The time-course of biological phenomena – illustrated with the London Marathon

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**Supplementary Material 3 – Summary Statistics**

**Table S1. Summary statistics for all runners completing the London Marathon on 24th April 2016, presented for all competitors, and also separated by gender and age categories.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Category | N | R2 | *r* (s.e.) | *c* (s.e.) | *t* (s.e.) | Mode | Median | Mean | S.D. | Skew | Kurtosis | Entropy |
| Men and Women | All | 38988 | 0.998 | 0.380  (<0.001) | 1.600  (0.001) | 4.640  (0.001) | 4.307 | 4.353 | 4.494 | 1.353 | 2.335 | 13.836 | 2.210 |
| Men | All | 23940 | 0.998 | 0.399  (<0.001) | 1.724  (0.002) | 4.389  (0.002) | 4.083 | 4.124 | 4.254 | 1.260 | 2.358 | 14.116 | 2.104 |
| Women | All | 15048 | 0.998 | 0.362  (0.001) | 1.634  (0.002) | 5.029  (0.002) | 4.678 | 4.722 | 4.871 | 1.384 | 2.548 | 15.731 | 2.209 |
| Men | 18-39 | 12034 | 0.999 | 0.416  (0.001) | 1.686  (0.002) | 4.449  (0.002) | 4.112 | 4.136 | 4.235 | 1.191 | 2.081 | 12.716 | 2.071 |
| Men | 40-49 | 7577 | 0.996 | 0.398  (0.001) | 1.765  (0.005) | 4.264  (0.004) | 3.979 | 4.028 | 4.170 | 1.271 | 2.450 | 14.478 | 2.098 |
| Men | 50-59 | 3409 | 0.996 | 0.377  (0.001) | 1.816  (0.007) | 4.383  (0.005) | 4.112 | 4.173 | 4.347 | 1.348 | 2.721 | 16.100 | 2.125 |
| Men | 60-69 | 765 | 0.994 | 0.338  (0.003) | 1.890  (0.019) | 4.642  (0.011) | 4.392 | 4.480 | 4.729 | 1.541 | 3.126 | 18.297 | 2.200 |
| Men | 70+ | 155 | 0.994 | 0.323  (0.007) | 1.470  (0.034) | 5.393  (0.036) | 5.027 | 5.099 | 5.305 | 1.637 | 2.675 | 15.845 | 2.416 |
| Women | 18-39 | 8867 | 0.998 | 0.367  (0.001) | 1.607  (0.003) | 5.078  (0.003) | 4.711 | 4.747 | 4.882 | 1.359 | 2.434 | 15.143 | 2.205 |
| Women | 40-49 | 4247 | 0.997 | 0.366  (0.001) | 1.690  (0.005) | 4.940  (0.004) | 4.603 | 4.647 | 4.796 | 1.358 | 2.606 | 16.150 | 2.171 |
| Women | 50-59 | 1599 | 0.994 | 0.344  (0.003) | 1.643  (0.012) | 4.998  (0.011) | 4.675 | 4.740 | 4.931 | 1.496 | 2.761 | 16.564 | 2.269 |
| Women | 60-69 | 289 | 0.991 | 0.317  (0.006) | 1.727  (0.036) | 5.094  (0.026) | 4.807 | 4.898 | 5.161 | 1.660 | 3.110 | 18.313 | 2.316 |
| Women | 70+ | 46 | 0.972 | 0.310  (0.034) | 1.514  (0.142) | 5.847  (0.159) | 5.461 | 5.525 | 5.734 | 1.651 | 2.884 | 17.881 | 2.393 |

N = sample size, the number of runners in each category. R2 = 1 - (Residual sum of squares)/(Corrected sum of squares)

