Supplemental Materials

Supplemental Figure 1.



*Note.*  Scree plot for factor analysis (*N* = 191). A five-factor solution is evident by visual inspection of the scree plot and by parallel analysis, a technique for determining the number of factors to retain by comparing the eigenvalues of the sample data with those of a randomly generated dataset (Horn, 1965). Actual eigenvalues are denoted by the line with circles; eigenvalues from a parallel analysis based on 1000 random samples are denoted by the dashed line with triangles and the 95th percentile of this analysis is denoted by the dotted line with squares.

Supplemental Table 1. *Correlations between PCA-derived hierarchical factors from Latzman et al. (2015) and ML-based EFA derived factors from the current study*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alpha | Beta |  | PEM | Disinh | NEM |  | Agreeable | Impuls | Dom | Extra |  | Agreeable | Impuls | Dom | Intellect | Extra |
| Alpha | **.955** | .093 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Beta | .046 | **.977** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Positive Emotionality (PEM) |  |  |  | **.833** | .382 | -.25 |  |  |  |  |  |  |  |  |  |  |  |
| Disinhibition (Disinh) |  |  |  | -.547 | **.657** | -.518 |  |  |  |  |  |  |  |  |  |  |  |
| Negative Emotionality (NEM) |  |  |  | -.093 | .604 | **.745** |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Agreeableness (Agreeable) |  |  |  |  |  |  |  | **.913** | -.091 | .043 | -.028 |  |  |  |  |  |  |
| Impulsivity (Impuls) |  |  |  |  |  |  |  | -.162 | **.932** | -.044 | .414 |  |  |  |  |  |  |
| Dominance (Dom) |  |  |  |  |  |  |  | .146 | .128 | **.925** | -.020 |  |  |  |  |  |  |
| Extraversion (Extra) |  |  |  |  |  |  |  | .308 | -.023 | .197 | **.863** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Agreeableness |  |  |  |  |  |  |  |  |  |  |  |  | **.900** | -.119 | -.020 | -.026 | .110 |
| Impulsivity |  |  |  |  |  |  |  |  |  |  |  |  | -.066 | **.933** | -.066 | .102 | -.038 |
| Low Dominance |  |  |  |  |  |  |  |  |  |  |  |  | .149 | .071 | **-.912** | .098 | .172 |
| Intellect |  |  |  |  |  |  |  |  |  |  |  |  | .256 | -.070 | -.182 | **.780** | .369 |
| Low Extraversion |  |  |  |  |  |  |  |  |  |  |  |  | .253 | .239 | -.096 | .536 | **-.829** |

*Note.* Highest convergent correlation between each solution shown in **boldface**.

Supplemental Table 2.

*Geomin rotated maximum likelihood exploratory factor analysis of chimpanzee personality:*

*Two factor solution*

|  |  |
| --- | --- |
|  | **Factor** |
| **Item** | **1. Alpha** | **2. Beta** |
| Active | **0.50** | 0.35 |
| Affectionate/Friendly | -0.17 | **0.72** |
| Affiliative | -0.02 | **0.72** |
| Aggressive | **0.75** | -0.16 |
| Anxious | 0.02 | -0.32 |
| Autistic | 0.01 | **-0.72** |
| Bold | **0.76** | 0.26 |
| Bullying | **0.75** | -0.11 |
| Calm | **-0.64** | 0.20 |
| Cautious  | **-0.61** | -0.29 |
| Considerate/Kind | -0.34 | **0.60** |
| Deceptive | **0.60** | -0.06 |
| Defiant  | **0.68** | 0.00 |
| Dependent | -0.21 | 0.34 |
| Depressed | -0.31 | -0.49 |
| Dominant | **0.57** | 0.18 |
| Eccentric | 0.11 | **-0.50** |
| Excitable | **0.66** | 0.01 |
| Fearful | -0.24 | -0.33 |
| Human Oriented | 0.22 | 0.33 |
| Impulsive | **0.77** | -0.05 |
| Inquisitive / Curious | 0.37 | **0.72** |
| Intelligent | 0.19 | **0.72** |
| Inventive | 0.33 | **0.64** |
| Irritable | **0.59** | -0.46 |
| Jealous/ Attention-seeking | **0.61** | 0.16 |
| Manipulative | 0.48 | 0.22 |
| Methodical | 0.04 | **0.60** |
| Mischievous | **0.78** | 0.03 |
| Persistent | 0.26 | 0.45 |
| Playful | 0.26 | 0.41 |
| Predictable | -0.38 | 0.22 |
| Protective | -0.04 | **0.55** |
| Relaxed | -0.35 | **0.56** |
| Self-caring | 0.19 | 0.34 |
| Sexual | 0.23 | 0.28 |
| Socially-inept | 0.34 | **-0.60** |
| Solitary | -0.22 | **-0.52** |
| Stingy | 0.46 | -0.01 |
| Temperamental/Moody | **0.63** | -0.42 |
| Timid | -0.47 | -0.46 |

*Note.**N* = 191. Loadings > .50 shown in **boldface.** The order in which factors were extracted is reflected in the factor numbers.

