# Supplemental Materials

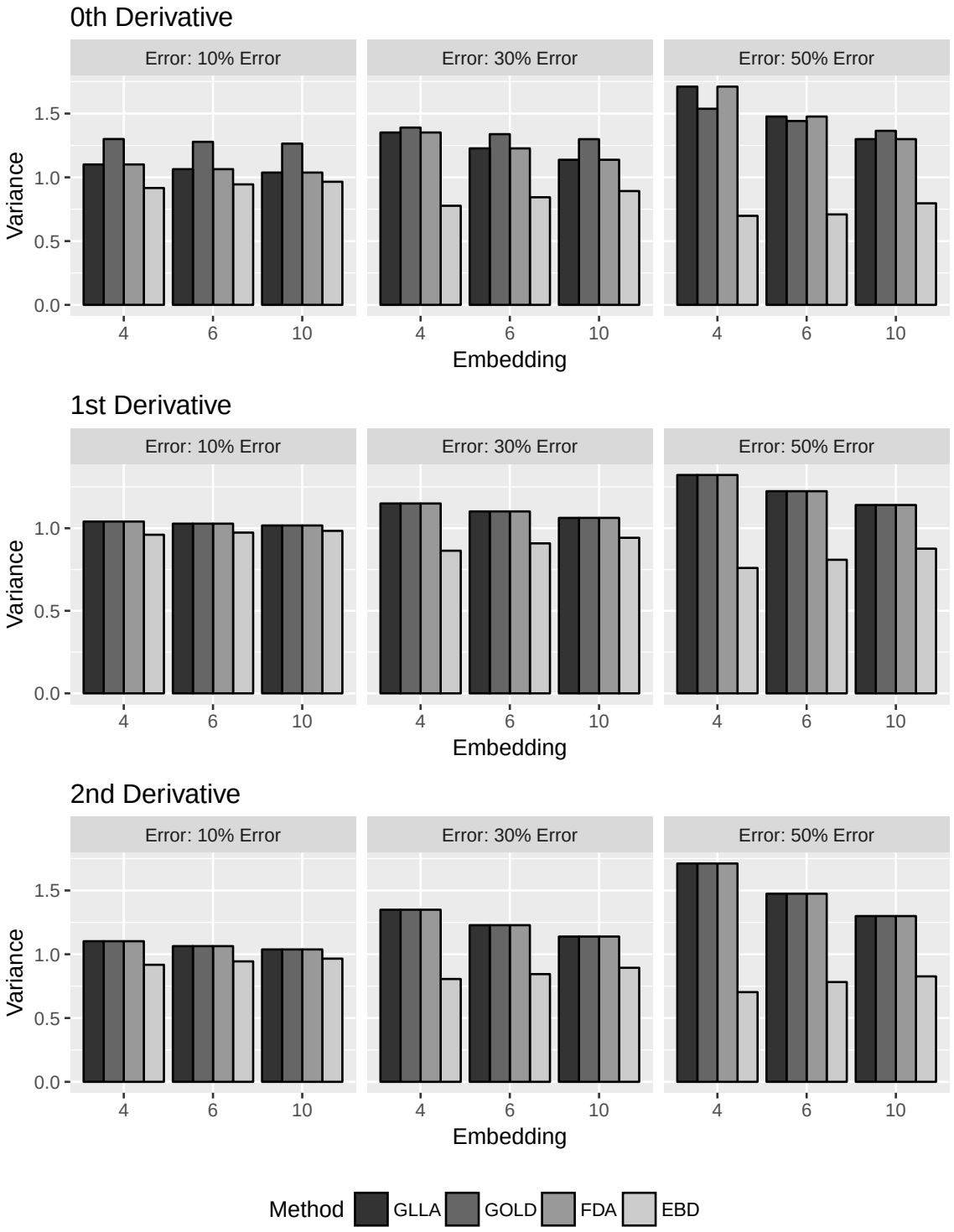


*Figure 1.* SIMULATION 1: Variance in Simulation 1. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the embedding dimension is varied. Results are for a sample size of 500 individuals, but the pattern of results was the same for smaller sample sizes.

