**S1 File. Principle component analysis**

A principle component analysis (PCA) with Varimax rotation and a default of maximum 25 iterations was used with the Maximum Likelihood method on the 23 questions concerning dog behaviour and personality traits on the full sample (N=500, NA=50). Seventeen items contributing to four factors were found to explain 57.8 % of the total variance, while six items were excluded (listed in short form: fit, best rest, slow, mount others, adaptive, and novelty seeking). Below can be found the SPSS output from the PCA.

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| **Notes** |
| Output Created | 28-SEP-2018 16:40:43 |
| Comments |   |
| Input | Data | D:\Google Drive\SDP\sortowner.sav |
| Active Dataset | DataSet2 |
| Filter | <none> |
| Weight | <none> |
| Split File | <none> |
| N of Rows in Working Data File | 550 |
| Missing Value Handling | Definition of Missing | MISSING=EXCLUDE: User-defined missing values are treated as missing. |
| Cases Used | LISTWISE: Statistics are based on cases with no missing values for any variable used. |
| Syntax | FACTOR /VARIABLES @2\_smart @11\_fast\_learner @6\_read\_people\_well @23\_obedience @3\_calm @9\_break\_rules @5\_cunning @13\_stubborn @12\_win\_play\_fights @15\_pack\_defence @4\_leading\_type @10\_interfere @16\_look\_down @20\_challenge\_others @17\_socialized\_rev @22\_chasing @8\_temper /MISSING LISTWISE /ANALYSIS @2\_smart @11\_fast\_learner @6\_read\_people\_well @23\_obedience @3\_calm @9\_break\_rules @5\_cunning @13\_stubborn @12\_win\_play\_fights @15\_pack\_defence @4\_leading\_type @10\_interfere @16\_look\_down @20\_challenge\_others @17\_socialized\_rev @22\_chasing @8\_temper /PRINT INITIAL KMO EXTRACTION ROTATION /FORMAT SORT /CRITERIA MINEIGEN(1) ITERATE(25) /EXTRACTION PC /CRITERIA ITERATE(25) /ROTATION VARIMAX /SAVE REG(ALL) /METHOD=CORRELATION. |
| Resources | Processor Time | 00:00:00.09 |
| Elapsed Time | 00:00:00.40 |
| Maximum Memory Required | 38416 (37.516K) bytes |
| Variables Created | FAC1\_1 | Component score 1 |
| FAC2\_1 | Component score 2 |
| FAC3\_1 | Component score 3 |
| FAC4\_1 | Component score 4 |

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| **KMO and Bartlett's Test** |  |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .793 |  |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2509.177 |  |
| df | 136 |  |
| Sig. | 0.000 |  |
|  |  |  |  |
| **Communalities** |  |
|   | Initial | Extraction |  |
| @12\_win\_play\_fights | 1.000 | .585 |  |
| @15\_pack\_defence | 1.000 | .509 |  |
| @4\_leading\_type | 1.000 | .567 |  |
| @10\_interfere | 1.000 | .529 |  |
| @16\_look\_down | 1.000 | .452 |  |
| @2\_smart | 1.000 | .716 |  |
| @11\_fast\_learner | 1.000 | .695 |  |
| @6\_read\_people\_well | 1.000 | .565 |  |
| @23\_obedience | 1.000 | .527 |  |
| @20\_challenge\_others | 1.000 | .641 |  |
| @22\_chasing | 1.000 | .602 |  |
| @8\_temper | 1.000 | .515 |  |
| @9\_break\_rules | 1.000 | .677 |  |
| @5\_cunning | 1.000 | .640 |  |
| @13\_stubborn | 1.000 | .567 |  |
| @3\_calm | 1.000 | .529 |  |
| @17\_socialized | 1.000 | .516 |  |
| Extraction Method: Principal Component Analysis. |  |
| **Total Variance Explained** |
| Component | Initial Eigenvalues | Extraction Sums of Squared Loadings | Rotation Sums of Squared Loadings |
| Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.871 | 22.770 | 22.770 | 3.871 | 22.770 | 22.770 | 2.785 | 16.382 | 16.382 |
| 2 | 2.869 | 16.875 | 39.645 | 2.869 | 16.875 | 39.645 | 2.481 | 14.597 | 30.979 |
| 3 | 1.782 | 10.484 | 50.129 | 1.782 | 10.484 | 50.129 | 2.436 | 14.328 | 45.306 |
| 4 | 1.311 | 7.713 | 57.842 | 1.311 | 7.713 | 57.842 | 2.131 | 12.535 | 57.842 |
| 5 | .845 | 4.972 | 62.814 |   |   |   |   |   |   |
| 6 | .781 | 4.593 | 67.407 |   |   |   |   |   |   |
| 7 | .721 | 4.238 | 71.645 |   |   |   |   |   |   |
| 8 | .633 | 3.725 | 75.370 |   |   |   |   |   |   |
| 9 | .623 | 3.666 | 79.036 |   |   |   |   |   |   |
| 10 | .609 | 3.584 | 82.620 |   |   |   |   |   |   |
| 11 | .543 | 3.192 | 85.812 |   |   |   |   |   |   |
| 12 | .532 | 3.129 | 88.941 |   |   |   |   |   |   |
| 13 | .432 | 2.539 | 91.480 |   |   |   |   |   |   |
| 14 | .421 | 2.478 | 93.958 |   |   |   |   |   |   |
| 15 | .397 | 2.334 | 96.293 |   |   |   |   |   |   |
| 16 | .327 | 1.924 | 98.216 |   |   |   |   |   |   |
| 17 | .303 | 1.784 | 100.000 |   |   |   |   |   |   |

