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Novometrics *vs.* Polychoric Correlation: Number of Lambs Born Over Two Years

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This study assesses the agreement between the number of lambs born to 227 ewes over two consecutive years. Polychoric correlation could not be validly used to assess agreement because underlying distributional assumptions were violated.[1] Requiring no such distributional assumptions, prior analysis via ODA[2] identified moderate, statistically significant agreement. Novometric analysis[3] conducted presently identified the globally-optimal model for this application.

Data analyzed herein are presented in Table 1.

Table 1: Number of Lambs Born to 227 Ewes Over Two Years[1]

	Lambs Born in 1953		
Lambs Born in 1952	Zero	One	Two
Zero	58	52	1
One	26	58	3
Two	8	12	9

Using ODA to evaluate the inter-year agreement (replicability) of these measures, a linear model emerged: if lambs born in 1952= zero, predict lambs born in 1953=zero; if lambs born in 1952=one, predict lambs born in 1953= one; if lambs born in 1952=three, predict lambs born in 1953=three.[2-8] Model effect strength (*relatively weak* ESS=25.0, $p<0.0001$) exactly equaled the threshold used to define the upper-bound of a relatively weak (ESS$\leq$25) effect.[2,3]

Using novometric analysis[3,8-13] to assess inter-year agreement (1953 data were treated as the ordered class variable, and 1952 data as the ordered attribute) the following model emerged: if lambs born in 1952=zero or one, then predict that lambs born in 1953=zero or one; otherwise predict lambs born in 1953=two. The sensitivity of this model was 98.0% for classifying actual events of no or one birth of a lamb, and 31.0% of actual events involving birth of two lambs: *moderate* ESS=29.0, $p<0.0001$. The predictive value (indicating the ability of the model to make accurate point predictions for individual events[2,3,14]) was 90.7% for births of no or one lamb, and 69.2% for births of two lambs: *relatively strong* ESP (effect strength for predictive value)=59.9.

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Author Notes

Data analyzed herein are publically available. No conflict of interest was reported.

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