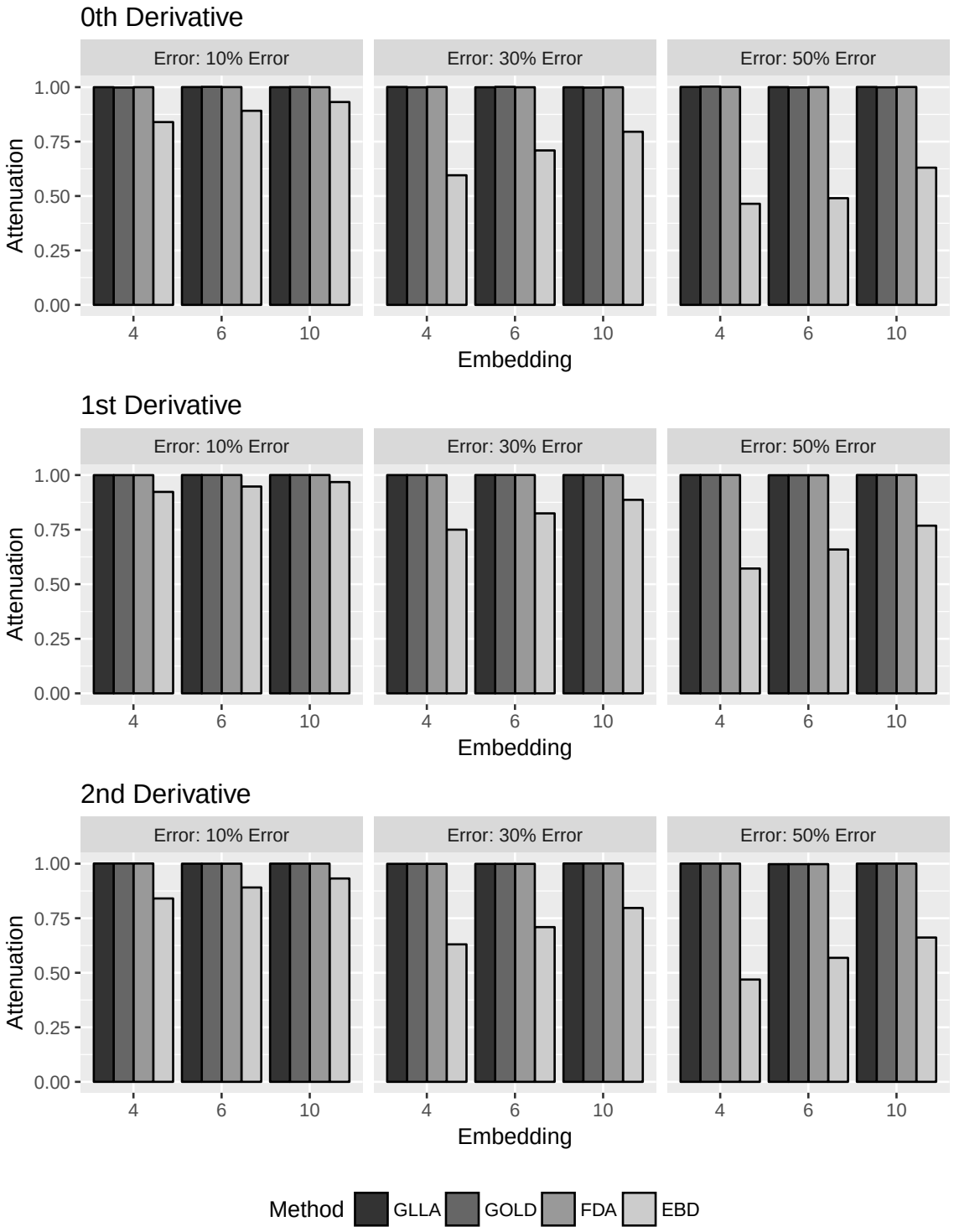


*Figure 2.* SIMULATION 1: Attenuation in Simulation 1. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the embedding dimension is varied. Results are for a sample size of 500 individuals, but the pattern of results was the same for smaller sample sizes.

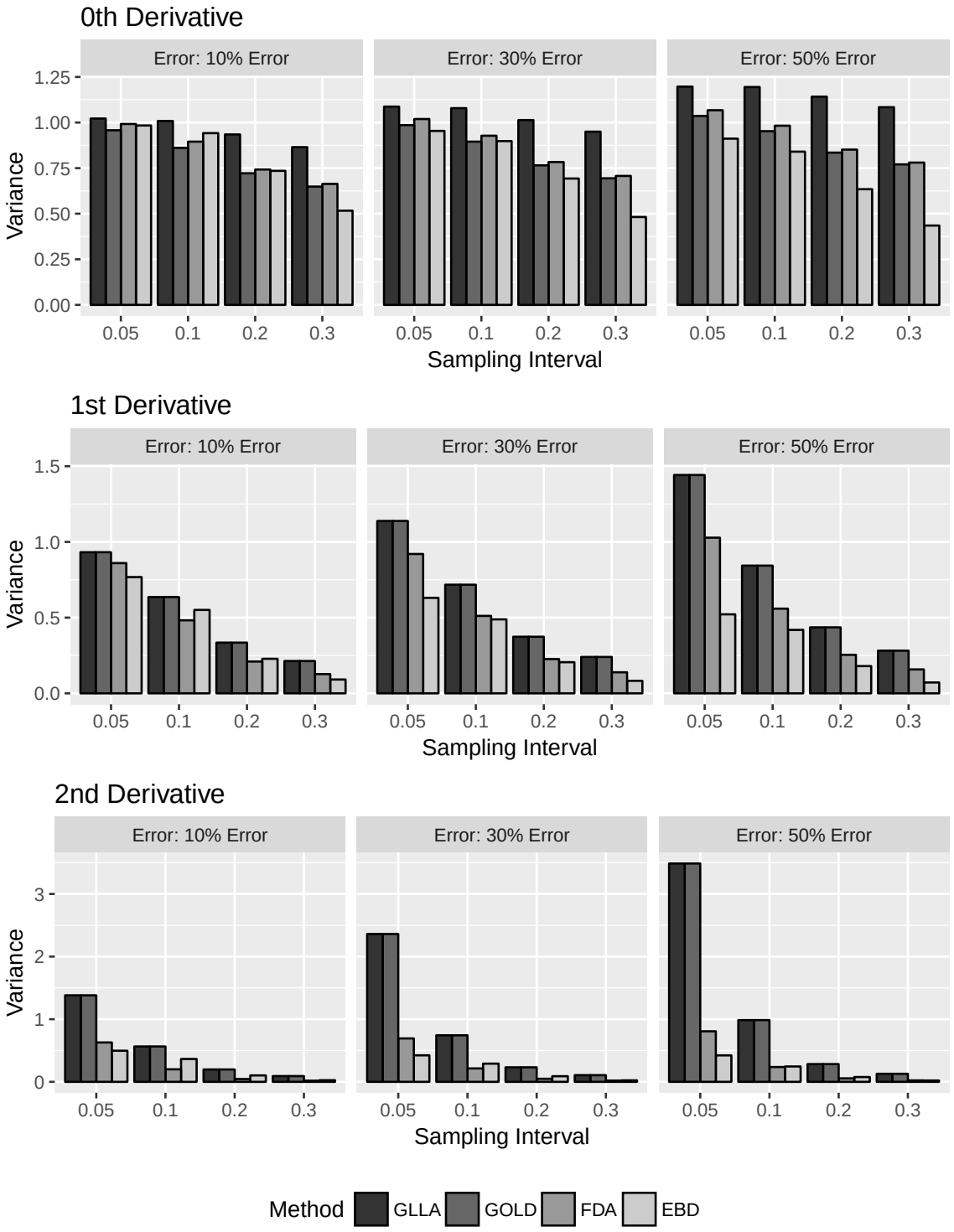


*Figure 3.* SIMULATION 2: Variance in Simulation 2. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals, but the pattern of results was the same for smaller sample sizes.