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| **Component Matrixa** |
|   | Component |
| 1 | 2 | 3 | 4 |
| @4\_leading\_type | .684 | .179 | .033 | -.256 |
| @10\_interfere | .673 | -.150 | .214 | -.087 |
| @20\_challenge\_others | .642 | -.293 | .251 | .282 |
| @22\_chasing | .638 | -.314 | .278 | .139 |
| @16\_look\_down | .603 | .081 | .059 | -.280 |
| @12\_win\_play\_fights | .560 | .178 | .273 | -.406 |
| @15\_pack\_defence | .550 | .072 | .338 | -.297 |
| @8\_temper | .499 | -.301 | -.110 | .404 |
| @6\_read\_people\_well | .206 | .719 | .025 | .073 |
| @2\_smart | .251 | .705 | .027 | .394 |
| @11\_fast\_learner | .239 | .698 | .061 | .384 |
| @17\_socialized | -.292 | .626 | -.077 | -.182 |
| @23\_obedience | -.069 | .522 | .429 | .256 |
| @9\_break\_rules | .411 | -.041 | -.708 | -.066 |
| @13\_stubborn | .443 | .117 | -.593 | -.066 |
| @5\_cunning | .447 | .338 | -.572 | -.004 |
| @3\_calm | -.290 | .449 | .122 | -.478 |
| Extraction Method: Principal Component Analysis. |
| a. 4 components extracted. |
|  |  |  |  |  |
| **Rotated Component Matrixa** |
|   | Component |
| 1 | 2 | 3 | 4 |
| @12\_win\_play\_fights | .757 | .086 | -.053 | .035 |
| @15\_pack\_defence | .705 | .061 | .077 | -.050 |
| @4\_leading\_type | .673 | .149 | .089 | .289 |
| @16\_look\_down | .627 | .045 | .086 | .222 |
| @10\_interfere | .612 | -.014 | .388 | .063 |
| @2\_smart | .049 | .834 | .019 | .134 |
| @11\_fast\_learner | .059 | .826 | .012 | .099 |
| @6\_read\_people\_well | .192 | .675 | -.226 | .147 |
| @23\_obedience | .029 | .616 | -.105 | -.369 |
| @3\_calm | .137 | .098 | -.696 | -.126 |
| @20\_challenge\_others | .390 | .054 | .696 | -.033 |
| @8\_temper | .076 | .028 | .677 | .224 |
| @22\_chasing | .472 | -.032 | .612 | -.049 |
| @17\_socialized | -.086 | .364 | -.612 | .051 |
| @9\_break\_rules | .057 | -.101 | .128 | .804 |
| @5\_cunning | .140 | .272 | -.002 | .739 |
| @13\_stubborn | .141 | .054 | .070 | .734 |
| Extraction Method: Principal Component Analysis.  Rotation Method: Varimax with Kaiser Normalization. |
| a. Rotation converged in 6 iterations. |
|  |  |  |  |  |
| **Component Transformation Matrix** |
| Component | 1 | 2 | 3 | 4 |
| 1 | .736 | .181 | .515 | .400 |
| 2 | .097 | .831 | -.532 | .131 |
| 3 | .392 | .153 | .087 | -.903 |
| 4 | -.544 | .504 | .666 | -.086 |
| Extraction Method: Principal Component Analysis.  Rotation Method: Varimax with Kaiser Normalization. |