**Table S1**

*Mean Absolute Bias for Graded Response Model*

| Skew/Kurtosis | N | Test Length | *a* | *b1* | *b2* | *b3* | *b4* |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0.00/0.00 | 125 | 10 | 0.25 | 0.21 | 0.15 | 0.15 | 0.22 |
| 0.00/0.00 | 125 | 20 | 0.23 | 0.21 | 0.14 | 0.15 | 0.21 |
| 0.00/0.00 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/0.00 | 250 | 10 | 0.17 | 0.15 | 0.10 | 0.10 | 0.15 |
| 0.00/0.00 | 250 | 20 | 0.16 | 0.15 | 0.10 | 0.10 | 0.15 |
| 0.00/0.00 | 250 | 40 | 0.15 | 0.16 | 0.11 | 0.11 | 0.16 |
| 0.00/0.00 | 500 | 10 | 0.12 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.00/0.00 | 500 | 20 | 0.11 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.00/0.00 | 500 | 40 | 0.11 | 0.12 | 0.09 | 0.09 | 0.12 |
| 0.00/0.00 | 1000 | 10 | 0.08 | 0.08 | 0.05 | 0.05 | 0.08 |
| 0.00/0.00 | 1000 | 20 | 0.08 | 0.08 | 0.06 | 0.06 | 0.08 |
| 0.00/0.00 | 1000 | 40 | 0.08 | 0.08 | 0.06 | 0.06 | 0.09 |
| 0.75/1.30 | 125 | 10 | 0.25 | 0.22 | 0.14 | 0.17 | 0.24 |
| 0.75/1.30 | 125 | 20 | 0.23 | 0.20 | 0.14 | 0.16 | 0.23 |
| 0.75/1.30 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.75/1.30 | 250 | 10 | 0.17 | 0.16 | 0.10 | 0.11 | 0.17 |
| 0.75/1.30 | 250 | 20 | 0.16 | 0.15 | 0.10 | 0.11 | 0.17 |
| 0.75/1.30 | 250 | 40 | 0.16 | 0.15 | 0.11 | 0.12 | 0.17 |
| 0.75/1.30 | 500 | 10 | 0.12 | 0.12 | 0.08 | 0.08 | 0.12 |
| 0.75/1.30 | 500 | 20 | 0.11 | 0.11 | 0.07 | 0.08 | 0.12 |
| 0.75/1.30 | 500 | 40 | 0.11 | 0.12 | 0.08 | 0.09 | 0.13 |
| 0.75/1.30 | 1000 | 10 | 0.09 | 0.09 | 0.05 | 0.06 | 0.09 |
| 0.75/1.30 | 1000 | 20 | 0.09 | 0.09 | 0.06 | 0.06 | 0.09 |
| 0.75/1.30 | 1000 | 40 | 0.09 | 0.09 | 0.07 | 0.08 | 0.10 |
| 1.25/1.30 | 125 | 10 | 0.24 | 0.22 | 0.14 | 0.18 | 0.25 |
| 1.25/1.30 | 125 | 20 | 0.23 | 0.20 | 0.14 | 0.17 | 0.24 |
| 1.25/1.30 | 125 | 40 | NA | NA | NA | NA | NA |
| 1.25/1.30 | 250 | 10 | 0.18 | 0.17 | 0.11 | 0.12 | 0.18 |
| 1.25/1.30 | 250 | 20 | 0.17 | 0.15 | 0.10 | 0.12 | 0.18 |
| 1.25/1.30 | 250 | 40 | 0.17 | 0.16 | 0.11 | 0.13 | 0.19 |
| 1.25/1.30 | 500 | 10 | 0.13 | 0.13 | 0.08 | 0.09 | 0.13 |
| 1.25/1.30 | 500 | 20 | 0.12 | 0.12 | 0.07 | 0.09 | 0.13 |
| 1.25/1.30 | 500 | 40 | 0.12 | 0.12 | 0.08 | 0.09 | 0.14 |
| 1.25/1.30 | 1000 | 10 | 0.10 | 0.11 | 0.06 | 0.07 | 0.10 |
| 1.25/1.30 | 1000 | 20 | 0.09 | 0.10 | 0.06 | 0.07 | 0.10 |
| 1.25/1.30 | 1000 | 40 | 0.09 | 0.09 | 0.06 | 0.07 | 0.10 |
| 1.75/6.90 | 125 | 10 | 0.27 | 0.26 | 0.16 | 0.20 | 0.30 |
| 1.75/6.90 | 125 | 20 | 0.24 | 0.23 | 0.15 | 0.18 | 0.27 |
| 1.75/6.90 | 125 | 40 | NA | NA | NA | NA | NA |
| 1.75/6.90 | 250 | 10 | 0.21 | 0.23 | 0.12 | 0.15 | 0.23 |
| 1.75/6.90 | 250 | 20 | 0.20 | 0.20 | 0.12 | 0.14 | 0.22 |
| 1.75/6.90 | 250 | 40 | 0.18 | 0.19 | 0.12 | 0.14 | 0.22 |
| 1.75/6.90 | 500 | 10 | 0.18 | 0.19 | 0.10 | 0.12 | 0.19 |
| 1.75/6.90 | 500 | 20 | 0.16 | 0.17 | 0.09 | 0.11 | 0.17 |
| 1.75/6.90 | 500 | 40 | 0.15 | 0.15 | 0.09 | 0.11 | 0.18 |
| 1.75/6.90 | 1000 | 10 | 0.17 | 0.18 | 0.08 | 0.10 | 0.16 |
| 1.75/6.90 | 1000 | 20 | 0.14 | 0.15 | 0.07 | 0.09 | 0.15 |
| 1.75/6.90 | 1000 | 40 | 0.12 | 0.13 | 0.07 | 0.09 | 0.14 |
| 2.25/6.90 | 125 | 10 | 0.29 | 0.29 | 0.16 | 0.22 | 0.33 |
| 2.25/6.90 | 125 | 20 | 0.25 | 0.24 | 0.14 | 0.19 | 0.27 |
| 2.25/6.90 | 125 | 40 | NA | NA | NA | NA | NA |
| 2.25/6.90 | 250 | 10 | 0.25 | 0.28 | 0.14 | 0.17 | 0.27 |
| 2.25/6.90 | 250 | 20 | 0.22 | 0.22 | 0.12 | 0.16 | 0.25 |