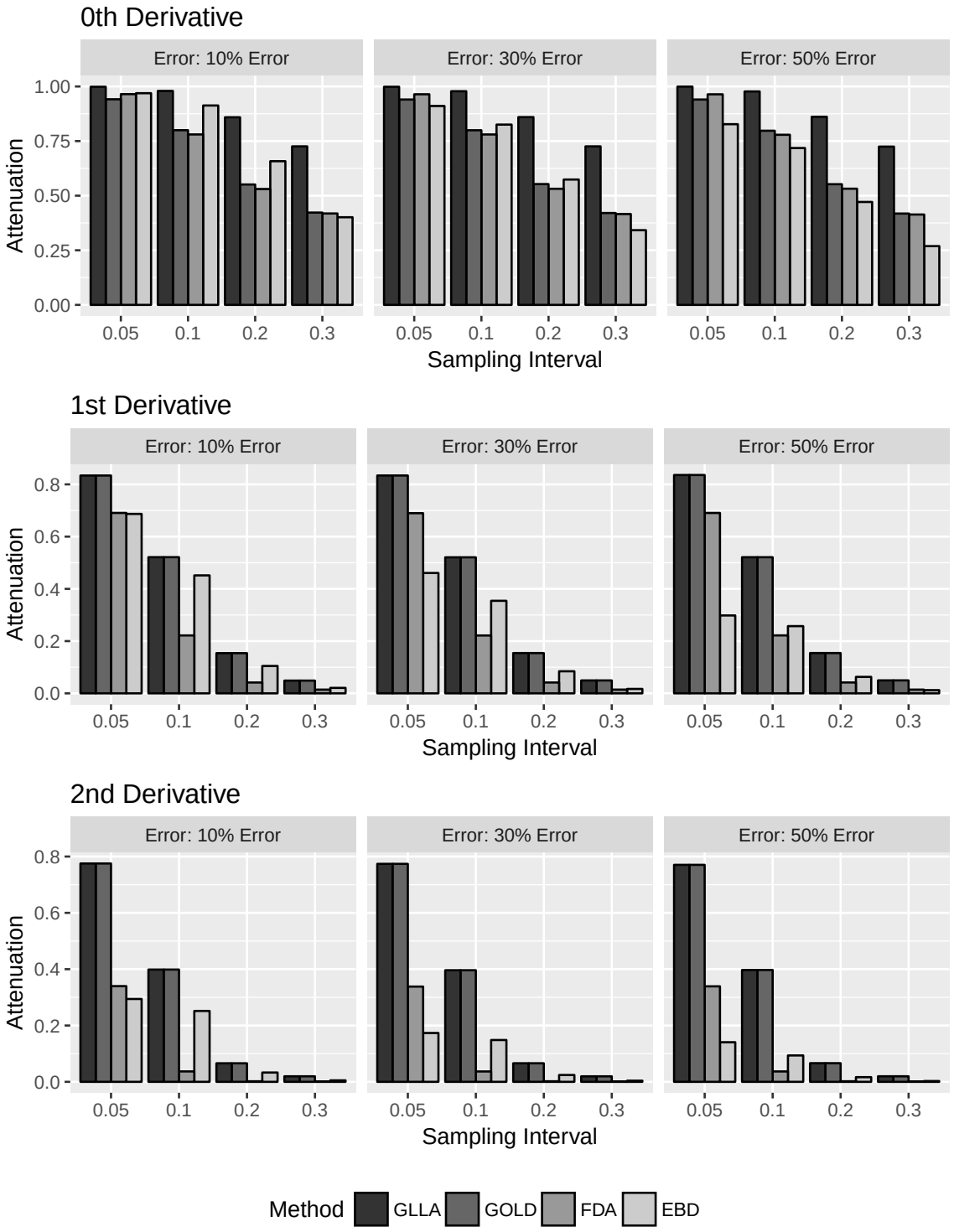


*Figure 4.* SIMULATION 2: Attenuation in Simulation 2. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals, but the pattern of results was the same for smaller sample sizes.

