P-curve disclosure table

Thornhill & Gangestad (1994)

Predictions:

“In the present study, we examined the relations of FA with self-reported number of lifetime copulatory partners and age at first sexual intercourse within a U.S. student population in an attempt to determine whether FA affects human mating patterns that may directly relate to the component of human sexual selection involving mate number” (pp. 296-297).

Primary Effects:

Correlations between FA and number of lifetime partners and physical attractiveness with age and age-squared partialled out.

Results:

“With the effects of age and age-squared statistically controlled, the correlation between FAI and lifetime number of partners was significant and negative for men (- .32, p < .02, n = 59)” (p. 299).

Recalculated *p* = .0152, *df* = 55

“Consistent with previous research (Gangestad et al., 1994), men's facial attractiveness correlated significantly with FAI with age and age-squared partialed out ( - .27, p < .05, n = 60)” (pp. 299-300).

Recalculated *p* = .0404, *df* = 56.

Note.

The association with number of partners was the first one reported in the article and, hence, we report that one in our main analysis (e.g., Simonsohn 2014a). In robustness analyses, we substituted the association with facial attractiveness.

Thornhill & Gangestad (1999)

Predictions:

“we wished to examine whether the first study [examining the association between men’s FA and women’s preferences for men’s scents when at high fertility; Gangestad & Thornhill 1998] would replicate and thereby assess the reliability of its main finding using a larger sample” (p. 178).

Primary Effect:

Association between men’s FA and women’s preferences for men’s scent when at high fertility, controlling for men’s number of showers.

Results:

“When number of showers was statistically controlled for, men’s FA significantly predicted high fertility-risk women’s ratings of scent attractiveness in this sample of men (r = -.33, p = .011)” (p. 184).

Recalculated *p* = .0220, *df* = 46

Gangestad & Thornhill (1999)

Predictions:

“Wedekind (1995) showed that women prefer the scent of men whose major histocompatibility genes differ from their own. We were interested in whether women’s preferences could also be predicted from men’s FA, particularly for women who were in the fertile phase of their ovulatory cycle” (p. 928).

Primary effect:

Association between men’s FA and women’s preferences for men’s scent when at high fertility.

Results:

“men’s FA significantly and negatively predicted the mean attractiveness ratings of high-fertility risk women, *r* = -0.31, *p* = .023.” (p. 929).

Recalculated *p* = .0457, *df* = 40

Hönekopp, Bartholomé, & Jansen (1980)

Predictions:

“In sum, our hypotheses are as follows: (1) There is a positive relationship between the physical fitness of women and the attractiveness of their faces; (2) There will also be a negative relationship between physical fitness and body FA” (p. 150-151)

(The authors do not explicitly predict the effect used in *p*-curve analysis; however, a predicted negative correlation between facial attractiveness and body FA can be inferred from the above passage.)

Primary Effect:

Correlation between facial attractiveness and bodily FA (a sum of asymmetry on 8 features: breadth of hands, wrists, feet, ankles, and ears; length of ears and of second and fifth fingers

Results:

“The relationship between *bas* [body asymmetry] and facial attractiveness proved to be negative *(r77* = -.24, *p =* .02), which is consistent with the view that both variables are indicators of mate value.”

Recalculated *p* = .0331, *df* = 77

Hughes, Harrison, & Gallup (2002)

Predictions:

“In the present study, we examined the relationship between independent ratings of voice attractiveness and bilateral symmetry in humans” (p. 174)

Primary Effect:

Correlation between rated vocal attractiveness and FA (a sum of asymmetry on 7 features: “the ventral surface of the second through the fifth digits from the basal crease to the tip of the finger, elbow width, the maximum width of the hand, and the maximum diameter of the wrist” [p. 175])

Results:

For females, the overall FA index was negatively correlated with both opposite-sex voice

attractiveness ratings (r =-.408, n = 46, P < .01) … For males, the overall FA index was also negatively correlated with both opposite-sex voice attractiveness ratings (r =-.364, n = 50, P < .01) (p. 178)

Recalculated *p* = .00013, *df* = 92 (averaging correlations for opposite-sex voice ratings, weighted by sample size)

Thornhill & Gangestad (2006)

Predictions:

“We predicted the negative associations between health measures and body and facial FA” (p. 136).

Primary Effect:

Association between body FA and self-reported total number of infections over the past 3 years.

