Analyses of breeding values for simulated discrete visual score data with different distributions and different genetic parameters

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The aim was to evaluate the effect of the form (Y) of assigning discrete visual scores (VS) based on a continuous underlying scale (US) on the estimates of the breeding values (BV) for two heritability values (H: 0.25 and 0.49) and two contemporary group variance values (GC: 0.04 and 0.16). Herds with 40 bulls and 1,200 cows, mated at random, were simulated for 20 years. Direct and maternal BV, maternal permanent environmental, contemporary group and age of dam effects were generated and combined with an independent error term to form the phenotype in the US. The VS data were assigned according to symmetric relative and fixed and asymmetric relative distributions. The BV was estimated using a linear model with the Gibbs Sampler. The procedure was repeated five times for each situation. Correlation (R) between estimated and true BV was obtained for each animal class (sires, dams and offspring). Significant effects of H on R for all animal classes were found (0.49 presented greater R). For bulls, significant effects of H x GC interaction on R were found (greater H and smaller GC presented greater R). Y had no effect on R. Larger samples may be needed for better evaluating the effects of the factors on BV estimates for VS.