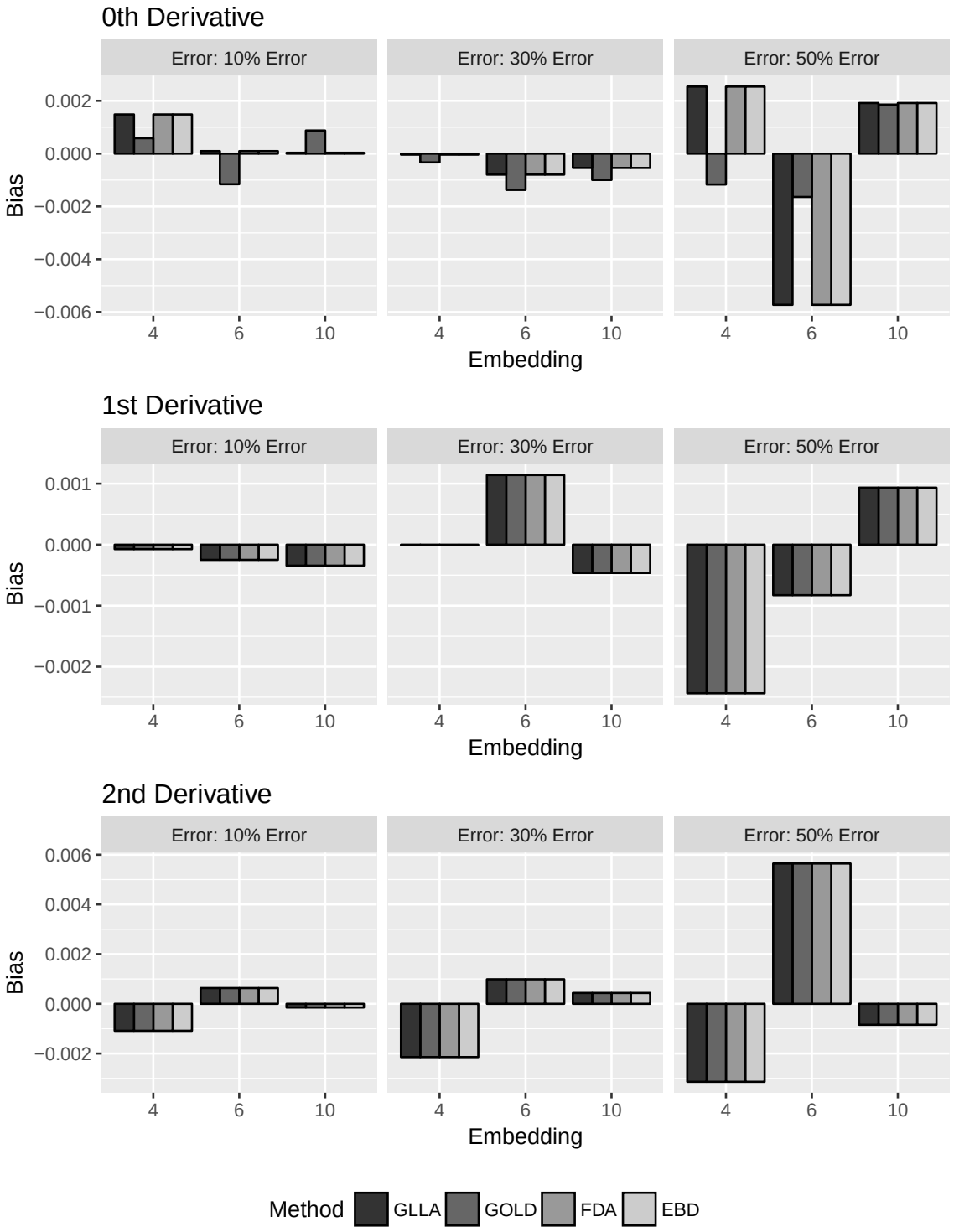


*Figure 5.* ROBUSTNESS Non-Normality: Bias in non-normally distributed derivatives, divided by the standard deviation of true scores. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals.

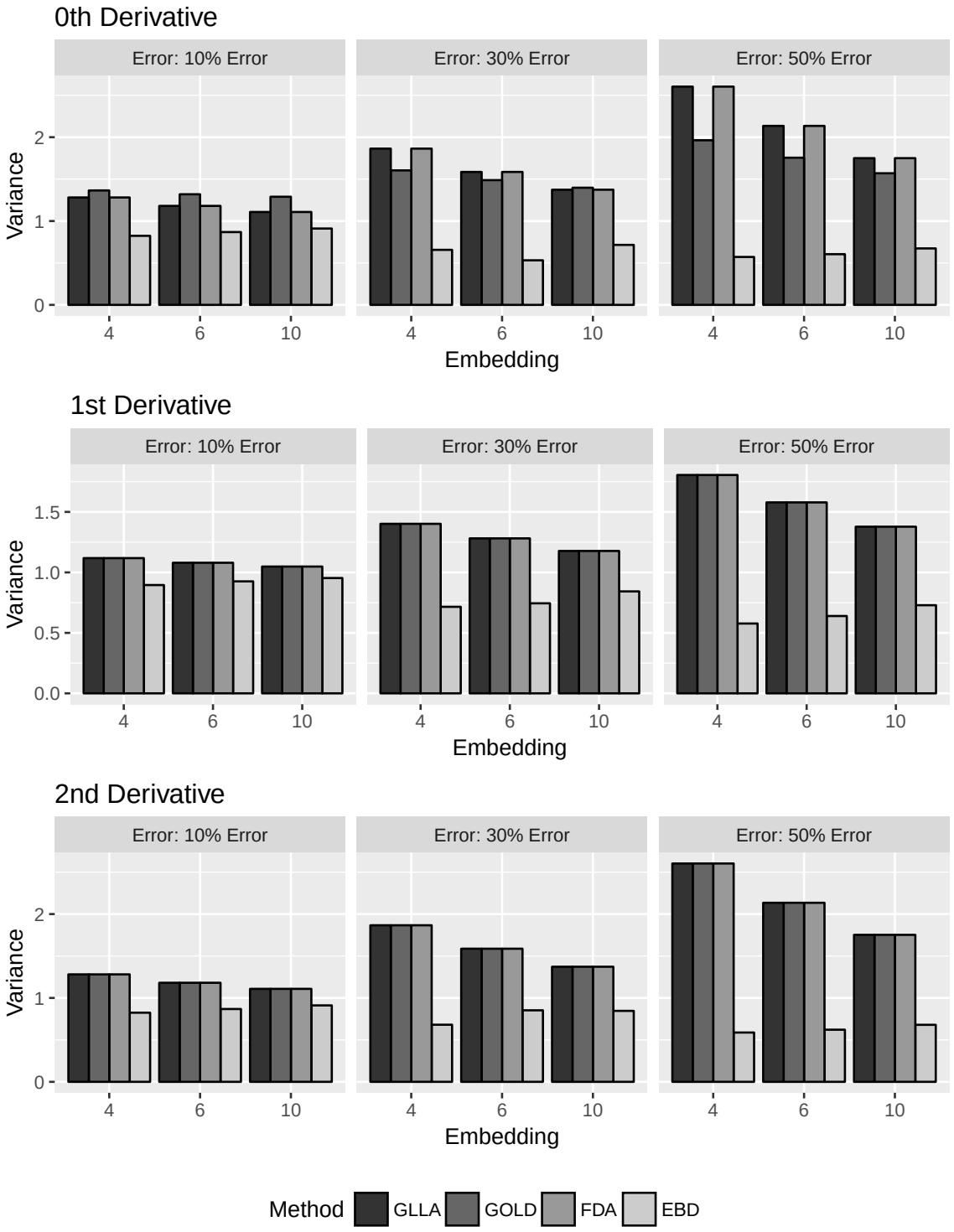


*Figure 6.* ROBUSTNESS Non-Normality: Variance in non-normally distributed derivatives. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals.