Supplemental Table 3.

*Geomin rotated maximum likelihood exploratory factor analysis of chimpanzee personality:*

*Three factor solution*

|  |  |
| --- | --- |
|  | **Factor** |
| **Item** | **1. Pos. Emot** | **2. Neg. Emot** | **3. Disinhibition** |
| Active | **.58** | .00 | **.56** |
| Affectionate/Friendly | **.72** | -.20 | -.16 |
| Affiliative | **.74** | -.12 | -.05 |
| Aggressive | -.10 | **.53** | .43 |
| Anxious | .00 | **-.57** | **.68** |
| Autistic | **-.66** | -.03 | .21 |
| Bold | .14 | **.83** | .05 |
| Bullying | -.17 | .72 | .21 |
| Calm | .00 | -.18 | **-.67** |
| Cautious  | -.17 | **-.71** | .02 |
| Considerate/Kind | **.56** | -.26 | -.28 |
| Deceptive | .04 | .27 | .46 |
| Defiant  | -.01 | **.57** | .26 |
| Dependent | **.52** | **-.53** | .22 |
| Depressed | **-.58** | -.06 | -.22 |
| Dominant | -.01 | **.81** | -.15 |
| Eccentric | -.42 | .00 | .25 |
| Excitable | .26 | .12 | **.72** |
| Fearful | -.01 | **-.77** | **.57** |
| Human Oriented | .41 | .03 | .19 |
| Impulsive | .13 | .32 | **.65** |
| Inquisitive / Curious | **.75** | .19 | .11 |
| Intelligent | **.73** | .07 | .00 |
| Inventive | **.75** | .01 | .26 |
| Irritable | -.40 | .39 | .41 |
| Jealous/ Attention-seeking | .20 | .41 | .31 |
| Manipulative | .13 | **.51** | .01 |
| Methodical | .49 | .16 | -.26 |
| Mischievous | .18 | .36 | **.58** |
| Persistent | .42 | .23 | -.01 |
| Playful | **.57** | -.06 | .31 |
| Predictable | .09 | -.09 | -.42 |
| Protective | .47 | .06 | -.23 |
| Relaxed | .34 | .07 | **-.64** |
| Self-caring | .47 | -.09 | .27 |
| Sexual | .33 | .09 | .14 |
| Socially-inept | -.42 | .00 | **.56** |
| Solitary | **-.64** | .08 | -.24 |
| Stingy | -.11 | **.52** | .03 |
| Temperamental/Moody | -.34 | .38 | .46 |
| Timid | -.21 | **-.82** | .35 |

*Note.**N* = **191**. Pos. Emot = Positive Emotionality. Neg. Emot = Negative Emotionality. Loadings > .50 shown in **boldface.** The order in which factors were extracted is reflected in the factor numbers.

Supplemental Table 4.

*Geomin rotated maximum likelihood exploratory factor analysis of chimpanzee personality:*

*Four factor solution*

|  |  |
| --- | --- |
|  | **Factor** |
| **Item** | **1. Agreeable** | **2. Impulsive** | **3. Dom** | **4. Extra** |
| Active | .19 | .28 | -.02 | **.68** |
| Affectionate/Friendly | **.76** | -.20 | -.10 | .04 |
| Affiliative | **.81** | -.03 | -.10 | .03 |
| Aggressive | -.26 | **.58** | .31 | .22 |
| Anxious | .01 | .36 | **-.71** | .10 |
| Autistic | **-.70** | .10 | -.09 | .00 |
| Bold | .01 | .41 | **.69** | .14 |
| Bullying | -.20 | **.56** | .48 | .00 |
| Calm | .07 | **-.70** | .10 | -.14 |
| Cautious  | -.06 | -.30 | **-.61** | -.11 |
| Considerate/Kind | **.58** | -.37 | -.09 | .04 |
| Deceptive | .27 | **.79** | -.09 | -.28 |
| Defiant  | -.01 | **.56** | .33 | -.01 |
| Dependent | **.64** | .04 | **-.55** | -.01 |
| Depressed | **-.50** | -.23 | -.01 | -.19 |
| Dominant | .00 | .30 | **.67** | -.08 |
| Eccentric | -.49 | .17 | -.07 | .06 |
| Excitable | -.04 | **.55** | -.04 | **.49** |
| Fearful | .03 | .16 | **-.83** | .06 |
| Human Oriented | -.01 | -.09 | .17 | **.60** |
| Impulsive | .03 | **.74** | .04 | .20 |
| Inquisitive / Curious | .47 | .05 | .26 | .44 |
| Intelligent | **.61** | .01 | .13 | .22 |
| Inventive | **.51** | .13 | .04 | .41 |
| Irritable | -.19 | **.78** | .02 | -.34 |
| Jealous/ Attention-seeking | .07 | .44 | .27 | .19 |
| Manipulative | .36 | .48 | .28 | -.33 |
| Methodical | .47 | -.14 | .25 | .03 |
| Mischievous | .09 | .71 | .10 | .17 |
| Persistent | .23 | .00 | .28 | .26 |
| Playful | .12 | -.05 | .07 | **.73** |
| Predictable | .02 | **-.51** | .13 | .07 |
| Protective | **.61** | -.07 | .07 | -.13 |
| Relaxed | .32 | **-.57** | .32 | -.01 |
| Self-caring | .17 | .01 | -.02 | .49 |
| Sexual | .16 | .07 | .11 | .29 |
| Socially-inept | **-.64** | .35 | -.12 | .30 |
| Solitary | **-.66** | -.24 | .16 | -.09 |
| Stingy | .13 | **.50** | .27 | -.38 |
| Temperamental/Moody | -.18 | **.79** | .02 | -.25 |
| Timid | -.12 | -.04 | **-.83** | -.05 |

