from randomized controls ($p = 0.02$). It is also noted that CP's IMQ deviates from chance expectation ($p = 0.01$), though in a direction opposite to CSICOP's, which will be discussed below.

Next, the IMQs of three additional professions were checked for which Gauquelin claimed positive Mars effects (executives, $N = 673$; military leaders, $N = 3,924$; and physicians, $N = 3,288$). For them, the Mars IMQs as plotted in Figure 7 fall within the range of what might be expected by chance. Thus Gauquelin's published executives, military leaders and physicians are apparently not affected by selection bias in any significant way.[6] Two samples collected by Mueller, German physicians ($N = 1,286$, Mueller, 1986) and French physicians (N = 1,083, Mueller and Ertel, 1994) were also subjected to this test: IMQs for these samples are not conspicuous either.

4. IMQs and Mars G-Effects Compared

As a side-step improving an understanding of IMQ it was examined whether the IMQ and G% are correlated, which, given the indications of Figures 5 and 6, they should be. First the data for ordinary people were examined. Since such data lack planetary effects, and thus any special emphasis on either main or initial sectors, Mars G% and IMQs for ordinary people would be expected to vary randomly and independently. Birth frequencies for, say, sectors 35 and 8 or 1 and 10 are expected to vary across samples of ordinary people no less, and no less randomly, than sectors 36 and 9.

From Gauquelin's large database samples of 800 ordinary persons were randomly drawn, 300 times. For each sample we noted G% and the corresponding IMQ, the results are plotted in Figure 8a. As expected, for ordinary people IMQs vary independently from G%, with Pearson's $r = -.04$.

By contrast, in samples displaying planetary effects, the IMQs and G% values should correlate significantly. In the case of positive effects, birth frequencies begin to rise in sectors 36 and 9 and they continue rising up to the level of the main G-sectors. The IMQ is therefore expected to be <1 in this case, representing the upward slope of frequencies within the G-zone. The greater the effect (that is, the G%), the steeper the slope, and the smaller the IMQ.[7] In the case of negative effects, birth frequencies begin to drop in sectors 36 to 9 and they continue to drop down to the level of the main G-sectors. Here IMQ is thus expected to be >1, representing the downward slopes. The correlation between the Mars IMQs and G% for Gauquelin's, the skeptics', and Mueller's professional samples displaying positive and negative Mars effects is shown by Figure 8b, based on Table 2, Appendix. As can be seen, IMQs and G% for these data sets are highly correlated ($r = -0.77$). For CSICOP's data and Gauquelin's unpublished athletes, G%

[6] The most plausible reason for Gauquelin's anomalous IMQs, particularly with athletes, seems to be his defending the Mars effect against skeptic attacks that focused on athletes only.

[7] With negative planetary effects, the direction of the relationship reverses, with birth frequencies dropping in sectors 36 and 9 toward the level of the main G-sectors. IMQ in this case is expected to be > 1 and to increase with increasing planetary effects (G%).