| 2.25/6.90 | 250 | 40 | 0.20 | 0.20 | 0.12 | 0.15 | 0.24 |
| 2.25/6.90 | 500 | 10 | 0.22 | 0.25 | 0.12 | 0.14 | 0.22 |
| 2.25/6.90 | 500 | 20 | 0.19 | 0.20 | 0.10 | 0.12 | 0.20 |
| 2.25/6.90 | 500 | 40 | 0.17 | 0.17 | 0.09 | 0.12 | 0.19 |
| 2.25/6.90 | 1000 | 10 | 0.21 | 0.24 | 0.10 | 0.12 | 0.19 |
| 2.25/6.90 | 1000 | 20 | 0.17 | 0.18 | 0.08 | 0.10 | 0.17 |
| 2.25/6.90 | 1000 | 40 | 0.14 | 0.15 | 0.08 | 0.09 | 0.15 |
| 0.00/1.30 | 125 | 10 | 0.25 | 0.23 | 0.15 | 0.16 | 0.22 |
| 0.00/1.30 | 125 | 20 | 0.23 | 0.22 | 0.15 | 0.15 | 0.22 |
| 0.00/1.30 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/1.30 | 250 | 10 | 0.17 | 0.17 | 0.11 | 0.11 | 0.17 |
| 0.00/1.30 | 250 | 20 | 0.16 | 0.16 | 0.11 | 0.11 | 0.16 |
| 0.00/1.30 | 250 | 40 | 0.16 | 0.16 | 0.11 | 0.11 | 0.17 |
| 0.00/1.30 | 500 | 10 | 0.12 | 0.12 | 0.08 | 0.08 | 0.12 |
| 0.00/1.30 | 500 | 20 | 0.11 | 0.11 | 0.07 | 0.08 | 0.12 |
| 0.00/1.30 | 500 | 40 | 0.12 | 0.12 | 0.08 | 0.08 | 0.12 |
| 0.00/1.30 | 1000 | 10 | 0.09 | 0.08 | 0.05 | 0.05 | 0.08 |
| 0.00/1.30 | 1000 | 20 | 0.08 | 0.08 | 0.06 | 0.06 | 0.09 |
| 0.00/1.30 | 1000 | 40 | 0.08 | 0.09 | 0.06 | 0.06 | 0.09 |
| 0.00/1.75 | 125 | 10 | 0.25 | 0.23 | 0.15 | 0.16 | 0.24 |
| 0.00/1.75 | 125 | 20 | 0.23 | 0.22 | 0.15 | 0.15 | 0.22 |
| 0.00/1.75 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/1.75 | 250 | 10 | 0.17 | 0.17 | 0.11 | 0.11 | 0.17 |
| 0.00/1.75 | 250 | 20 | 0.16 | 0.16 | 0.11 | 0.11 | 0.16 |
| 0.00/1.75 | 250 | 40 | 0.16 | 0.17 | 0.11 | 0.11 | 0.17 |
| 0.00/1.75 | 500 | 10 | 0.12 | 0.12 | 0.08 | 0.08 | 0.12 |
| 0.00/1.75 | 500 | 20 | 0.11 | 0.12 | 0.08 | 0.08 | 0.12 |
| 0.00/1.75 | 500 | 40 | 0.12 | 0.13 | 0.09 | 0.09 | 0.13 |
| 0.00/1.75 | 1000 | 10 | 0.09 | 0.09 | 0.06 | 0.06 | 0.09 |
| 0.00/1.75 | 1000 | 20 | 0.09 | 0.09 | 0.06 | 0.06 | 0.09 |
| 0.00/1.75 | 1000 | 40 | 0.08 | 0.09 | 0.06 | 0.06 | 0.09 |
| 0.00/3.75 | 125 | 10 | 0.25 | 0.25 | 0.16 | 0.17 | 0.25 |
| 0.00/3.75 | 125 | 20 | 0.24 | 0.24 | 0.15 | 0.16 | 0.24 |
| 0.00/3.75 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/3.75 | 250 | 10 | 0.19 | 0.19 | 0.12 | 0.12 | 0.19 |
| 0.00/3.75 | 250 | 20 | 0.17 | 0.18 | 0.11 | 0.11 | 0.18 |
| 0.00/3.75 | 250 | 40 | 0.17 | 0.18 | 0.12 | 0.12 | 0.18 |
| 0.00/3.75 | 500 | 10 | 0.14 | 0.14 | 0.09 | 0.09 | 0.14 |
| 0.00/3.75 | 500 | 20 | 0.13 | 0.13 | 0.08 | 0.08 | 0.13 |
| 0.00/3.75 | 500 | 40 | 0.13 | 0.14 | 0.09 | 0.09 | 0.14 |
| 0.00/3.75 | 1000 | 10 | 0.11 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.00/3.75 | 1000 | 20 | 0.10 | 0.11 | 0.06 | 0.07 | 0.11 |
| 0.00/3.75 | 1000 | 40 | 0.10 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.00/6.90 | 125 | 10 | 0.27 | 0.28 | 0.17 | 0.18 | 0.28 |
| 0.00/6.90 | 125 | 20 | 0.25 | 0.25 | 0.16 | 0.17 | 0.25 |
| 0.00/6.90 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/6.90 | 250 | 10 | 0.21 | 0.23 | 0.13 | 0.13 | 0.22 |
| 0.00/6.90 | 250 | 20 | 0.19 | 0.21 | 0.12 | 0.12 | 0.21 |
| 0.00/6.90 | 250 | 40 | 0.18 | 0.20 | 0.12 | 0.13 | 0.20 |
| 0.00/6.90 | 500 | 10 | 0.17 | 0.19 | 0.10 | 0.10 | 0.17 |
| 0.00/6.90 | 500 | 20 | 0.15 | 0.16 | 0.09 | 0.09 | 0.16 |
| 0.00/6.90 | 500 | 40 | 0.15 | 0.16 | 0.10 | 0.10 | 0.16 |
| 0.00/6.90 | 1000 | 10 | 0.15 | 0.15 | 0.08 | 0.08 | 0.15 |
| 0.00/6.90 | 1000 | 20 | 0.13 | 0.14 | 0.08 | 0.08 | 0.14 |
| 0.00/6.90 | 1000 | 40 | 0.12 | 0.12 | 0.07 | 0.07 | 0.13 |

*Note:* NA = zero converged replications.