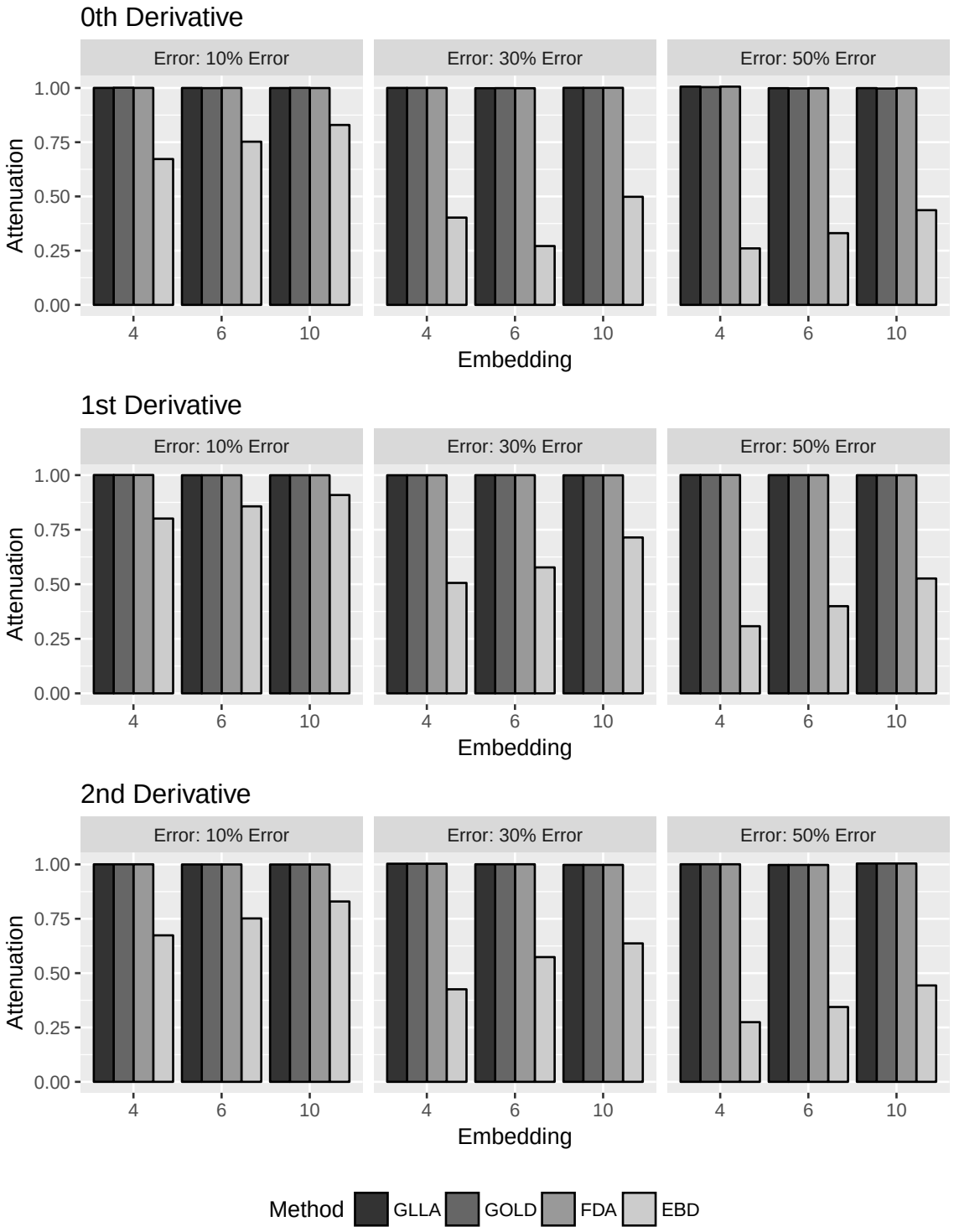


*Figure 7.* ROBUSTNESS Non-Normality: Attenuation in non-normally distributed derivatives. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals.