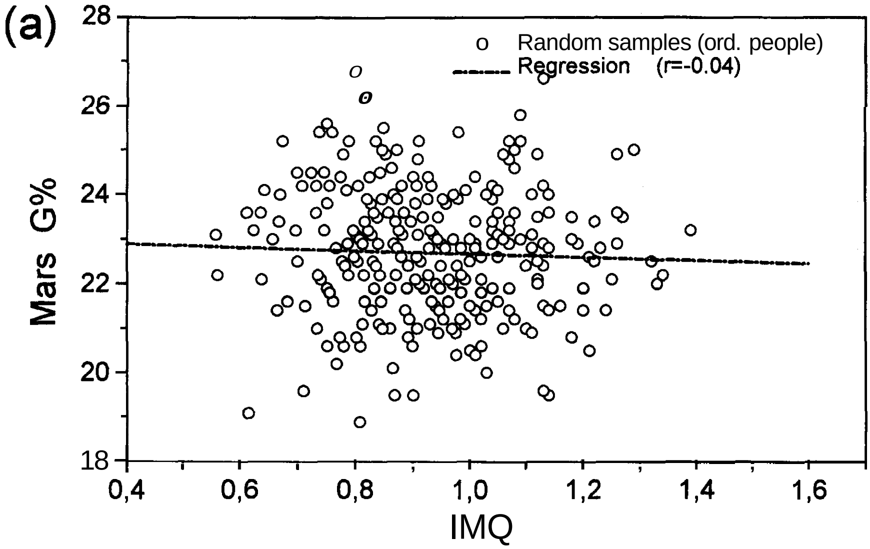

Fig. 8a. IMQ and G% for ordinary people, based on 300 samples N = 800 people drawn randomly from a large database (N = 13,650).

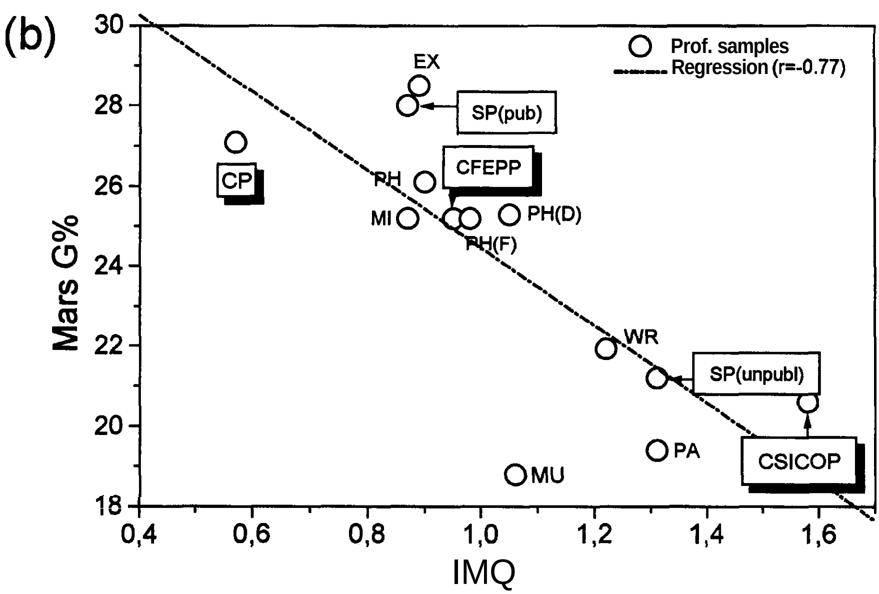

Fig. 8b. IMQ and G% for athletes and additional Mars-effect samples, based on Table 2 (Appendix).

is much lower than for other samples, and the IMQs are therefore inflated even above the level of samples with unbiased negative Mars effects (musicians, writers, painters). As already noted, the CP's G% appears larger than other samples with positive Mars effect. But its IMQ is negatively inflated, opposite in direction from the CSICOP or Gauquelin's unpublished samples.

5. Discussion

The negative outlier IMQ of the Belgian skeptics (CP) is somewhat puzzling. Even though the CP has steadfastly defended the integrity of its sample and its freedom from any possible taint due to Gauquelin's participation[8] Ertel (1995) had discovered what appeared to be a pro-Gauquelin selection bias in the CP data (admitting low-eminent G-sector cases).

In fact it had been noted earlier (Ertel (1988) that Gauquelin had assisted this group in collecting birth data as the author found documents for N = 73 cases excluded from the CP sample in Gauquelin's files in Paris (CP's office is in Brussels). But the known Gauquelin-bias (admitting low eminent G-sector cases), unquestionably in operation with CP's sample, could merely raise its main G-sector level. The initial G-sector level should remain untouched; biased selections of the Gauquelin-type could not depress it (see Figure 5 for comparison of CP with other samples). Likewise, even if Gauquelin had excluded non-G sector cases from analysis irrespective of eminence criteria — which would imply fraud — only main G-sector frequencies would have been affected. It is not immediately clear why such handling of G-sector and/or non-G sector cases might ever cause an initial sector level to move out of the range of normal variation.