**Table S2. Summary statistics for runners completing the London Marathon in April each year, between 2001 and 2011, separated by gender.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Gender | Year | N | *r* (s.e.) | *c* (s.e.) | *t* (s.e.) | Mode | Median | Mean | SD | Skew | Kurtosis | Entropy |
| Men | 2001 | 2559  (23259) | 0.421  (0.002) | 1.777  (0.006) | 4.601  (0.005) | 4.255 | 4.268 | 4.353 | 1.127 | 2.117 | 13.618 | 1.989 |
| 2002 | 2667  (24768) | 0.447  (0.002) | 1.875  (0.006) | 4.526  (0.005) | 4.178 | 4.177 | 4.239 | 1.020 | 1.934 | 12.966 | 1.873 |
| 2003 | 2593  (23893) | 0.423  (0.002) | 1.731  (0.005) | 4.659  (0.005) | 4.276 | 4.271 | 4.327 | 1.060 | 1.717 | 11.360 | 1.955 |
| 2004 | 2549  (23251) | 0.423  (0.001) | 1.875  (0.006) | 4.509  (0.004) | 4.185 | 4.201 | 4.292 | 1.104 | 2.272 | 14.727 | 1.937 |
| 2005 | 2690  (24690) | 0.422  (0.001) | 1.747  (0.005) | 4.657  (0.004) | 4.299 | 4.308 | 4.388 | 1.125 | 2.038 | 13.159 | 1.999 |
| 2006 | 2449  (22849) | 0.422  (0.001) | 1.888  (0.006) | 4.482  (0.004) | 4.164 | 4.182 | 4.276 | 1.108 | 2.313 | 14.942 | 1.935 |
| 2007 | 2611  (24815) | 0.424  (0.002) | 1.556  (0.005) | 4.906  (0.006) | 4.480 | 4.475 | 4.535 | 1.157 | 1.613 | 10.387 | 2.094 |
| 2008 | 2574  (23574) | 0.422  (0.001) | 1.867  (0.006) | 4.512  (0.004) | 4.188 | 4.204 | 4.296 | 1.109 | 2.272 | 14.692 | 1.944 |
| 2009 | 2628  (24228) | 0.423  (0.002) | 1.725  (0.005) | 4.693  (0.005) | 4.326 | 4.333 | 4.409 | 1.124 | 1.977 | 12.792 | 2.006 |
| 2010 | 24468 | 0.400  (<0.001) | 1.790  (0.002) | 4.596  (0.001) | 4.274 | 4.303 | 4.419 | 1.209 | 2.412 | 15.143 | 2.042 |
| 2011 | 22453 | 0.407  (<0.001) | 1.624  (0.001) | 4.752  (0.001) | 4.378 | 4.394 | 4.485 | 1.210 | 2.011 | 12.578 | 2.106 |
| Women | 2001 | 807  (6807) | 0.392  (0.003) | 1.617  (0.009) | 5.28  (0.009) | 4.861 | 4.866 | 4.948 | 1.213 | 2.056 | 13.657 | 2.106 |
| 2002 | 968  (7768) | 0.438  (0.003) | 1.865  (0.009) | 5.087  (0.007) | 4.687 | 4.670 | 4.714 | 0.994 | 1.828 | 13.339 | 1.850 |
| 2003 | 1074  (8274) | 0.395  (0.002) | 1.720  (0.009) | 5.185  (0.007) | 4.793 | 4.800 | 4.886 | 1.177 | 2.223 | 14.968 | 2.040 |
| 2004 | 1094  (8394) | 0.396  (0.002) | 1.801  (0.008) | 5.063  (0.006) | 4.697 | 4.709 | 4.802 | 1.164 | 2.382 | 16.040 | 2.000 |
| 2005 | 1268  (10568) | 0.391  (0.002) | 1.678  (0.008) | 5.198  (0.007) | 4.802 | 4.811 | 4.901 | 1.206 | 2.204 | 14.649 | 2.077 |
| 2006 | 1143  (10075) | 0.401  (0.002) | 1.741  (0.008) | 5.076  (0.007) | 4.693 | 4.700 | 4.784 | 1.159 | 2.201 | 14.767 | 2.020 |
| 2007 | 1252  (10852) | 0.400  (0.002) | 1.539  (0.006) | 5.451  (0.008) | 4.986 | 4.976 | 5.037 | 1.194 | 1.737 | 11.752 | 2.124 |
| 2008 | 1237  (10638) | 0.379  (0.002) | 1.909  (0.011) | 5.019  (0.007) | 4.691 | 4.719 | 4.845 | 1.220 | 2.801 | 18.656 | 1.994 |
| 2009 | 1238  (11038) | 0.385  (0.002) | 1.713  (0.007) | 5.166  (0.007) | 4.786 | 4.802 | 4.904 | 1.225 | 2.362 | 15.613 | 2.075 |
| 2010 | 12136 | 0.361  (0.001) | 1.771  (0.002) | 5.115  (0.002) | 4.778 | 4.817 | 4.967 | 1.338 | 2.782 | 17.837 | 2.121 |
| 2011 | 12257 | 0.358  (0.001) | 1.686  (0.002) | 5.229  (0.002) | 4.870 | 4.908 | 5.053 | 1.362 | 2.664 | 17.005 | 2.170 |

Sample size employed in each model fit (out of total number of runners finishing the race in parenthesis). The proportion of variance accounted for by each model fit was ≥ 0.998.

**Table S3. Correlation coefficients (and their associated significance probability in parentheses) for the relationship between each model parameter or statistical moment and maximum temperature (°C) on the date of each event of the London Marathon for the period 2001-2011.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *r* | *c* | *t* | Mode | Median | Mean | SD | Skewness | Kurtosis | Entropy |
| Men | -0.313  (0.348) | **-0.914**  (<0.001) | **0.907**  (<0.001) | **0.898**  (<0.001) | **0.882**  (<0.001) | **0.829**  (0.002) | 0.438  (0.178) | **-0.6823**  (0.021) | **-0.771**  (0.005) | **0.767**  (0.006) |
| Women | -0.295  (0.379) | **-0.667**  (0.025) | **0.717**  (0.013) | **0.767**  (0.006) | **0.773**  (0.005) | **0.721**  (0.012) | 0.402  (0.221) | -0.155  (0.649) | -0.265  (0.431) | **0.614**  (0.044) |

Significant figures (P<0.05) are highlighted in bold