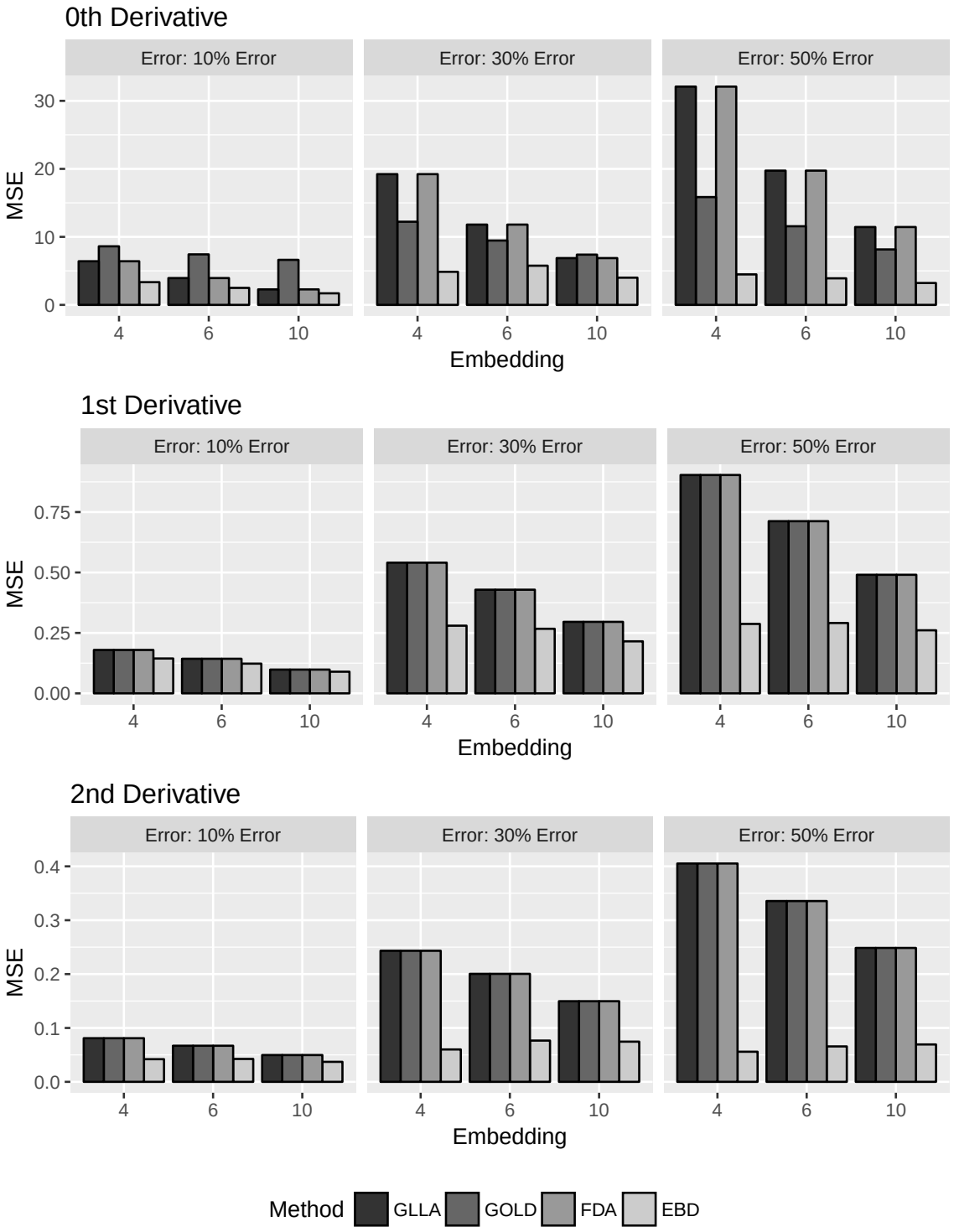


*Figure 8.* ROBUSTNESS Non-Normality: MSE in non-normally distributed derivatives. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals.

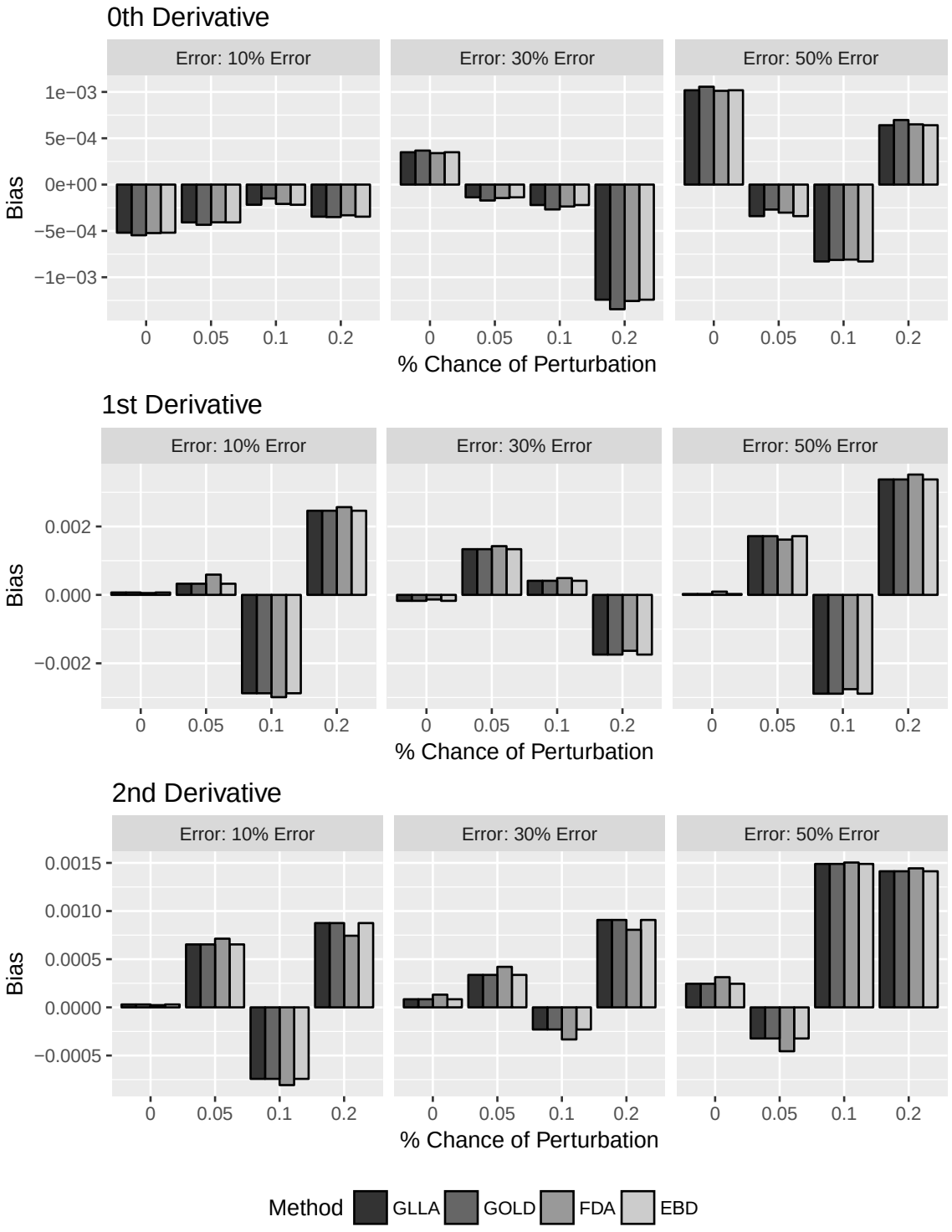


*Figure 9.* ROBUSTNESS Process Error: Bias in derivative with process error, divided by the standard deviation of true scores. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals and a sampling interval of 0.05.