**Table S2**

*RMSE for Graded Response Model*

| Skew/Kurtosis | N | Test Length | *a* | *b1* | *b2* | *b3* | *b4* |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0.00/0.00 | 125 | 10 | 0.31 | 0.27 | 0.18 | 0.19 | 0.27 |
| 0.00/0.00 | 125 | 20 | 0.29 | 0.26 | 0.18 | 0.19 | 0.26 |
| 0.00/0.00 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/0.00 | 250 | 10 | 0.21 | 0.19 | 0.13 | 0.13 | 0.19 |
| 0.00/0.00 | 250 | 20 | 0.20 | 0.19 | 0.13 | 0.13 | 0.19 |
| 0.00/0.00 | 250 | 40 | 0.19 | 0.20 | 0.14 | 0.14 | 0.20 |
| 0.00/0.00 | 500 | 10 | 0.14 | 0.13 | 0.09 | 0.09 | 0.14 |
| 0.00/0.00 | 500 | 20 | 0.14 | 0.14 | 0.09 | 0.09 | 0.14 |
| 0.00/0.00 | 500 | 40 | 0.14 | 0.15 | 0.11 | 0.11 | 0.16 |
| 0.00/0.00 | 1000 | 10 | 0.10 | 0.09 | 0.06 | 0.06 | 0.10 |
| 0.00/0.00 | 1000 | 20 | 0.10 | 0.10 | 0.07 | 0.07 | 0.10 |
| 0.00/0.00 | 1000 | 40 | 0.10 | 0.11 | 0.08 | 0.08 | 0.11 |
| 0.75/1.30 | 125 | 10 | 0.30 | 0.27 | 0.18 | 0.21 | 0.29 |
| 0.75/1.30 | 125 | 20 | 0.28 | 0.26 | 0.18 | 0.20 | 0.28 |
| 0.75/1.30 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.75/1.30 | 250 | 10 | 0.21 | 0.20 | 0.13 | 0.14 | 0.21 |
| 0.75/1.30 | 250 | 20 | 0.20 | 0.20 | 0.13 | 0.14 | 0.21 |
| 0.75/1.30 | 250 | 40 | 0.20 | 0.20 | 0.13 | 0.15 | 0.22 |
| 0.75/1.30 | 500 | 10 | 0.15 | 0.15 | 0.09 | 0.10 | 0.15 |
| 0.75/1.30 | 500 | 20 | 0.14 | 0.14 | 0.09 | 0.10 | 0.15 |
| 0.75/1.30 | 500 | 40 | 0.14 | 0.15 | 0.11 | 0.11 | 0.16 |
| 0.75/1.30 | 1000 | 10 | 0.11 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.75/1.30 | 1000 | 20 | 0.10 | 0.11 | 0.07 | 0.08 | 0.11 |
| 0.75/1.30 | 1000 | 40 | 0.11 | 0.12 | 0.09 | 0.09 | 0.13 |
| 1.25/1.30 | 125 | 10 | 0.30 | 0.28 | 0.18 | 0.22 | 0.30 |
| 1.25/1.30 | 125 | 20 | 0.29 | 0.26 | 0.17 | 0.21 | 0.30 |
| 1.25/1.30 | 125 | 40 | NA | NA | NA | NA | NA |
| 1.25/1.30 | 250 | 10 | 0.21 | 0.22 | 0.13 | 0.15 | 0.22 |
| 1.25/1.30 | 250 | 20 | 0.20 | 0.20 | 0.13 | 0.15 | 0.22 |
| 1.25/1.30 | 250 | 40 | 0.21 | 0.21 | 0.14 | 0.16 | 0.24 |
| 1.25/1.30 | 500 | 10 | 0.16 | 0.18 | 0.10 | 0.11 | 0.16 |
| 1.25/1.30 | 500 | 20 | 0.15 | 0.15 | 0.09 | 0.10 | 0.16 |
| 1.25/1.30 | 500 | 40 | 0.15 | 0.16 | 0.10 | 0.12 | 0.17 |
| 1.25/1.30 | 1000 | 10 | 0.13 | 0.14 | 0.08 | 0.08 | 0.12 |
| 1.25/1.30 | 1000 | 20 | 0.11 | 0.13 | 0.08 | 0.09 | 0.12 |
| 1.25/1.30 | 1000 | 40 | 0.11 | 0.12 | 0.08 | 0.09 | 0.13 |
| 1.75/6.90 | 125 | 10 | 0.33 | 0.34 | 0.20 | 0.25 | 0.37 |
| 1.75/6.90 | 125 | 20 | 0.30 | 0.30 | 0.19 | 0.23 | 0.33 |
| 1.75/6.90 | 125 | 40 | NA | NA | NA | NA | NA |
| 1.75/6.90 | 250 | 10 | 0.25 | 0.29 | 0.16 | 0.18 | 0.28 |
| 1.75/6.90 | 250 | 20 | 0.23 | 0.26 | 0.15 | 0.17 | 0.27 |
| 1.75/6.90 | 250 | 40 | 0.22 | 0.25 | 0.15 | 0.17 | 0.27 |
| 1.75/6.90 | 500 | 10 | 0.21 | 0.24 | 0.13 | 0.14 | 0.22 |
| 1.75/6.90 | 500 | 20 | 0.19 | 0.21 | 0.11 | 0.13 | 0.21 |
| 1.75/6.90 | 500 | 40 | 0.18 | 0.20 | 0.12 | 0.14 | 0.21 |
| 1.75/6.90 | 1000 | 10 | 0.19 | 0.22 | 0.11 | 0.12 | 0.18 |
| 1.75/6.90 | 1000 | 20 | 0.17 | 0.18 | 0.10 | 0.11 | 0.17 |
| 1.75/6.90 | 1000 | 40 | 0.15 | 0.16 | 0.09 | 0.11 | 0.17 |
| 2.25/6.90 | 125 | 10 | 0.35 | 0.38 | 0.21 | 0.27 | 0.39 |
| 2.25/6.90 | 125 | 20 | 0.31 | 0.31 | 0.18 | 0.23 | 0.34 |
| 2.25/6.90 | 125 | 40 | NA | NA | NA | NA | NA |
| 2.25/6.90 | 250 | 10 | 0.29 | 0.35 | 0.18 | 0.21 | 0.31 |
| 2.25/6.90 | 250 | 20 | 0.26 | 0.30 | 0.16 | 0.19 | 0.30 |