CP's lack of initial sector frequences might possibly be explained as follows: Gauquelin, at his speedily screening Mars sectors of CP athletes', might have separated near-hits (missing the G-zone by one sector) from the rest (clear hits and misses). He might have done this in order to look up near-hit cases more carefully later hoping to find among them additional hits. Eventually he might have joined the subsamples thereby excluding athletes of lesser eminence. At this moment his reluctance to exclude cases with Mars in G-zones would have become effective. At his joining of the subsamples, however, while forming a subsample of exclusions, the subsample of near-hits — small anyway — might have escaped him, inadvertantly he might have taken it as part of what he was going to exclude.

[8]Prof. Dommanget replied (15 March 1993) to Ertel's question concerning Gauquelin's possible influence on the Committee's data: "I consider it very difficult to fake a material like the one of 535 sports champions in such a way that this could not be seen. This material has been 'peeled' by us in different ways when trying to understand the problem and we never observed any indices permitting any suspicion of falsification. Moreover, all decisions about the material have been taken in common.... Of course, I may be wrong...."

Is there any evidence for this conjecture? If Gauquelin had really behaved that way we would have to expect that birth frequencies are not only rare for initial sectors 36 and 9 (preceding sector numbers 1, 2, 3 and 10, 11, 12), but also for G-zone-succeeding sectors 4 and 13. Our prediction is testable. A quotient can be formed analogous to IMQ, let us call it SMQ, representing the level of G-zone-Succeeding sectors: (s4+s13)/(s1+s2+s3+s10+s11+s12)/6. In fact, for the CP sample SMQ is conspicuously low (0.71), much lower than for the athlete samples which did not suffer from IMQ-deflections: CFEPP (0.92), GAUQ-publ.+unpubl.(0.95), lower than for the unbiased Mueller samples (PH–German: 0.87, PH–French: 0.96) and lower than for the ordinary people's SMQ (1.05). All Mars SMQ values obtained from 15 available files exceed CP's low level except the executives' SMQ (sample size N = 673) which is almost at the CP's level. Admittedly, the present guesswork is somewhat daring, but the available evidence suggests that CP's IMQ anomaly is not necessarily incomprehensible.

The IMQ for the study by the French skeptics (CFEPP) was not conspicuous, thus giving no indication of a suppression of G-sector cases. This is not to say that their sample was not biased, however, since an appreciable bent towards low-eminence admissions has distorted it (Ertel, 1995). Nevertheless, even under such unfavorable conditions, when the 36-sector division was used, a Mars effect became manifest. The present results also indicate a positive Mars effect (see Figure 5), as the deviations of the CFEPP's G-sector frequencies from chance expectancy resemble the G-sector frequencies obtained from Gauquelin's published athletes (displaying the Mars effect), they do not resemble those obtained from ordinary people (not displaying the Mars effect), see bottom graph in Figure 5.

The IMQ for the U.S. skeptics (CSICOP) appears anomalous. It deviates from expectancy in a way as was found with Gauquelin's problem data. The pattern of their initial and main G-sectors, as shown in Figure 5, fits the pattern of Gauquelin's unpublished athletes, and their IMQ of 1.58 is equally significant. Regarding Gauquelin's IMQ, there is no doubt that it indicates selection bias, considering Ertel's (1988) independent evidence. Selection bias of a similar nature should thus be considered as a possible explanation for CSICOP's IMQ. Is independent evidence here also available?[9]

In fact it is. Additional support for an understanding of the CSICOP's anomaly in terms of bias is obtained in view of an observation connected with CSICOP's collecting the data in three successive canvasses, with sector calculations run for each batch before the next was gathered. This procedure was criticized for possible feedback effects in the commentaries that followed publication of the study (*e.g.* Rawlins, 1981; Curry, 1982), and statistical evidence for such effects has now been established. Figure 9a shows that in the CSICOP study the eminence criteria appear to have been lowered from one batch to the next. This judgment is backed by independent evidence from citation counts, as G-percentages for successive batches declined in lock step with eminence levels (see Ertel, 1995, Figure 9b) (a scrutiny of this effect has been provided by Ertel, 1995).