Results:

“As predicted, body FA significantly and positively predicted number of infections [*F*(1,387) = 4.25, *p* < .03]” (p. 139).

Recalculated *p* = .0401, *df* = 387

Gangestad, Merriman & Emery Thompson (2010)

Predictions:

“We therefore predicted that individual differences in susceptibility to oxidative stress should be associated with FA. We examined the association between men’s FA and biomarkers of oxidative stress” (p. 1006).

Primary Effect:

Association between men’s body FA and composite measure of oxidative stress, with confounds (exposure to toxins and number of cigarettes smoked daily) controlled.

Results:

“We examined the correlation between FA and oxidative stress, with toxin exposure, smoking, and their interaction partialled out. As expected, FA significantly and positively predicted oxidative stress (partial *r* = 0.26, *N* =70, *P* = 0.021; Table 2, Fig. 1)” (p. 1009).

Recalculated *p* = .0336, *df* = 65

Milne, Belsky, Poulton, Thomson, Caspi & Keiser (2003)

Predictions:

“If, as suggested, ill-health derives from the inability to cope with genetic and environmental stressors, ill-health should be positively correlated with FA.” (p .55)

Primary Effect:

Logistic regression on six-feature composite of body FA and number of medical conditions (zero vs. two or more).

Results:

“FA was significantly associated with …the number of self-reported medical conditions but not with other health measures. These associations remained significant after controlling for sex, exercise, and SES. Effects were modest: a one standard deviation increase in asymmetry… increased odds of reporting two or more medical conditions of 1.24 (95% CI = 1.01–1.52)” (p. 59)

Table 2: Model 1 odds ratio, 0 vs. 2 or more medical conditions: 1.27 (CI: 1.04-1.54)

Recalculated *p* = .0388

Waynforth (1998)

Predictions:

“Given this fact, and that low FA connotes pathogen resistance, it may be the case that FA will be strongly correlated with morbidity in this sample, and that both will be predictors of reproductive success” (p. 1498)

Primary Effect:

Poisson regression on number of illnesses as an adult and body FA (8-feature composite), controlling for age.

Results:

“The occurrence of life-threatening illness was significantly higher in men with higher FA (Poisson regression, χ2 = 5.52, d.f. = 1, p = 0.02; table 2)” (p. 1500)

Recalculated *p =* .0188, *df* = 55

Alternative test-statistic: *r*(55) = .31, *p* = .0189 (see Table 1)

Lalumiére, Harris, & Rice (1999)

Predictions:

“In this paper, we investigate the relationship between the number of older brothers and FA in two different groups of adult males. It was predicted that male FA scores would be positively and linearly related to their number of older brothers.” (p. 2352)

Primary Effect:

Correlation between number of older brothers and body FA (10-trait composite), controlling for number of siblings and total family size.

Results:

“The results presented in table1 show that only the number of older brothers significantly contributed to variance in FA. The larger the number of older brothers a participant had, the larger his FA value.” (p. 2352-2353)

Table1: *r*(68) = .31

Recalculated *p =* .0090, *df* = 68

Kieser, Groenefeld, & Da Silva (1997)

Predictions:

“In the present paper we examine the levels of dental fluctuating asymmetry in children of obese and non-obese mothers, the aim being to determine whether maternal obesity results in significantly raised levels of fluctuating asymmetry. We also examine the possible effects of maternal cigarette smoking in obese and non-obese mothers.” (p. 134)

Primary Effect:

Maternal Weight x Smoking interaction on dental FA (6 possible FA metrics: 3 teeth x 2 tooth surfaces)

Results:

“An analysis of variance, testing for differences in gender, body mass, smoking status and interactions between the latter two (Table 4) confirmed that the combination of obesity and smoking status was a significant predictor of fluctuating asymmetry.” (p. 135)

Table 4 contains six statistically significant effects; median statistically significant effect: *p* = .0065

Recalculated *p* = .0065, *df* = 437

Benderlioglu & Nelson (2004)

Predictions:

“Additional relationships [such as] birth order were also investigated as covariates, all implicated to have independently contributed to FA.” (p. 299)

Primary Effect:

Main ANCOVA effect of birth order on composite FA.