| 2.25/6.90 | 250 | 40 | 0.24 | 0.27 | 0.15 | 0.19 | 0.29 |
| 2.25/6.90 | 500 | 10 | 0.26 | 0.32 | 0.15 | 0.16 | 0.24 |
| 2.25/6.90 | 500 | 20 | 0.22 | 0.26 | 0.13 | 0.15 | 0.23 |
| 2.25/6.90 | 500 | 40 | 0.20 | 0.22 | 0.12 | 0.14 | 0.23 |
| 2.25/6.90 | 1000 | 10 | 0.24 | 0.30 | 0.14 | 0.14 | 0.21 |
| 2.25/6.90 | 1000 | 20 | 0.20 | 0.23 | 0.11 | 0.12 | 0.19 |
| 2.25/6.90 | 1000 | 40 | 0.17 | 0.19 | 0.10 | 0.12 | 0.18 |
| 0.00/1.30 | 125 | 10 | 0.30 | 0.29 | 0.19 | 0.20 | 0.28 |
| 0.00/1.30 | 125 | 20 | 0.29 | 0.28 | 0.19 | 0.20 | 0.27 |
| 0.00/1.30 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/1.30 | 250 | 10 | 0.21 | 0.21 | 0.14 | 0.14 | 0.21 |
| 0.00/1.30 | 250 | 20 | 0.20 | 0.20 | 0.13 | 0.13 | 0.20 |
| 0.00/1.30 | 250 | 40 | 0.20 | 0.21 | 0.14 | 0.14 | 0.21 |
| 0.00/1.30 | 500 | 10 | 0.15 | 0.15 | 0.10 | 0.09 | 0.15 |
| 0.00/1.30 | 500 | 20 | 0.14 | 0.14 | 0.09 | 0.10 | 0.15 |
| 0.00/1.30 | 500 | 40 | 0.14 | 0.15 | 0.10 | 0.11 | 0.16 |
| 0.00/1.30 | 1000 | 10 | 0.11 | 0.10 | 0.07 | 0.07 | 0.10 |
| 0.00/1.30 | 1000 | 20 | 0.10 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.00/1.30 | 1000 | 40 | 0.10 | 0.11 | 0.08 | 0.08 | 0.12 |
| 0.00/1.75 | 125 | 10 | 0.30 | 0.29 | 0.19 | 0.20 | 0.30 |
| 0.00/1.75 | 125 | 20 | 0.29 | 0.28 | 0.19 | 0.20 | 0.28 |
| 0.00/1.75 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/1.75 | 250 | 10 | 0.21 | 0.21 | 0.13 | 0.14 | 0.21 |
| 0.00/1.75 | 250 | 20 | 0.20 | 0.21 | 0.13 | 0.14 | 0.21 |
| 0.00/1.75 | 250 | 40 | 0.20 | 0.21 | 0.14 | 0.14 | 0.21 |
| 0.00/1.75 | 500 | 10 | 0.15 | 0.15 | 0.10 | 0.10 | 0.15 |
| 0.00/1.75 | 500 | 20 | 0.14 | 0.15 | 0.10 | 0.10 | 0.15 |
| 0.00/1.75 | 500 | 40 | 0.15 | 0.16 | 0.11 | 0.12 | 0.17 |
| 0.00/1.75 | 1000 | 10 | 0.11 | 0.11 | 0.07 | 0.07 | 0.11 |
| 0.00/1.75 | 1000 | 20 | 0.10 | 0.11 | 0.07 | 0.08 | 0.11 |
| 0.00/1.75 | 1000 | 40 | 0.10 | 0.11 | 0.08 | 0.08 | 0.12 |
| 0.00/3.75 | 125 | 10 | 0.31 | 0.31 | 0.20 | 0.22 | 0.31 |
| 0.00/3.75 | 125 | 20 | 0.29 | 0.30 | 0.20 | 0.21 | 0.30 |
| 0.00/3.75 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/3.75 | 250 | 10 | 0.22 | 0.23 | 0.15 | 0.15 | 0.23 |
| 0.00/3.75 | 250 | 20 | 0.21 | 0.23 | 0.14 | 0.14 | 0.23 |
| 0.00/3.75 | 250 | 40 | 0.21 | 0.23 | 0.15 | 0.15 | 0.23 |
| 0.00/3.75 | 500 | 10 | 0.17 | 0.17 | 0.11 | 0.11 | 0.17 |
| 0.00/3.75 | 500 | 20 | 0.15 | 0.16 | 0.10 | 0.10 | 0.17 |
| 0.00/3.75 | 500 | 40 | 0.15 | 0.17 | 0.11 | 0.12 | 0.18 |
| 0.00/3.75 | 1000 | 10 | 0.13 | 0.13 | 0.08 | 0.08 | 0.14 |
| 0.00/3.75 | 1000 | 20 | 0.12 | 0.13 | 0.08 | 0.08 | 0.13 |
| 0.00/3.75 | 1000 | 40 | 0.12 | 0.13 | 0.09 | 0.09 | 0.14 |
| 0.00/6.90 | 125 | 10 | 0.32 | 0.35 | 0.22 | 0.24 | 0.35 |
| 0.00/6.90 | 125 | 20 | 0.30 | 0.32 | 0.20 | 0.22 | 0.32 |
| 0.00/6.90 | 125 | 40 | NA | NA | NA | NA | NA |
| 0.00/6.90 | 250 | 10 | 0.25 | 0.28 | 0.17 | 0.17 | 0.27 |
| 0.00/6.90 | 250 | 20 | 0.23 | 0.26 | 0.16 | 0.16 | 0.26 |
| 0.00/6.90 | 250 | 40 | 0.22 | 0.25 | 0.16 | 0.16 | 0.26 |
| 0.00/6.90 | 500 | 10 | 0.20 | 0.22 | 0.13 | 0.13 | 0.21 |
| 0.00/6.90 | 500 | 20 | 0.18 | 0.20 | 0.12 | 0.12 | 0.20 |
| 0.00/6.90 | 500 | 40 | 0.17 | 0.20 | 0.13 | 0.13 | 0.21 |
| 0.00/6.90 | 1000 | 10 | 0.17 | 0.18 | 0.10 | 0.10 | 0.18 |
| 0.00/6.90 | 1000 | 20 | 0.15 | 0.16 | 0.09 | 0.10 | 0.16 |
| 0.00/6.90 | 1000 | 40 | 0.14 | 0.15 | 0.09 | 0.09 | 0.16 |

*Note:* NA = zero converged replications.

