Errata in Moran and Smith's (1966) *Commentary on R. A. Fisher's Paper on the Correlations Between Relatives on the Supposition of Mendelian Inheritance*

July 19, 2013

The commentary by Moran and Smith (1966) is an invaluable guide to understanding the intricate arguments put forth in Fisher's (1918) classic paper on the correlations between relatives. Unfortunately, Moran and Smith itself contains a few misprints and obscurities, which I have attempted to remedy.

There are no doubt errata that I have failed to note. Please send me an email if you have any additional errata to point out or feel that any of my attempted corrections are in error.

Fisher's argument that linkage should not affect his results remains unclear to me even after reading the exegesis of Moran and Smith. Since derivations using path analysis or conditional expectations seem to bear out Fisher's argument, perhaps this point is no longer worth pursuing. I will still be grateful, however, to any reader who can direct me to relevant literature illuminating Fisher's particular line of thought. I have not made any corrections to this portion of the commentary.

Errata

Fisher calls the numbered parts of his paper 'Articles,' but Moran and Smith refer to them as 'paragraphs' or 'sections.'

pp. 3–4: The beginning of the paragraph running across the two pages should be replaced by the following:

> Suppose that x and X are measurements on two parents, and z on their offspring. Then the proportion of the variance of z accounted for by the two parents is the squared multiple correlation of z with x and X, i.e. in this case

the squared correlation of z with $x+X$. The variances of x, X, and z are σ^2 each and the variance of $x+X$ is $2\sigma^2(1+r_m)$, where r_m is the correlation between x and X, i.e. the 'marital' correlation. The covariance of z with $(x+X)$ is the mean value of $z(x+X)$ which equals $2\sigma^2 r_p$ where r_p is the correlation between a son and a parent. The multiple correlation is therefore $\sqrt{2}r_p(1+r_m)^{-1/2}$ and in the particular case considered the square of this is

$$\left[\sqrt{2}(.5066)(1.2804)^{-1/2}\right]^2 = 0.4009,$$

which agrees closely with Fisher's value 0.4010.

p. 8: Equation (IIIa) is missing a term. It should start: "$m + 2d(\overline{PR} - \overline{Q}^2) + \cdots$"

p. 9: The unnumbered equation above Table D should read: "$m + 2d(PR - Q^2)$."

p. 9: Replace "first and second" in the first sentence below Table D with "second and third."

p. 10: Replace the α in the first term of Equation (IV) with a.

p. 11: The second sentence of the first commentary paragraph should read: "Fisher proposes to replace these values by $c+b$, c, $c-b$."

p. 14: The first unnumbered equation in Fisher's text should be

$$\frac{x}{\sigma^2}\frac{\beta^2}{2}.$$

This is also a misprint in Fisher's original.

p. 28: The unnumbered integral near the bottom of the page contains a misprint. The last term of the exponential argument on the LHS should be

$$-\frac{\mu^2x^2 - 2\mu xy + \mu^2y^2}{2V(1-\mu^2)}.$$

p. 29: The clause after the unnumbered equation near the middle of the page should read: "whilst the proportion of D, H and R amongst the mates entering into these matings is

$$\frac{1}{2}\frac{f_1}{f_1+f_2}, \frac{f_2}{f_1+f_2}, \frac{1}{2}\frac{f_1}{f_1+f_2}."$$

p. 30: Prior to the last equation before Fisher's text, replace the α with δ.

p. 34: In the sentence after Fisher's Equation (XIXa), replace $R'D'$ with RR'. This is also a misprint in Fisher's original.

p. 35: Find the sentence that reads: "We therefore apply the same formula ..." The RHS of the concluding equation should be

$$i'P' - k'R' + A(I'P' - K'R').$$

p. 36: Replace the I on the RHS of the equation in the first sentence of the commentary with 1.

p. 39: Replace the $=$ sign in the first line of the equation following Table R with $+$.

p. 53: The equation after the expressions for τ^2 and ϵ^2 should be

$$\begin{aligned} \overline{v}_s &= \frac{1}{2}\tau^2 + \frac{3}{4}\epsilon^2 + \frac{V_1}{c_1} - V \\ &= \frac{1}{4}\left\{2c_2(1-A) + 3(1-c_2)\right\} + \frac{V}{c_1} - V. \end{aligned}$$

Replace the c_2 in the next equation with c_1.

p. 56: Replace the z in the third equation with $\overline{z}$.