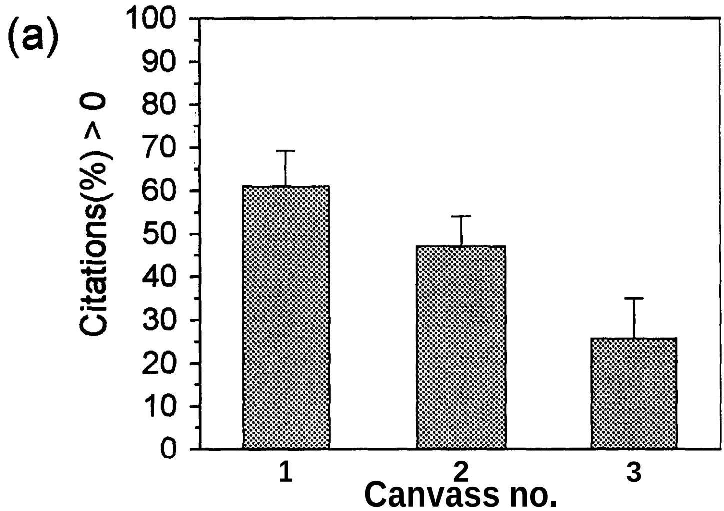

Fig. 9a. Declining eminence levels for CSICOP's three successive canvasses.

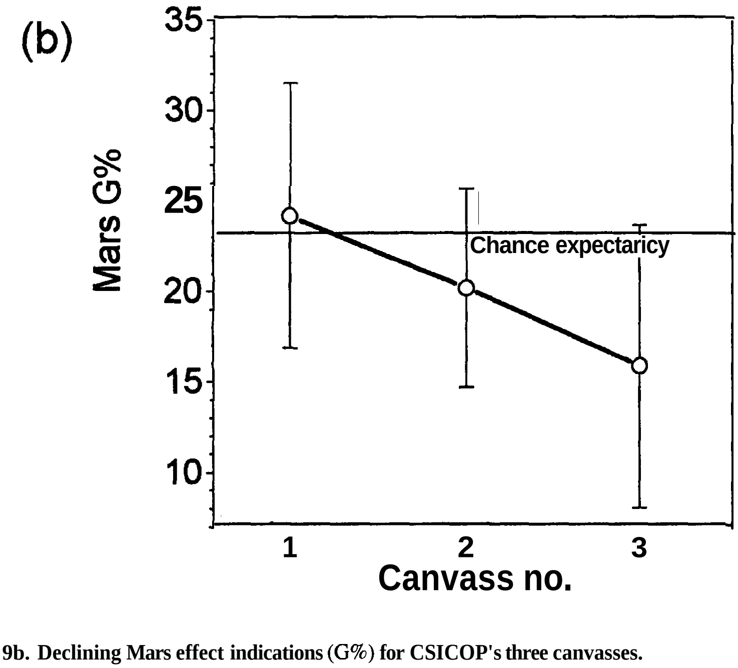

Fig. 9b. Declining Mars effect indications (G%) for CSICOP's three canvasses.

Thus, the evidence, obtained by both, eyewitness of former reseachers and present statistical analysis, betrays an increasing eminence loss across batches. If CSICOP's IMQ is truly indicative of biased selections one would expect that their IMQ should rise correspondingly from one canvass to the next. The data are consequent with this expectation (see Table 3, Appendix), as the IMQ rises sharply across batches. That is, the level of the main sectors drops, while the level of the initial sectors remains constant. Looking at the error probabilities illustrated in Figure 7, we find the IMQs for the first canvass to be within normal range, while the IMQs for the second and third canvasses combined (N = 280), at 1.52, deviate at the 0.05 level.[10]

The above argument implies that the two types of bias, G-sector avoidance and low-eminence admission, must be properly distinguished. Only G-sector avoidance affects the IMQ, due to the discrepancy between the untouched initial sector frequencies and the altered main sector frequencies. By contrast, low-eminence admission by itself will not affect the IMQ, since admitting less eminent athletes lowers frequencies in both the extended and narrow sectors equally — that is to say, the effect is fairly distributed across all 8 sectors involved. Unquestionably, as was shown in Ertel, 1995, CSICOP's sample has been affected by a low-eminence bias, as shown in Figure 9a and 9b. The evidence of our present study suggests that their sample might suffer in addition from effects by G-sector avoidance.