**Table S3**

*Mean Absolute Bias for 2-Parameter Logistic Model When Generating b-Parameters with a Truncated Normal Distribution*

| Skew/Kurtosis | N | Test Length | *a* | *b* |
| --- | --- | --- | --- | --- |
| 0.00/0.00 | 125 | 10 | 0.33 | 0.25 |
| 0.00/0.00 | 125 | 20 | 0.28 | 0.24 |
| 0.00/0.00 | 125 | 40 | 0.26 | 0.23 |
| 0.00/0.00 | 250 | 10 | 0.23 | 0.18 |
| 0.00/0.00 | 250 | 20 | 0.19 | 0.16 |
| 0.00/0.00 | 250 | 40 | 0.18 | 0.16 |
| 0.00/0.00 | 500 | 10 | 0.15 | 0.12 |
| 0.00/0.00 | 500 | 20 | 0.14 | 0.12 |
| 0.00/0.00 | 500 | 40 | 0.13 | 0.11 |
| 0.00/0.00 | 1000 | 10 | 0.11 | 0.09 |
| 0.00/0.00 | 1000 | 20 | 0.10 | 0.08 |
| 0.00/0.00 | 1000 | 40 | 0.09 | 0.08 |
| 0.75/1.30 | 125 | 10 | 0.33 | 0.27 |
| 0.75/1.30 | 125 | 20 | 0.29 | 0.25 |
| 0.75/1.30 | 125 | 40 | 0.26 | 0.23 |
| 0.75/1.30 | 250 | 10 | 0.24 | 0.20 |
| 0.75/1.30 | 250 | 20 | 0.20 | 0.18 |
| 0.75/1.30 | 250 | 40 | 0.19 | 0.17 |
| 0.75/1.30 | 500 | 10 | 0.17 | 0.14 |
| 0.75/1.30 | 500 | 20 | 0.15 | 0.13 |
| 0.75/1.30 | 500 | 40 | 0.13 | 0.12 |
| 0.75/1.30 | 1000 | 10 | 0.13 | 0.10 |
| 0.75/1.30 | 1000 | 20 | 0.11 | 0.09 |
| 0.75/1.30 | 1000 | 40 | 0.10 | 0.09 |
| 1.25/1.30 | 125 | 10 | 0.35 | 0.29 |
| 1.25/1.30 | 125 | 20 | 0.30 | 0.27 |
| 1.25/1.30 | 125 | 40 | 0.27 | 0.24 |
| 1.25/1.30 | 250 | 10 | 0.27 | 0.23 |
| 1.25/1.30 | 250 | 20 | 0.23 | 0.21 |
| 1.25/1.30 | 250 | 40 | 0.20 | 0.19 |
| 1.25/1.30 | 500 | 10 | 0.22 | 0.18 |
| 1.25/1.30 | 500 | 20 | 0.18 | 0.16 |
| 1.25/1.30 | 500 | 40 | 0.15 | 0.14 |
| 1.25/1.30 | 1000 | 10 | 0.19 | 0.15 |
| 1.25/1.30 | 1000 | 20 | 0.15 | 0.12 |
| 1.25/1.30 | 1000 | 40 | 0.12 | 0.11 |
| 1.75/6.90 | 125 | 10 | 0.35 | 0.31 |
| 1.75/6.90 | 125 | 20 | 0.30 | 0.29 |
| 1.75/6.90 | 125 | 40 | 0.27 | 0.26 |
| 1.75/6.90 | 250 | 10 | 0.27 | 0.25 |
| 1.75/6.90 | 250 | 20 | 0.23 | 0.22 |
| 1.75/6.90 | 250 | 40 | 0.21 | 0.21 |
| 1.75/6.90 | 500 | 10 | 0.23 | 0.20 |
| 1.75/6.90 | 500 | 20 | 0.19 | 0.17 |
| 1.75/6.90 | 500 | 40 | 0.17 | 0.16 |
| 1.75/6.90 | 1000 | 10 | 0.20 | 0.16 |
| 1.75/6.90 | 1000 | 20 | 0.17 | 0.15 |
| 1.75/6.90 | 1000 | 40 | 0.15 | 0.13 |
| 2.25/6.90 | 125 | 10 | 0.38 | 0.34 |
| 2.25/6.90 | 125 | 20 | 0.33 | 0.32 |
| 2.25/6.90 | 125 | 40 | 0.28 | 0.27 |