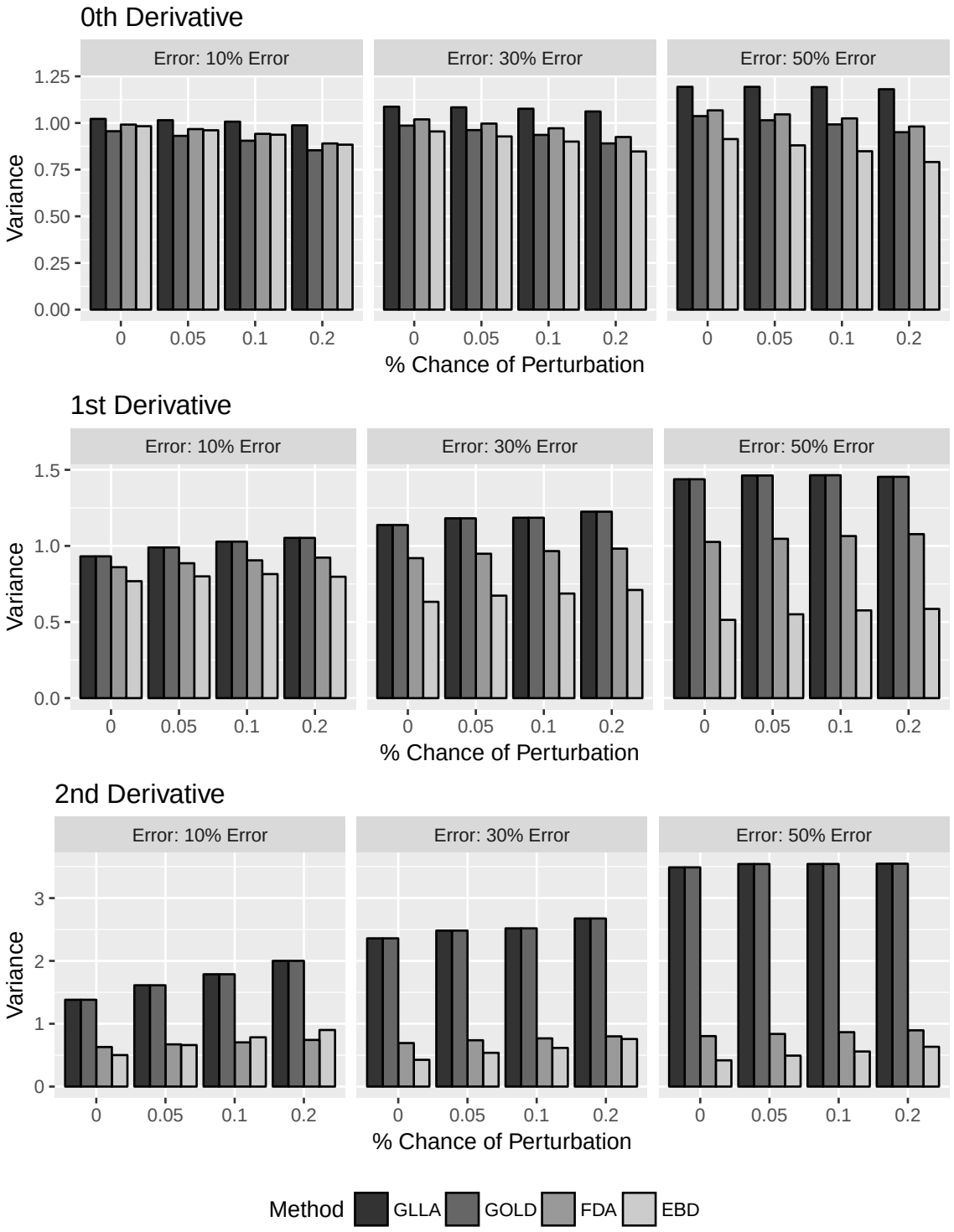


*Figure 10.* ROBUSTNESS Process Error: Variance in derivative with process error. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals and a sampling interval of 0.05.