 *Note.**N* = 191. Agreeable = Agreeableness. Dom = Dominance. Extra = Extraversion. Loadings > .50 shown in **boldface.** The order in which factors were extracted is reflected in the factor numbers.

Supplemental Table 5.

*Geomin rotated maximum likelihood exploratory factor analysis of chimpanzee personality: Five factor solution*

|  |  |
| --- | --- |
|  | **Factor** |
| **Item** | **1. Agreeable** | **2. Impuls** | **3. Low D** | **4. Intell** | **5. Extra** |
| Active | .28 | .31 | -.01 | .33 | **-.55** |
| Affectionate/Friendly | **.74** | -.19 | .17 | .13 | .09 |
| Affiliative | **.81** | -.01 | .14 | .05 | .03 |
| Aggressive | -.22 | **.61** | -.36 | .05 | -.22 |
| Anxious | -.01 | .31 | **.73** | .14 | .01 |
| Autistic | **-.69** | .09 | -.05 | -.05 | -.06 |
| Bold | .01 | .44 | **-.64** | .19 | .01 |
| Bullying | -.17 | **.60** | **-.50** | -.03 | -.02 |
| Calm | .10 | **-.67** | -.13 | -.22 | -.03 |
| Cautious  | -.09 | -.34 | **.60** | -.05 | .08 |
| Considerate/Kind | **.57** | -.36 | .12 | .04 | -.01 |
| Deceptive | .23 | **.78** | .14 | -.03 | .34 |
| Defiant  | -.01 | **.58** | -.32 | .02 | .04 |
| Dependent | **.66** | .05 | **.54** | -.10 | -.05 |
| Depressed | **-.57** | -.28 | .03 | .01 | .23 |
| Dominant | .02 | .36 | **-.67** | -.06 | .06 |
| Eccentric | **-.54** | .11 | .12 | .23 | .13 |
| Excitable | -.04 | **.53** | .09 | .45 | -.19 |
| Fearful | .00 | .11 | **.83** | .07 | -.01 |
| Human Oriented | -.09 | -.19 | .00 | **.87** | .00 |
| Impulsive | .03 | **.74** | -.03 | .18 | -.08 |
| Inquisitive / Curious | .48 | .05 | -.15 | .48 | -.08 |
| Intelligent | **.61** | .01 | -.03 | .31 | .04 |
| Inventive | **.51** | .12 | .07 | **.48** | -.05 |
| Irritable | -.23 | **.77** | -.01 | -.14 | .29 |
| Jealous/ Attention-seeking | .01 | .40 | -.13 | **.50** | .23 |
| Manipulative | .30 | .48 | -.18 | .02 | **.46** |
| Methodical | .43 | -.15 | -.13 | .31 | -.28 |
| Mischievous | .10 | **.71** | -.08 | .16 | -.05 |
| Persistent | .18 | -.03 | -.12 | **.55** | .21 |
| Playful | .18 | -.04 | -.06 | .46 | **-.50** |
| Predictable | .00 | **-.53** | -.08 | .18 | .08 |
| Protective | **.65** | -.01 | -.10 | -.23 | -.01 |
| Relaxed | .33 | **-.55** | -.29 | .01 | .02 |
| Self-caring | .24 | .04 | -.02 | .19 | -.43 |
| Sexual | .25 | .13 | -.15 | -.01 | -.34 |
| Socially-inept | **-.68** | .29 | .13 | .33 | -.10 |
| Solitary | **-.71** | -.29 | -.16 | .04 | .11 |
| Stingy | .04 | .49 | -.15 | .07 | **.57** |
| Temperamental/Moody | -.29 | **.76** | .00 | -.04 | .26 |
| Timid | -.13 | -.09 | **.78** | -.10 | -.04 |

*Note.**N* = 191. Agreeable = Agreeableness. Impuls = Impulsivity. Dom = Dominance. Intell = Intellect. Extra = Extraversion. Loadings > .50 shown in **boldface.** The order in which factors were extracted is reflected in the factor numbers.