| 2.25/6.90 | 250 | 10 | 0.32 | 0.31 |
| 2.25/6.90 | 250 | 20 | 0.28 | 0.27 |
| 2.25/6.90 | 250 | 40 | 0.24 | 0.24 |
| 2.25/6.90 | 500 | 10 | 0.29 | 0.28 |
| 2.25/6.90 | 500 | 20 | 0.24 | 0.24 |
| 2.25/6.90 | 500 | 40 | 0.21 | 0.20 |
| 2.25/6.90 | 1000 | 10 | 0.27 | 0.24 |
| 2.25/6.90 | 1000 | 20 | 0.22 | 0.20 |
| 2.25/6.90 | 1000 | 40 | 0.19 | 0.17 |
| 0.00/1.30 | 125 | 10 | 0.33 | 0.27 |
| 0.00/1.30 | 125 | 20 | 0.28 | 0.25 |
| 0.00/1.30 | 125 | 40 | 0.26 | 0.23 |
| 0.00/1.30 | 250 | 10 | 0.23 | 0.19 |
| 0.00/1.30 | 250 | 20 | 0.20 | 0.18 |
| 0.00/1.30 | 250 | 40 | 0.18 | 0.17 |
| 0.00/1.30 | 500 | 10 | 0.16 | 0.13 |
| 0.00/1.30 | 500 | 20 | 0.14 | 0.12 |
| 0.00/1.30 | 500 | 40 | 0.13 | 0.12 |
| 0.00/1.30 | 1000 | 10 | 0.12 | 0.09 |
| 0.00/1.30 | 1000 | 20 | 0.10 | 0.09 |
| 0.00/1.30 | 1000 | 40 | 0.09 | 0.08 |
| 0.00/1.75 | 125 | 10 | 0.33 | 0.27 |
| 0.00/1.75 | 125 | 20 | 0.29 | 0.25 |
| 0.00/1.75 | 125 | 40 | 0.26 | 0.24 |
| 0.00/1.75 | 250 | 10 | 0.23 | 0.19 |
| 0.00/1.75 | 250 | 20 | 0.20 | 0.18 |
| 0.00/1.75 | 250 | 40 | 0.18 | 0.17 |
| 0.00/1.75 | 500 | 10 | 0.16 | 0.13 |
| 0.00/1.75 | 500 | 20 | 0.14 | 0.12 |
| 0.00/1.75 | 500 | 40 | 0.13 | 0.12 |
| 0.00/1.75 | 1000 | 10 | 0.12 | 0.09 |
| 0.00/1.75 | 1000 | 20 | 0.10 | 0.09 |
| 0.00/1.75 | 1000 | 40 | 0.09 | 0.08 |
| 0.00/3.75 | 125 | 10 | 0.33 | 0.28 |
| 0.00/3.75 | 125 | 20 | 0.29 | 0.27 |
| 0.00/3.75 | 125 | 40 | 0.27 | 0.24 |
| 0.00/3.75 | 250 | 10 | 0.23 | 0.21 |
| 0.00/3.75 | 250 | 20 | 0.20 | 0.19 |
| 0.00/3.75 | 250 | 40 | 0.19 | 0.18 |
| 0.00/3.75 | 500 | 10 | 0.18 | 0.14 |
| 0.00/3.75 | 500 | 20 | 0.16 | 0.13 |
| 0.00/3.75 | 500 | 40 | 0.14 | 0.13 |
| 0.00/3.75 | 1000 | 10 | 0.14 | 0.11 |
| 0.00/3.75 | 1000 | 20 | 0.12 | 0.10 |
| 0.00/3.75 | 1000 | 40 | 0.11 | 0.09 |
| 0.00/6.90 | 125 | 10 | 0.34 | 0.31 |
| 0.00/6.90 | 125 | 20 | 0.30 | 0.28 |
| 0.00/6.90 | 125 | 40 | 0.27 | 0.25 |
| 0.00/6.90 | 250 | 10 | 0.26 | 0.23 |
| 0.00/6.90 | 250 | 20 | 0.22 | 0.21 |
| 0.00/6.90 | 250 | 40 | 0.20 | 0.20 |
| 0.00/6.90 | 500 | 10 | 0.20 | 0.17 |
| 0.00/6.90 | 500 | 20 | 0.18 | 0.15 |
| 0.00/6.90 | 500 | 40 | 0.16 | 0.14 |
| 0.00/6.90 | 1000 | 10 | 0.17 | 0.13 |
| 0.00/6.90 | 1000 | 20 | 0.15 | 0.12 |
| 0.00/6.90 | 1000 | 40 | 0.13 | 0.11 |

