## Table S1

| **Component** | **Term** | **Estimate** | **Std Error** | **t-value** | **p-value** |
| --- | --- | --- | --- | --- | --- |
| A. parametric coefficients | (Intercept) | -0.744 | 0.025 | -29.270 | \*\*\* |
| TypeEcology & Behavior | -1.717 | 0.052 | -32.740 | \*\*\* |
| TypeGeography | -1.248 | 0.087 | -14.292 | \*\*\* |
| TypePeople | -1.227 | 0.062 | -19.851 | \*\*\* |
| TypeModern & Past Culture | -3.663 | 0.148 | -24.715 | \*\*\* |
| TypeOthers | -2.529 | 0.112 | -22.618 | \*\*\* |
| **Component** | **Term** | **edf** | **Ref. df** | **F-value** | **p-value** |
| B. smooth terms | s(Year) | 5.342 | 6.218 | 2.948 | \*\* |
| s(Year):TypeMorphology | 1.813 | 2.035 | 0.494 |  |
| s(Year):TypeEcology & Behavior | 6.590 | 7.580 | 5.621 | \*\*\* |
| s(Year):TypeGeography | 8.318 | 8.766 | 9.339 | \*\*\* |
| s(Year):TypePeople | 5.116 | 6.053 | 6.916 | \*\*\* |
| s(Year):TypeModern & Past Culture | 2.825 | 3.520 | 7.446 | \*\*\* |
| s(Year):TypeOthers | 7.498 | 7.882 | 8.826 | \*\*\* |
| Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1 | | | | | |
|  | | | | | |
| Adjusted R-squared: 0.942, Deviance explained 0.932 | | | | | |
| GCV : 1.956, Scale est: 2.036, N: 1386 | | | | | |