Results:

“Birth order also had a significant effect on composite FA (F[1,178] = 5.19, P = 0.0239.” (p. 302)

Recalculated *p =* .0238, *df* = 178

Van Dongen, Wijnaendts, Ten Broek & Galis (2009)

Predictions:

“We predict increased limb bone asymmetry in both fetuses with minor and with major congenital abnormalities … However, the severity and profoundness of the major congenital abnormalities renders this latter group to correspond to fetuses suffering from the worst imaginable developmental disorders. If any, we expect an association between developmental disorders and asymmetry in this group.” (p. 1833-1834)

Primary Effect:

Main effect of congenital abnormality severity (none/minor vs. major) on skeletal FA (seven-trait composite).

Results:

“On average, the degree of asymmetry was 0.22% higher in fetuses with major (chromosomal number changes or not) congenital abnormalities compared to the fetuses with no or minor abnormalities, and this difference was highly significant (F 1,439 =8.47, P = 0.004)” (p. 1838)

Recalculated *p* = .0038, *df* = 439

Barden (1980)

Predictions:

“The present study compares fluctuating dental asymmetry in Down syndrome with that of normal derived from the literature (Moorrees and Reed, ’64). Fluctuating dental asymmetry is used to support the contention that aneuploidy produces amplified developmental instability in Down syndrome subjects.” (p. 170)

Primary Effect:

Difference in intra-class correlation coefficients between mesiodistal diameters of antimeric teeth of those with Down syndrome and controls.

Results:

“Table 1 lists the correlation coefficients for mesiodistal crown diameters of Down syndrome subjects and normal subjects (Moorrees and Reed, ’64). In comparison with normal values, dental asymmetry in Down syndrome is significantly greater in 10 of the 14 teeth measured” (p. 170)

[From Table 1] Mandible I2, *rDown*= 0.85, *rnormal* = 0.93 *t* = 2.44

(This paper includes separate tests on each of the 14 teeth measured. We selected the median *t* value with the larger *df* )

Recalculated *p* = .0156, *df* = 190

Gangestad & Thornhill (2003)

Predictions:

“These results make most theoretical sense if, in fact, men who possess low FA also have more masculine features on average, such that male symmetry and facial masculinity tap a shared underlying quality … The current study examined the association between facial masculinity and bodily FA” (pp. 232-233).

Primary Effect:

Association between measure of facial masculinity and a composite measure of bodily FA.

Results:

“Separate correlational analyses on men and women revealed that, for men, bodily FA was negatively associated with facial masculinity (r =\_.268, P= .001; see Fig. 1).

Recalculated *p* = .0013; *df* = 139

Furlow, Gangestad & Thornhill (1997), Study 1

Predictions:

“In the present research, we examined the relationship between a measure of IQ, performance on Cattell's culture fair intelligence test and FA to assess whether developmental stress may contribute to lower IQ within a normal adult college population. We predicted on the basis of the considerations outlined above that FA and IQ test performance would correlate negatively” (p. 823-824).

Primary Effect:

Association between body FA and test performance on the Cattell culture-fair test.

Results:

“To examine the association between FA and CFIT, we first simply correlated the two measures. The Pearson product-moment correlation was *−*0*.*214, *t*(110) = 2*.*30, *p* = 0*:*012 (one-tailed)” (p. 825).

Recalculated *p* = .0233; *df* = 110

Furlow, Gangestad & Thornhill (1997), Study 1

Predictions:

See above.

Primary Effect:

Association between body FA and test performance on the Cattell culture-fair test.

Results:

“In the replication study, the correlation between FA and CFIT scores was *−*0*.*244, *t*(122) = 2*.*78, *p* = 0*:*0031 (one-tailed) (see Figure 2)” (p. 826).

Recalculated *p* = .0063; *df* = 122

Thoma, Yeo, Gangestad, Halgren, Sanchez & Lewine (2005)

Predictions:

Sought to replicate (our interest) and extend previously found associations between FA and intelligence.

Primary Effect:

Association between FA and composite measure of general intelligence.

Results:

“As predicted, FA was also significantly associated with RAPM scores, r=-0.49, p=0.017 (see Fig. 3), and the general intelligence component, r=-0.51, p=0.013” (p. 33). (We used the general intelligence component of multiple tests, as it is expected to be a better measure of general intelligence that the single test, the RAPM.)

Recalculated *p* = .0257; *df* = 17

Thoma (2008)

Predictions:

“In an unselected sample of university students, we investigated whether individuals scoring relatively higher on schizotypy scales would have increased FA and MPAs. We predicted positive correlations between markers of DI and schizotypy” (p. 588).

Primary Effect:

Association between body FA and a composite measure of schizotypy.