**Table S4**

*RMSE for 2-Parameter Logistic Model When Generating b-Parameters with a Truncated Normal Distribution*

| Skew/Kurtosis | N | Test Length | *a* | *b* |
| --- | --- | --- | --- | --- |
| 0.00/0.00 | 125 | 10 | 0.42 | 0.33 |
| 0.00/0.00 | 125 | 20 | 0.37 | 0.34 |
| 0.00/0.00 | 125 | 40 | 0.34 | 0.31 |
| 0.00/0.00 | 250 | 10 | 0.29 | 0.24 |
| 0.00/0.00 | 250 | 20 | 0.25 | 0.23 |
| 0.00/0.00 | 250 | 40 | 0.23 | 0.23 |
| 0.00/0.00 | 500 | 10 | 0.19 | 0.16 |
| 0.00/0.00 | 500 | 20 | 0.17 | 0.16 |
| 0.00/0.00 | 500 | 40 | 0.16 | 0.15 |
| 0.00/0.00 | 1000 | 10 | 0.14 | 0.11 |
| 0.00/0.00 | 1000 | 20 | 0.12 | 0.11 |
| 0.00/0.00 | 1000 | 40 | 0.11 | 0.11 |
| 0.75/1.30 | 125 | 10 | 0.42 | 0.37 |
| 0.75/1.30 | 125 | 20 | 0.37 | 0.35 |
| 0.75/1.30 | 125 | 40 | 0.34 | 0.33 |
| 0.75/1.30 | 250 | 10 | 0.30 | 0.27 |
| 0.75/1.30 | 250 | 20 | 0.26 | 0.26 |
| 0.75/1.30 | 250 | 40 | 0.24 | 0.24 |
| 0.75/1.30 | 500 | 10 | 0.21 | 0.18 |
| 0.75/1.30 | 500 | 20 | 0.18 | 0.18 |
| 0.75/1.30 | 500 | 40 | 0.17 | 0.17 |
| 0.75/1.30 | 1000 | 10 | 0.16 | 0.14 |
| 0.75/1.30 | 1000 | 20 | 0.14 | 0.13 |
| 0.75/1.30 | 1000 | 40 | 0.12 | 0.12 |
| 1.25/1.30 | 125 | 10 | 0.45 | 0.40 |
| 1.25/1.30 | 125 | 20 | 0.39 | 0.39 |
| 1.25/1.30 | 125 | 40 | 0.34 | 0.34 |
| 1.25/1.30 | 250 | 10 | 0.34 | 0.33 |
| 1.25/1.30 | 250 | 20 | 0.29 | 0.30 |
| 1.25/1.30 | 250 | 40 | 0.26 | 0.28 |
| 1.25/1.30 | 500 | 10 | 0.28 | 0.26 |
| 1.25/1.30 | 500 | 20 | 0.23 | 0.23 |
| 1.25/1.30 | 500 | 40 | 0.19 | 0.20 |
| 1.25/1.30 | 1000 | 10 | 0.24 | 0.21 |
| 1.25/1.30 | 1000 | 20 | 0.20 | 0.18 |
| 1.25/1.30 | 1000 | 40 | 0.16 | 0.16 |
| 1.75/6.90 | 125 | 10 | 0.44 | 0.43 |
| 1.75/6.90 | 125 | 20 | 0.38 | 0.42 |
| 1.75/6.90 | 125 | 40 | 0.34 | 0.36 |
| 1.75/6.90 | 250 | 10 | 0.34 | 0.35 |
| 1.75/6.90 | 250 | 20 | 0.29 | 0.33 |
| 1.75/6.90 | 250 | 40 | 0.26 | 0.30 |
| 1.75/6.90 | 500 | 10 | 0.28 | 0.28 |
| 1.75/6.90 | 500 | 20 | 0.24 | 0.25 |
| 1.75/6.90 | 500 | 40 | 0.21 | 0.22 |
| 1.75/6.90 | 1000 | 10 | 0.25 | 0.23 |
| 1.75/6.90 | 1000 | 20 | 0.21 | 0.20 |
| 1.75/6.90 | 1000 | 40 | 0.18 | 0.17 |
| 2.25/6.90 | 125 | 10 | 0.48 | 0.48 |
| 2.25/6.90 | 125 | 20 | 0.41 | 0.46 |
| 2.25/6.90 | 125 | 40 | 0.36 | 0.38 |
| 2.25/6.90 | 250 | 10 | 0.40 | 0.45 |
| 2.25/6.90 | 250 | 20 | 0.35 | 0.42 |
| 2.25/6.90 | 250 | 40 | 0.30 | 0.36 |
| 2.25/6.90 | 500 | 10 | 0.36 | 0.42 |
| 2.25/6.90 | 500 | 20 | 0.31 | 0.37 |
| 2.25/6.90 | 500 | 40 | 0.26 | 0.31 |
| 2.25/6.90 | 1000 | 10 | 0.33 | 0.36 |
| 2.25/6.90 | 1000 | 20 | 0.28 | 0.31 |
| 2.25/6.90 | 1000 | 40 | 0.24 | 0.26 |
| 0.00/1.30 | 125 | 10 | 0.42 | 0.37 |
| 0.00/1.30 | 125 | 20 | 0.36 | 0.34 |
| 0.00/1.30 | 125 | 40 | 0.34 | 0.32 |
| 0.00/1.30 | 250 | 10 | 0.29 | 0.25 |
| 0.00/1.30 | 250 | 20 | 0.25 | 0.25 |
| 0.00/1.30 | 250 | 40 | 0.24 | 0.24 |
| 0.00/1.30 | 500 | 10 | 0.20 | 0.17 |
| 0.00/1.30 | 500 | 20 | 0.17 | 0.17 |
| 0.00/1.30 | 500 | 40 | 0.16 | 0.16 |
| 0.00/1.30 | 1000 | 10 | 0.14 | 0.12 |
| 0.00/1.30 | 1000 | 20 | 0.12 | 0.11 |
| 0.00/1.30 | 1000 | 40 | 0.12 | 0.11 |
| 0.00/1.75 | 125 | 10 | 0.42 | 0.37 |
| 0.00/1.75 | 125 | 20 | 0.37 | 0.35 |
| 0.00/1.75 | 125 | 40 | 0.34 | 0.33 |
| 0.00/1.75 | 250 | 10 | 0.29 | 0.26 |
| 0.00/1.75 | 250 | 20 | 0.25 | 0.24 |
| 0.00/1.75 | 250 | 40 | 0.23 | 0.24 |
| 0.00/1.75 | 500 | 10 | 0.20 | 0.18 |
| 0.00/1.75 | 500 | 20 | 0.18 | 0.17 |
| 0.00/1.75 | 500 | 40 | 0.16 | 0.16 |
| 0.00/1.75 | 1000 | 10 | 0.15 | 0.12 |
| 0.00/1.75 | 1000 | 20 | 0.13 | 0.12 |
| 0.00/1.75 | 1000 | 40 | 0.12 | 0.11 |
| 0.00/3.75 | 125 | 10 | 0.41 | 0.39 |
| 0.00/3.75 | 125 | 20 | 0.37 | 0.37 |
| 0.00/3.75 | 125 | 40 | 0.34 | 0.34 |
| 0.00/3.75 | 250 | 10 | 0.29 | 0.29 |
| 0.00/3.75 | 250 | 20 | 0.26 | 0.26 |
| 0.00/3.75 | 250 | 40 | 0.24 | 0.25 |
| 0.00/3.75 | 500 | 10 | 0.22 | 0.19 |
| 0.00/3.75 | 500 | 20 | 0.19 | 0.18 |
| 0.00/3.75 | 500 | 40 | 0.17 | 0.17 |
| 0.00/3.75 | 1000 | 10 | 0.17 | 0.14 |
| 0.00/3.75 | 1000 | 20 | 0.15 | 0.13 |
| 0.00/3.75 | 1000 | 40 | 0.13 | 0.12 |
| 0.00/6.90 | 125 | 10 | 0.42 | 0.43 |
| 0.00/6.90 | 125 | 20 | 0.37 | 0.40 |
| 0.00/6.90 | 125 | 40 | 0.34 | 0.35 |
| 0.00/6.90 | 250 | 10 | 0.31 | 0.31 |
| 0.00/6.90 | 250 | 20 | 0.28 | 0.30 |
| 0.00/6.90 | 250 | 40 | 0.26 | 0.28 |
| 0.00/6.90 | 500 | 10 | 0.24 | 0.22 |
| 0.00/6.90 | 500 | 20 | 0.22 | 0.21 |
| 0.00/6.90 | 500 | 40 | 0.19 | 0.20 |
| 0.00/6.90 | 1000 | 10 | 0.21 | 0.17 |
| 0.00/6.90 | 1000 | 20 | 0.18 | 0.16 |
| 0.00/6.90 | 1000 | 40 | 0.16 | 0.15 |