## Table S2

| **Component** | **Term** | **Estimate** | **Std Error** | **t-value** | **p-value** |
| --- | --- | --- | --- | --- | --- |
| A. parametric coefficients | (Intercept) | -0.919 | 0.037 | -25.102 | \*\*\* |
| ContinentAfrica | 0.161 | 0.056 | 2.874 | \*\* |
| ContinentAmericas | 0.070 | 0.044 | 1.614 |  |
| ContinentAsia | 0.159 | 0.047 | 3.385 | \*\*\* |
| ContinentOceania | 0.164 | 0.076 | 2.176 | \* |
| TypeEcology & Behavior | -1.233 | 0.069 | -17.750 | \*\*\* |
| TypeGeography | -1.064 | 0.091 | -11.741 | \*\*\* |
| TypePeople | -0.848 | 0.074 | -11.538 | \*\*\* |
| TypeModern & Past Culture | -3.077 | 0.166 | -18.520 | \*\*\* |
| TypeOthers | -2.450 | 0.114 | -21.420 | \*\*\* |
| ContinentAfrica:TypeEcology & Behavior | -0.640 | 0.104 | -6.157 | \*\*\* |
| ContinentAmericas:TypeEcology & Behavior | -0.363 | 0.085 | -4.279 | \*\*\* |
| ContinentAsia:TypeEcology & Behavior | -0.532 | 0.093 | -5.733 | \*\*\* |
| ContinentOceania:TypeEcology & Behavior | -0.541 | 0.150 | -3.611 | \*\*\* |
| ContinentAfrica:TypeGeography | -0.020 | 0.135 | -0.147 |  |
| ContinentAmericas:TypeGeography | -0.184 | 0.121 | -1.522 |  |
| ContinentAsia:TypeGeography | -0.180 | 0.132 | -1.358 |  |
| ContinentOceania:TypeGeography | -1.849 | 2.250 | -0.822 |  |
| ContinentAfrica:TypePeople | -0.056 | 0.116 | -0.481 |  |
| ContinentAmericas:TypePeople | -0.416 | 0.094 | -4.419 | \*\*\* |
| ContinentAsia:TypePeople | -0.277 | 0.095 | -2.898 | \*\* |
| ContinentOceania:TypePeople | -0.453 | 0.196 | -2.309 | \* |
| ContinentAfrica:TypeModern & Past Culture | -0.775 | 0.280 | -2.766 | \*\* |
| ContinentAmericas:TypeModern & Past Culture | -0.350 | 0.231 | -1.517 |  |
| ContinentAsia:TypeModern & Past Culture | -0.651 | 0.226 | -2.882 | \*\* |
| ContinentOceania:TypeModern & Past Culture | -1.524 | 1.643 | -0.928 |  |
| ContinentAfrica:TypeOthers | -0.146 | 0.200 | -0.729 |  |
| ContinentAmericas:TypeOthers | 0.308 | 0.142 | 2.166 | \* |
| ContinentAsia:TypeOthers | -0.368 | 0.157 | -2.347 | \* |
| ContinentOceania:TypeOthers | -0.405 | 0.356 | -1.140 |  |
| **Component** | **Term** | **edf** | **Ref. df** | **F-value** | **p-value** |
| B. smooth terms | s(Year):interaction(Continent, Type)Europe.Morphology | 2.613 | 3.264 | 49.432 | \*\*\* |
| s(Year):interaction(Continent, Type)Africa.Morphology | 6.136 | 7.167 | 20.540 | \*\*\* |
| s(Year):interaction(Continent, Type)Americas.Morphology | 5.578 | 6.643 | 152.632 | \*\*\* |
| s(Year):interaction(Continent, Type)Asia.Morphology | 6.984 | 7.965 | 42.661 | \*\*\* |
| s(Year):interaction(Continent, Type)Oceania.Morphology | 7.365 | 8.148 | 50.024 | \*\*\* |
| s(Year):interaction(Continent, Type)Europe.Ecology & Behavior | 1.783 | 2.224 | 23.570 | \*\*\* |
| s(Year):interaction(Continent, Type)Africa.Ecology & Behavior | 1.315 | 1.569 | 9.062 | \*\*\* |
| s(Year):interaction(Continent, Type)Americas.Ecology & Behavior | 6.819 | 7.855 | 26.866 | \*\*\* |
| s(Year):interaction(Continent, Type)Asia.Ecology & Behavior | 5.452 | 6.535 | 27.596 | \*\*\* |
| s(Year):interaction(Continent, Type)Oceania.Ecology & Behavior | 5.242 | 6.273 | 6.653 | \*\*\* |
| s(Year):interaction(Continent, Type)Europe.Geography | 5.050 | 6.080 | 25.259 | \*\*\* |
| s(Year):interaction(Continent, Type)Africa.Geography | 7.791 | 8.423 | 15.544 | \*\*\* |
| s(Year):interaction(Continent, Type)Americas.Geography | 4.533 | 5.490 | 123.320 | \*\*\* |
| s(Year):interaction(Continent, Type)Asia.Geography | 8.557 | 8.906 | 45.186 | \*\*\* |
| s(Year):interaction(Continent, Type)Oceania.Geography | 7.624 | 7.883 | 29.810 | \*\*\* |
| s(Year):interaction(Continent, Type)Europe.People | 6.468 | 7.497 | 14.400 | \*\*\* |
| s(Year):interaction(Continent, Type)Africa.People | 7.516 | 8.241 | 7.613 | \*\*\* |
| s(Year):interaction(Continent, Type)Americas.People | 6.964 | 7.825 | 28.957 | \*\*\* |
| s(Year):interaction(Continent, Type)Asia.People | 5.807 | 6.823 | 16.618 | \*\*\* |
| s(Year):interaction(Continent, Type)Oceania.People | 4.692 | 5.637 | 28.432 | \*\*\* |
| s(Year):interaction(Continent, Type)Europe.Modern & Past Culture | 2.241 | 2.826 | 12.018 | \*\*\* |
| s(Year):interaction(Continent, Type)Africa.Modern & Past Culture | 5.271 | 6.305 | 16.633 | \*\*\* |
| s(Year):interaction(Continent, Type)Americas.Modern & Past Culture | 3.513 | 4.340 | 86.192 | \*\*\* |
| s(Year):interaction(Continent, Type)Asia.Modern & Past Culture | 2.295 | 2.891 | 8.244 | \*\*\* |
| s(Year):interaction(Continent, Type)Oceania.Modern & Past Culture | 5.974 | 6.569 | 8.085 | \*\*\* |
| s(Year):interaction(Continent, Type)Europe.Others | 2.412 | 3.045 | 0.691 |  |
| s(Year):interaction(Continent, Type)Africa.Others | 6.535 | 7.467 | 4.119 | \*\*\* |
| s(Year):interaction(Continent, Type)Americas.Others | 8.634 | 8.941 | 16.380 | \*\*\* |
| s(Year):interaction(Continent, Type)Asia.Others | 5.262 | 6.302 | 2.872 | \*\* |
| s(Year):interaction(Continent, Type)Oceania.Others | 4.621 | 5.571 | 2.208 | \* |
| Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1 | | | | | |
|  | | | | | |
| Adjusted R-squared: 0.852, Deviance explained 0.833 | | | | | |
| GCV : 1.387, Scale est: 1.484, N: 6372 | | | | | |

## Table S3

|  | Estimate | Standard Error | z value | Pr(>|z|) | Signif. |
| --- | --- | --- | --- | --- | --- |
| (Intercept) | -1.109 | 0.042 | -26.380 | 0.0000 | \*\*\* |
| ContinentAfrica | 0.529 | 0.046 | 11.581 | 0.0000 | \*\*\* |
| ContinentAmericas | 0.355 | 0.044 | 8.052 | 0.0000 | \*\*\* |
| ContinentAsia | 0.396 | 0.044 | 8.905 | 0.0000 | \*\*\* |
| ContinentOceania | 0.378 | 0.046 | 8.147 | 0.0000 | \*\*\* |
| *Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1* | | | | | |
|  | | | | | |
| (Dispersion parameter for binomial family taken to be 1) | | | | | |
| Null deviance: 5.937e+04 on 44558 degrees of freedom | | | | | |
| Residual deviance: 5.921e+04 on 44554 degrees of freedom | | | | | |