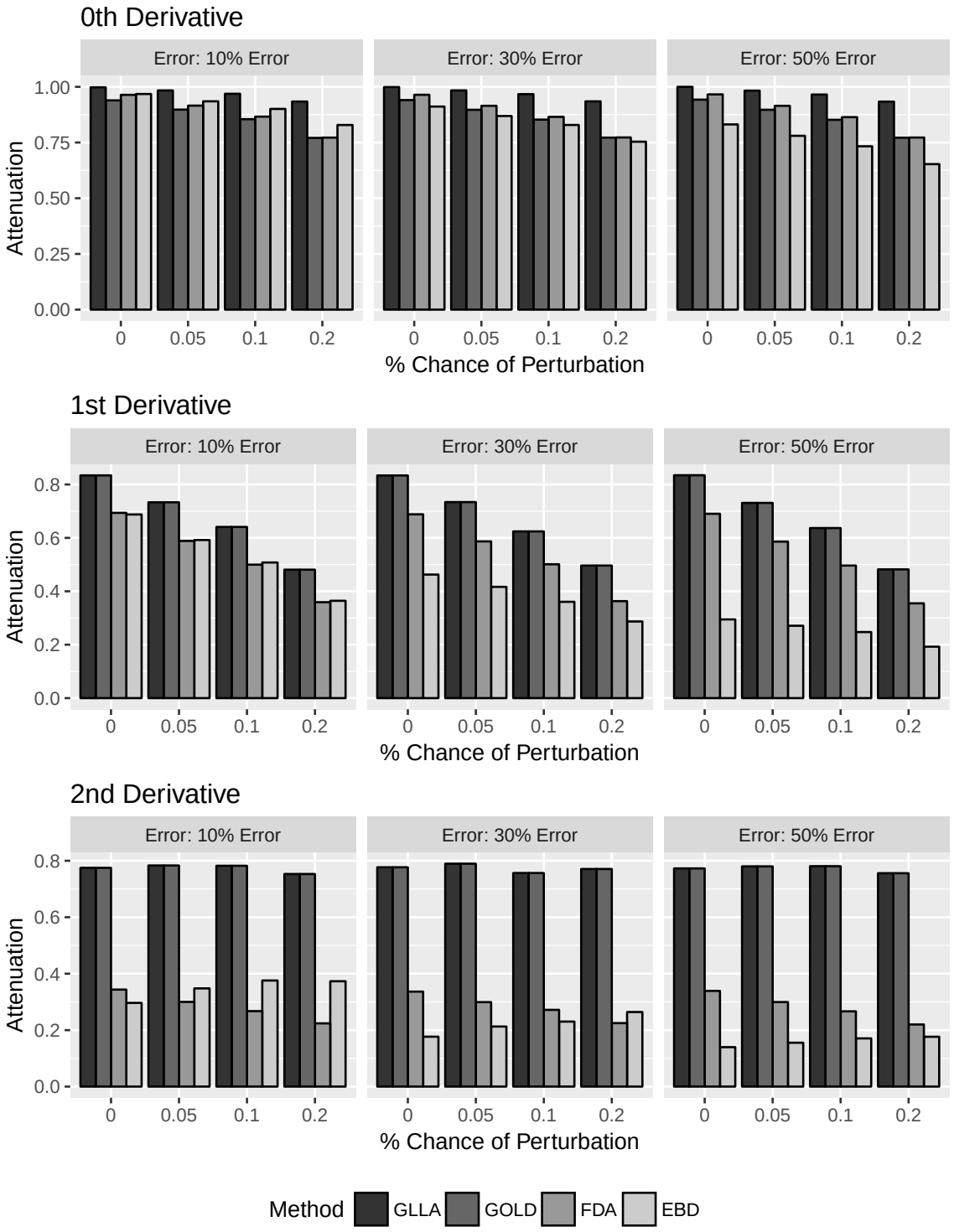


*Figure 11.* ROBUSTNESS Process Error: Attenuation in derivative with process error. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals and a sampling interval of 0.05.

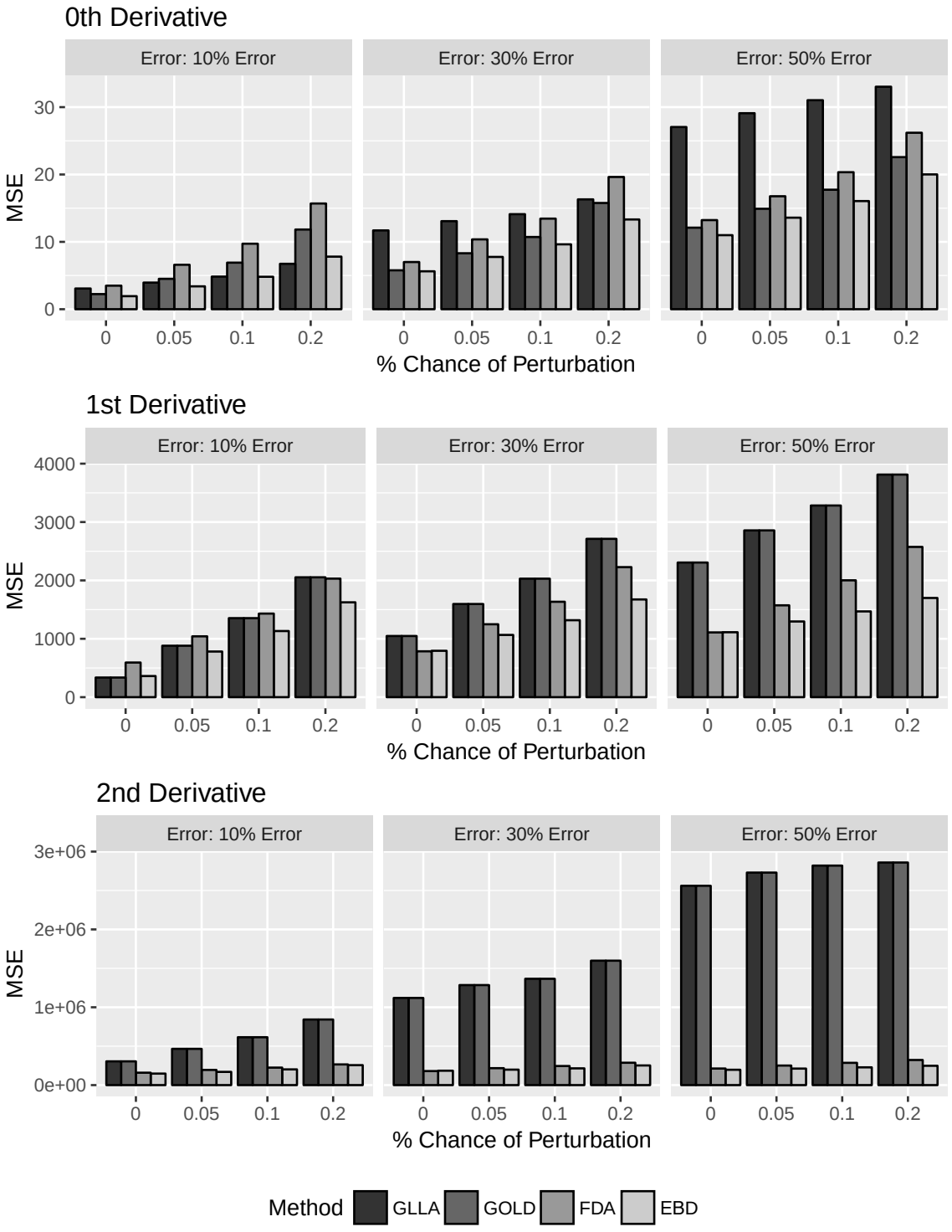


*Figure 12.* ROBUSTNESS Process Error: MSE in derivative with process error. The rows and columns vary the order of derivative estimate and the proportion of measurement error. On the x-axis of each panel the sampling rate is varied. Results are for a sample size of 500 individuals and a sampling interval of 0.05.