Results:

“FA correlated significantly and positively with Schizotypy (*r* = .23, *p* = .03),…” (p. 589).

Recalculated *p* = .0414, *df* = 77.

Prokosch, Yeo & Miller (2005)

Predictions:

“cognitive tests with higher g-loadings should show higher correlations with body symmetry.” (p. 205)

Primary Effect:

Association between body FA and the Raven Advanced Progressive Matrices.

Results:

*“*we found a 0.39 raw correlation between our index of morpho developmental stability (the 10-trait composite score of body symmetry) and our best index of neurodevelopmental stability (i.e., our most highly g-loaded test, Raven Advanced Progressive Matrices).” (pp. 206-207)

Recalculated *p* = .0004, *df* = 76

Luxen & Buunk (2006)

Predictions:

“We expected g to be related to developmental quality as indexed by Fluctuating Asymmetry” (p. 897)

Primary Effect:

Association between body FA and intelligence (g).

Results:

“The effect of FA on g was statistically significant (*t* = -2.13, *p* = .037).” (p. 900)

Recalculated *p* = .0364, *df* = 76

Bates (2006), Study 1

Predictions:

“The first hypothesis tested in the present report was that this [negative] FA–IQ correlation would be replicable in an independent sample.” (p. 42)

Primary Effect:

Correlation between Raven Progressive Matrices score and composite FA (6 features)

Results:

“The core hypothesis that FA would predict Raven scores was supported in a regression analysis [R2 of 0.185,F(1,96)=21.8, p<0.0001], equivalent to an r of 0.43” (p. 43)

Recalculated *p* = .00001, *df* = 96

Bates (2006), Study 2

Predictions:

“This second study, then tested four hypotheses: that the FA–IQ correlation would replicate …” (p. 44).

Primary Effect:

Correlation between Raven Progressive Matrices score and digit FA (4 features)

Results:

“Supporting Hypothesis 1, FA showed a significant negative correlation with Raven scores (r= −0.29, p<0.0003).” (p. 44)

Recalculated *p* = .0003 , *df* = 151

Rahman, Wilson, & Abrahams (2004)

Predictions:

“Thus, there is precedent for viewing DI as an important source of variation in neurocognitive functioning… The aim of the present study was to examine the associations between markers of FA and performance on a broad range of cognitive functions in a large sample of healthy men and women” (p. 244)

Primary Effect:

Association between digit FA and Raven’s Standard Progressive Matrices test.

Results:

**“**There was a small, yet significant, negative correlation between composite FA and Raven’s SPM scores (our measure of general intelligence) for the whole group (*r* = -.13, *p* = .04)…” (p. 245)

Recalculated *p* = .0442, *df* = 238

Euler, Thoma, Gangestad, Cañive, & Yeo (2009)

Predictions:

“The etiologic factors underlying schizophrenia have been conceptualized as reflecting two largely genetic components — those unique to schizophrenia and those representing vulnerability to neurodevelopmental deviation in general. The Developmental Instability (DI) approach suggests that the latter can be indexed by minor physical anomalies (MPAs), which assess early prenatal growth abnormalities, and fluctuating anatomic asymmetries (FA), which reflects later deviations.” (p. 1)

Primary Effect:

Difference in FA between schizophrenics and controls.

Results:

“Descriptive statistics on age, overall cognitive performance, and DI measures are provided in Table 1 along with independent samples t-tests of group differences. As hypothesized, individuals with schizophrenia exhibited greater overall DI, as well as greater FA and MPA scores.” (p. 5)

[From Table 1] FA difference, *t* = 2.39, *p* = .023

Recalculated *p* = .0216, *df* = 40

Gangestad, Bennett & Thornhill (2001)

Predictions:

Sought to replicate and extend previous findings showing an association between men’s FA and lifetime number of sexual partners, controlling for age.

Primary Effect:

Association between a composite measure of FA and men’s self-reported lifetime number of sexual partners, with age controlled.

Results:

“Moreover, the sum of the individual asymmetries (which is expressed as a proportion of character size; i.e., relative FA [Palmer, 1994]) covaried significantly with number of sexual partners (with age partialled out), (r = -.267 and p < .001), thereby replicating Thornhill & Gangestad (1994) and Gangestad & Thornhill (1997)” (p. 1680).