But is the evidence compelling? Combining the significance levels of our two independent indicators, IMQ (p = 0.02), and its rise over three successive can-

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[9]Rawlins (1979) explicitly addressed questions about the CSICOP sample, saying that "I vainly urged that the rest of CSICOP also stay out of sampling, as a matter of policy. However, since some have expressed suspicions regarding the fairness in this instance, I am bound to state that 1 (more than anyone) can vouch for the fact that Kurtz's selection was unbiased. To fudge the sample, one must correctly precompute celestial position, but Kurtz, Zelen, and Abell never did accomplish this before the samples were finally turned over to me and the solutions given to them." However, as the above-mentioned researchers themselves point out (Kurtz, Zelen, Abell, 1979), the Gauquelin sections are "similar to the 'Placidean' houses" which means they are easily approximated with standard horoscopes widely available from computer calculation services for a nominal fee. This is only to point out that the potential problems denied by Rawlins and alleged by others are within the realm of possibility, not to state that they are fact. As for "neutral researchers" Frank Dolce and Germaine Harnden, who were said to have made the "actual selection" of the data in order to "avoid any bias by Kurtz, Zelen, and Abell" (Kurtz, Zelen, Abell, 1979), despite this statement, their role in the experiment is decidedly unclear, particularly with respect to who controlled the process of monitoring the responses to requests for birth data from various states and forwarding it to Rawlins. No account which details either of these two crucial steps mentions either Harnden or Dolce as having been involved in them. See Curry (1962) and Rawlins (1981).

[10]Though only Dennis Rawlins, member of the CSICOP research team, apparently had the expertise to do the astronomical computer calculations and he, by his own choice, had no part in the sampling process, this does not exclude the possibility that researchers in charge of data selection obtained Mars sector positions independently. Since the Gauquelin "sectors are roughly equivalent to the 9th and 12th houses of a standard horoscope using Placidus houses (Jerome, 1975), any birth for which the horoscope shows Mars in one of these houses will likely have Mars in a key sector. No expertise is required to obtain such horoscopes. As one example, widely-advertised computer calculation services have offered batch calculations of such horoscopes for nominal sums since the early 1970s, and all that is required to use them is the raw data. Discussion of the relation of Placidus houses to Gauquelin sectors is found at several points in the extensive literature on CSICOP and the Mars effect, so knowledge of the relation between the two was available to all principals.

vasses ($p = 0.05$), yields p = 0.01. For ordinary research, effects associated with this level of error probability are conventionally considered as "very significant." However, in the present case we expressly abstain from any firm interpretation of this finding. After all, an error probability of p = .01 does not exclude error. Even though G-sector avoidance would fit as just another aspect of the conspicious drop of G-sector frequencies from one batch to the next the anomalous IMQ might be fortuitous.

Only one conclusion appears unavoidable: CSICOP's alleged negative evidence for a Mars effect must henceforth be disregarded unless the CSICOP would prove that a chance interpretation of the present IMQ-finding has in fact no alternative. For example, the CSICOP might invite critical non-CSICOP researchers to check their original lists of data and their correspondence with birth registry offices. This would be in keeping with the open files policy followed by Gauquelin, and also consequent with the CSICOP's own generously providing their data in the past to critical researchers. Alternative ways of proving the integrity of CSICOP's data are hardly conceivable, but if convincing, might certainly be accepted.

Disclosures of retarding episodes obtained by probes into past research are less urgent than is the advancement of our understanding of the planetary effects in future perspective. If nothing else, the IMQ has added another element to the evidence of Gauquelin's findings, a seemingly small one, but powerful enough to reveal at one blow the discoverer's personal weakness as well as the strength of his discovery.