## Table S4

|  | Estimate | Standard Error | z value | Pr(>|z|) | Signif. |
| --- | --- | --- | --- | --- | --- |
| (Intercept) | -2.501 | 0.079 | -31.625 | 0.0000 | \*\*\* |
| ContinentAfrica | -0.279 | 0.092 | -3.026 | 0.0025 | \*\* |
| ContinentAmericas | -0.273 | 0.086 | -3.193 | 0.0014 | \*\* |
| ContinentAsia | -0.596 | 0.090 | -6.644 | 0.0000 | \*\*\* |
| ContinentOceania | -0.217 | 0.092 | -2.359 | 0.0183 | \* |
| *Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1* | | | | | |
|  | | | | | |
| (Dispersion parameter for binomial family taken to be 1) | | | | | |
| Null deviance: 1.952e+04 on 44558 degrees of freedom | | | | | |
| Residual deviance: 1.946e+04 on 44554 degrees of freedom | | | | | |

## Table S5

|  | Estimate | Standard Error | z value | Pr(>|z|) | Signif. |
| --- | --- | --- | --- | --- | --- |
| (Intercept) | -0.968 | 0.040 | -24.388 | 0.0000 | \*\*\* |
| ContinentAfrica | -0.335 | 0.046 | -7.244 | 0.0000 | \*\*\* |
| ContinentAmericas | -0.014 | 0.042 | -0.341 | 0.7330 |  |
| ContinentAsia | 0.102 | 0.043 | 2.392 | 0.0168 | \* |
| ContinentOceania | -0.141 | 0.046 | -3.077 | 0.0021 | \*\* |
| *Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1* | | | | | |
|  | | | | | |
| (Dispersion parameter for binomial family taken to be 1) | | | | | |
| Null deviance: 5.472e+04 on 44558 degrees of freedom | | | | | |
| Residual deviance: 5.445e+04 on 44554 degrees of freedom | | | | | |

## Table S6

|  | Estimate | Standard Error | z value | Pr(>|z|) | Signif. |
| --- | --- | --- | --- | --- | --- |
| (Intercept) | -1.076 | 0.041 | -25.947 | 0.0000 | \*\*\* |
| ContinentAfrica | -0.242 | 0.048 | -5.050 | 0.0000 | \*\*\* |
| ContinentAmericas | -0.527 | 0.046 | -11.558 | 0.0000 | \*\*\* |
| ContinentAsia | -0.399 | 0.046 | -8.703 | 0.0000 | \*\*\* |
| ContinentOceania | -0.211 | 0.048 | -4.379 | 0.0000 | \*\*\* |
| *Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1* | | | | | |
|  | | | | | |
| (Dispersion parameter for binomial family taken to be 1) | | | | | |
| Null deviance: 4.598e+04 on 44558 degrees of freedom | | | | | |
| Residual deviance: 4.577e+04 on 44554 degrees of freedom | | | | | |

## Table S7

|  | Estimate | Standard Error | z value | Pr(>|z|) | Signif. |
| --- | --- | --- | --- | --- | --- |
| (Intercept) | -3.165 | 0.109 | -29.005 | 0.0000 | \*\*\* |
| ContinentAfrica | -0.619 | 0.134 | -4.635 | 0.0000 | \*\*\* |
| ContinentAmericas | 0.177 | 0.115 | 1.542 | 0.1231 |  |
| ContinentAsia | -0.819 | 0.127 | -6.441 | 0.0000 | \*\*\* |
| ContinentOceania | -0.376 | 0.130 | -2.891 | 0.0038 | \*\* |
| *Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1* | | | | | |
|  | | | | | |
| (Dispersion parameter for binomial family taken to be 1) | | | | | |
| Null deviance: 1.272e+04 on 44558 degrees of freedom | | | | | |
| Residual deviance: 1.248e+04 on 44554 degrees of freedom | | | | | |

## Table S8

|  | Estimate | Standard Error | z value | Pr(>|z|) | Signif. |
| --- | --- | --- | --- | --- | --- |
| (Intercept) | -3.395 | 0.122 | -27.791 | 0.0000 | \*\*\* |
| ContinentAfrica | 0.275 | 0.134 | 2.052 | 0.0402 | \* |
| ContinentAmericas | 0.689 | 0.126 | 5.457 | 0.0000 | \*\*\* |
| ContinentAsia | -0.229 | 0.134 | -1.710 | 0.0873 | . |
| ContinentOceania | 0.182 | 0.136 | 1.337 | 0.1811 |  |
| *Signif. codes: 0 <= '\*\*\*' < 0.001 < '\*\*' < 0.01 < '\*' < 0.05 < '.' < 0.1 < '' < 1* | | | | | |
|  | | | | | |
| (Dispersion parameter for binomial family taken to be 1) | | | | | |
| Null deviance: 1.627e+04 on 44558 degrees of freedom | | | | | |
| Residual deviance: 1.602e+04 on 44554 degrees of freedom | | | | | |