Gangestad & Thornhill (1997)

Predictions:

“Based on these notions, then, we can derive a prediction about women's extrapair sex: Women's EPC partners will tend to exhibit developmental quality, as revealed by low fluctuating asymmetry. Hence, men's fluctuating asymmetry should negatively correlate with the number of times they have been a woman's EPC” (p. 74).

Primary Effect:

Association between men’s body FA and times having been an EPC partner, with age, expected salary, SES, and physical attractiveness controlled. (The zero-order correlation presented yielded nearly identical results.)

Results:

“As expected men of lower FA tended to have been an EPC partner more times than did men of high FA, beta = -.27, *t*(80) = 2.67, *p* < .005” (p. 79). (Table 3, p. 80, reports the t-value to be 2.69. We used the smaller value.)

Recalculated *p* = .0092; *df* = 80

(The zero-order correlation was -.28, *t*(84) = 2.67, *p* = .0090.)

Thornhill, Gangestad & Comer (1995) (Note: Updated values reported by Møller, Thornhill & Gangestad (1999)

Predictions:

Examined association between male FA and proportion of copulations resulting in female orgasm.

Primary Effect:

Association between FA and this self-reported proportion, with male height, weight, height-squared, and weight-squared controlled, in sample of couples reporting having had sex at least 5 times in the past month..

Results:

For couples with > 5 times sex in last month in expanded sample, t(77) =-2.28.

Recalculated *p* = .0253; *df* = 77

(For robustness analysis: association with arcsine transformation of proportion; t(77) = -2.22, p = .0293.)

Firman, Simmons, Cummins, & Matson (2003)

Predictions:

“The FA-fertility hypothesis proposes that FA may be a reliable indicator of ejaculate quality in humans” (p. 808)

Primary Effect:

Regression of sperm number on body FA.

Results:

“Univariate tests showed that there were significant relationships between body FA and total sperm number, sperm motility, and sperm head length (Table I).” (p. 810)

[From Table 1] predicting Numbers of sperm from Body FA, *b* = -15.31, *SEM* = 6.70, *t*(48) = 2.28, *p* = .027

Recalculated *p* = .0271, *df* = 48

Manning, Scutt, & Lewis-Jones (1998)

Predictions:

“The purpose of this work was to consider the relationship between sperm parameters associated with fertility (including ejaculate size, sperm speed, and sperm migration) (World Health Organisation 1987) and FA.” (p. 274)

Primary Effect

Regression of sperm number on relative digit FA controlling for age, height, and weight

Results:

“Tables 2 and 3 show the results of multiple regression tests with sperm number, average speed, and SMT as dependent variables and overall FA, weight, height, and age as independent variables. … Overall FA was significant for all tests.” (p. 279)

[From Table 3] predicting Sperm number from Overall Relative FA, *b* = -17.04, *t* = 2.13, *p* = .04

Recalculated *p* = .0382, *df* = 49

Gangestad, Thornhill & Garver-Apgar (2005)

Predictions:

“Hence, the ovulatory cycle shift in women’s extra-pair desires and flirtation should be strongest for women with partners who lack traits preferred by women when fertile. Women whose partners lack these traits may furthermore be less sexually attracted to their partners when fertile. We tested this hypothesis by examining the moderating effect of male partners’ fluctuating asymmetry (FA) on women’s extrapair and in-pair sexual interests across the cycle” (p. 2024).

Primary Effect:

Association between men’s FA and their partners’ sexual attraction to extra-men during their fertile phase.

Results:

“Scatterplots and regressions of women’s sexual attraction to extra-pair men as a function of their primary partner’s FA. Solid diamonds and solid regression line: fertile phase. …. *r* = 0.37, p =0.006, …” (p. 2025).

Recalculated *p* = .0069; *df* = 50

Study exclusions

Adams & Niswander (1967).

This study examined differences in palmar dermatoglyphics and dentition in members of families with an instance of cleft palate compared with controls. Omnibus tests only were reported, and are not usable in *p*-curve analyses.

Lalumière, Harris, & Rice (2001).

This study examined the relationship between FA and Psychopathy in three groups, Psychopath offenders, Non-psychopath offenders, and Non-offenders. The main effect of group was reported, however the primary effect of interest, the difference in FA between Psychopath offenders and Non-psychopath offenders, was presented only in graphical form so precise values cannot be established.

Żądzińska (2007):

This study performed a multiple regression between 14 predictor variables and each of 8 different cephalic FA measurements. Effects are presented as multiple R, representing a linear combination of the predictors, and cannot be interpreted in the same way as a Pearson *r*.