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Appendix: Further Explanation of IMQ

Gauquelin's published sample of (N = 2,888) is biased by individual selections favoring a Mars effect, since cases born with Mars in main G-sectors tended to be included. We therefore expect an IMQ smaller than chance level. The effect for the published sample, however, should be numerically smaller than that for the unpublished sample, considering the greater size of the published compared to the unpublished sample. The logic will become clear through the examples in Table 1.

An athletes' sample may have, say, 720 cases, 20 cases in each of 36 Mars sectors. So 20 cases are assumed to be born with Mars in each of 8 G-sectors (for sector numbers, see first row). We may divide the total equally into two subsamples (PUB and U–PUB) in such a way that each subsamples has 10 cases in each G-sector (second row). IMQs for PUB or U–PUB are therefore (10)/)10+10+10)/3 = 1.0 (see last column). We now simulate biased selections such that each main G-sector of the U–PUB sample obtains 8 instead of 10 cases (third row, IMQ = 1.25). In this instance the published counterpart sample PUB(1) gets 12 G-sector cases instead of 10 (fourth row, IMQ = 0.83).

Suppose the original sample has 30 cases with Mars in each G-sector and our dividing the total allocates 10 cases to U–PUB and 20 cases to PUB. In that case, biased allocation to U–PUB as shown in the third row would give rise to

TABLE 1
Effects on IMQs by Biased Sampling for Fictive Samples

	I	M	M	M	I	M	M	M	
I sectors	36	1	2	3	9	10	11	12	IMQ
2 PUB & U_PUB	10	10	10	10	10	10	10	10	1.0
3 U_PUB	10	8	8	8	10	8	8	8	1.25
4 PUB (1)	10	12	12	12	12	12	12	12	0.83
5 PUB (2)	20	22	22	22	20	20	20	20	0.91

I: initial G-sector
M: main G-sector

TABLE 2
Mars G-Sector Percentages

	Profession	Source	N	p/n	G%	IMQ
CFEPP	Athletes, French	CFEPP	1076	pos	25.2	0.95
CP	Athletes, Belg./Fr.	CP	535	pos	27.1	0.57
CSICOP	Athletes, U.S.A.	CSICOP	408	–	20.6	1.58
EX	Executives	Gauq.	673	pos	28.5	0.89
MI	Milit. Leaders	Gauq.	3924	pos	25.2	0.87
MU	Musicians	Gauq.	977	neg	18.8	1.06
SP (Pub)	Athletes, Publ.	Gauq.	2888	pos	28.0	0.87
SP (Upub)	Ahtletes, Unpubl.	Gauq.	1503	–	21.2	1.31
PA	Painters	Gauq.	1662	neg	19.4	1.31
PH	Physicians	Gauq.	3288	pos	26.1	0.90
PH(D)	Physicians, German	Muel.	1286	pos	25.3	1.05
PH(F)	Physicians, French	Muel.	1083	pos	25.2	0.98
WR	Writers	Gauq.	1699	neg	21.9	1.22

(G%) direction of Mars effect, (pos/neg), and initial/main sector quotient (IMQ) for athletes and additional samples.

TABLE 3
IMQs for CSICOP's Three Canvasses Separately and Total (cd. Figs. 9a & 9b)

Canvass:	1st	2nd	3rd	Total
N	128	198	82	408
f(I)	6	16	7	29
f(M)	25	24	6	55
IMQ	0.72	2.00	3.50	1.58

f(I) frequencies of births for initial sectors 36, 9 f(M) frequencies of births for main sectors 1, 2, 3, 10, 11, 12. Example for IMQ calculation, 2nd canvass: (16/2)/(24/6)= 2.00.

biased allocations for PUB(2) is 0.91, and the distortion of IMQ for PUB (2) is thus numerically smaller than IMQ for PUB (1).

Gauquelin's published sample is almost twice as large as Gauquelin's unpublished sample, so its IMQ (= 0.87) deviates less from expectation (which is < 1 anyway) than the IMQ of the unpublished sample, IMQ = 0.87 is, for that reason, not significant, as Figure 7 shows.

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