Errata: Corrections to a 1961 paper on variance components

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Searle and Henderson (1961) develop computing procedures for estimating variance components in the 2-way classification, mixed model, the prime object of that paper being presentation of a formula convenient for computing one of the more complicated coefficients that arises in the estimation procedure. An important error in that formula is now corrected; other minor errors are also noted.

1. In the definition of U following equation (15) on page 611 the elements should be $\sum_{j=1}^{b} n_{ij}^2$, with the upper limit of summation being b and not b-1; and V has order b-1 by a, with elements $v_{ji} = n_{ij}^2$ for j = 1,2,...,b-1 and i = 1,2,...,a. Consequences of the correction to U are as follows.

   (a) On page 612, λ_i should be $\sum_{j=1}^{b} n_{ij}^2/n_i$. with upper limit of summation b and not b-1.

   (b) Equation (16) on page 612 can be replaced by $\sum_{j'=1}^{b} f_{i,jj'} = 0$ for all i and j.

   (c) Table 2 on page 615 is as Table 2 herewith.

   (d) The computed k_β on page 615 is 99.37 and not 77.16.

2. In two places at the bottom of page 610 a B should obviously be B'.

3. In equation (15) the first "2" should be omitted.

4. In the expression for k_β on page 612 the "2" should be omitted from the last term.

5. The computed value of $R_\beta = r'Dr$ on page 614 should be 737288 and not 736703.

The original paper gives few details of the derivation of the results presented. These are available in Searle (1967) which validates in detail, the corrections indicated above.

Acknowledgment

I am most grateful to W. R. Harvey of Ohio State University for bringing these errors to my notice.

References

Searle, S. R. (1967). Proof and correction of a result in a 1961 paper on variance components. Paper number BU-235-M (20 pp.), in the mimeograph series of the Biometrics Unit, Cornell University, Ithaca, N.Y.

Searle, S. R., and Henderson, C. R. (1961). Computing procedures for estimating components of variance in the 2-way classification, mixed model. Biometrics, 17, 607-616.

Table 2

Terms used in calculating k_β

i	λ_i	$f_{i,11}$	$f_{i,22}$	$f_{i,33}$	$f_{i,44}$	$-f_{i,12}$	$-f_{i,13}$	$-f_{i,14}$	$-f_{i,23}$	$-f_{i,24}$	$-f_{i,34}$
1	3.0	1.1	3.6	6.3	8.0	0.0	.3	.8	1.2	2.4	4.8
2	5.5	8.775	24.3	14.0	28.175	3.15	.9	4.725	5.4	15.75	7.7
3	13.6	106.56	—	106.56	138.24	—	37.44	69.12	—	—	69.12
4	12.52	110.9376	110.9376	123.4376	123.4376	33.0624	38.9376	38.9376	38.9376	38.9376	45.5624
5	25.0	312.5	312.5	—	—	312.5	—	—	—	—	—
Total	59.62	539.8726	451.3376	250.2976	297.8526	348.7124	77.5776	113.5826	45.5376	57.0876	127.1824

Note: the last 6 columns are prefixed by minus signs.