**Table S5**

*Mean Absolute Bias for 2-Parameter Logistic Model When Generating b-Parameters with a Uniform Distribution*

| Skew/Kurtosis | N | Test Length | *a* | *b* |
| --- | --- | --- | --- | --- |
| 0.00/0.00 | 125 | 10 | 0.35 | 0.32 |
| 0.00/0.00 | 125 | 20 | 0.31 | 0.30 |
| 0.00/0.00 | 125 | 40 | 0.28 | 0.28 |
| 0.00/0.00 | 250 | 10 | 0.25 | 0.24 |
| 0.00/0.00 | 250 | 20 | 0.22 | 0.22 |
| 0.00/0.00 | 250 | 40 | 0.20 | 0.21 |
| 0.00/0.00 | 500 | 10 | 0.18 | 0.17 |
| 0.00/0.00 | 500 | 20 | 0.15 | 0.15 |
| 0.00/0.00 | 500 | 40 | 0.14 | 0.15 |
| 0.00/0.00 | 1000 | 10 | 0.12 | 0.11 |
| 0.00/0.00 | 1000 | 20 | 0.10 | 0.10 |
| 0.00/0.00 | 1000 | 40 | 0.10 | 0.10 |
| 0.75/1.30 | 125 | 10 | 0.36 | 0.34 |
| 0.75/1.30 | 125 | 20 | 0.31 | 0.32 |
| 0.75/1.30 | 125 | 40 | 0.29 | 0.28 |
| 0.75/1.30 | 250 | 10 | 0.27 | 0.27 |
| 0.75/1.30 | 250 | 20 | 0.23 | 0.24 |
| 0.75/1.30 | 250 | 40 | 0.20 | 0.22 |
| 0.75/1.30 | 500 | 10 | 0.20 | 0.20 |
| 0.75/1.30 | 500 | 20 | 0.17 | 0.17 |
| 0.75/1.30 | 500 | 40 | 0.15 | 0.16 |
| 0.75/1.30 | 1000 | 10 | 0.16 | 0.15 |
| 0.75/1.30 | 1000 | 20 | 0.13 | 0.13 |
| 0.75/1.30 | 1000 | 40 | 0.11 | 0.12 |
| 1.25/1.30 | 125 | 10 | 0.40 | 0.37 |
| 1.25/1.30 | 125 | 20 | 0.33 | 0.35 |
| 1.25/1.30 | 125 | 40 | 0.28 | 0.29 |
| 1.25/1.30 | 250 | 10 | 0.33 | 0.34 |
| 1.25/1.30 | 250 | 20 | 0.27 | 0.30 |
| 1.25/1.30 | 250 | 40 | 0.22 | 0.26 |
| 1.25/1.30 | 500 | 10 | 0.28 | 0.29 |
| 1.25/1.30 | 500 | 20 | 0.23 | 0.25 |
| 1.25/1.30 | 500 | 40 | 0.18 | 0.21 |
| 1.25/1.30 | 1000 | 10 | 0.26 | 0.26 |
| 1.25/1.30 | 1000 | 20 | 0.20 | 0.21 |
| 1.25/1.30 | 1000 | 40 | 0.15 | 0.17 |
| 1.75/6.90 | 125 | 10 | 0.38 | 0.38 |
| 1.75/6.90 | 125 | 20 | 0.33 | 0.36 |
| 1.75/6.90 | 125 | 40 | 0.29 | 0.30 |
| 1.75/6.90 | 250 | 10 | 0.31 | 0.34 |
| 1.75/6.90 | 250 | 20 | 0.27 | 0.32 |
| 1.75/6.90 | 250 | 40 | 0.23 | 0.28 |
| 1.75/6.90 | 500 | 10 | 0.27 | 0.29 |
| 1.75/6.90 | 500 | 20 | 0.22 | 0.25 |
| 1.75/6.90 | 500 | 40 | 0.19 | 0.22 |
| 1.75/6.90 | 1000 | 10 | 0.24 | 0.25 |
| 1.75/6.90 | 1000 | 20 | 0.20 | 0.21 |
| 1.75/6.90 | 1000 | 40 | 0.16 | 0.18 |
| 2.25/6.90 | 125 | 10 | 0.43 | 0.42 |
| 2.25/6.90 | 125 | 20 | 0.36 | 0.39 |
| 2.25/6.90 | 125 | 40 | 0.30 | 0.32 |
| 2.25/6.90 | 250 | 10 | 0.37 | 0.43 |
| 2.25/6.90 | 250 | 20 | 0.32 | 0.41 |
| 2.25/6.90 | 250 | 40 | 0.26 | 0.34 |
| 2.25/6.90 | 500 | 10 | 0.35 | 0.42 |
| 2.25/6.90 | 500 | 20 | 0.30 | 0.38 |
| 2.25/6.90 | 500 | 40 | 0.24 | 0.31 |
| 2.25/6.90 | 1000 | 10 | 0.34 | 0.42 |
| 2.25/6.90 | 1000 | 20 | 0.28 | 0.35 |
| 2.25/6.90 | 1000 | 40 | 0.22 | 0.27 |
| 0.00/1.30 | 125 | 10 | 0.35 | 0.33 |
| 0.00/1.30 | 125 | 20 | 0.31 | 0.31 |
| 0.00/1.30 | 125 | 40 | 0.28 | 0.28 |
| 0.00/1.30 | 250 | 10 | 0.26 | 0.25 |
| 0.00/1.30 | 250 | 20 | 0.22 | 0.23 |
| 0.00/1.30 | 250 | 40 | 0.20 | 0.22 |
| 0.00/1.30 | 500 | 10 | 0.18 | 0.17 |
| 0.00/1.30 | 500 | 20 | 0.15 | 0.15 |
| 0.00/1.30 | 500 | 40 | 0.14 | 0.15 |
| 0.00/1.30 | 1000 | 10 | 0.13 | 0.12 |
| 0.00/1.30 | 1000 | 20 | 0.11 | 0.11 |
| 0.00/1.30 | 1000 | 40 | 0.10 | 0.10 |
| 0.00/1.75 | 125 | 10 | 0.35 | 0.34 |
| 0.00/1.75 | 125 | 20 | 0.31 | 0.31 |
| 0.00/1.75 | 125 | 40 | 0.28 | 0.28 |
| 0.00/1.75 | 250 | 10 | 0.26 | 0.26 |
| 0.00/1.75 | 250 | 20 | 0.22 | 0.23 |
| 0.00/1.75 | 250 | 40 | 0.20 | 0.22 |
| 0.00/1.75 | 500 | 10 | 0.18 | 0.18 |
| 0.00/1.75 | 500 | 20 | 0.15 | 0.16 |
| 0.00/1.75 | 500 | 40 | 0.14 | 0.15 |
| 0.00/1.75 | 1000 | 10 | 0.13 | 0.12 |
| 0.00/1.75 | 1000 | 20 | 0.11 | 0.11 |
| 0.00/1.75 | 1000 | 40 | 0.10 | 0.11 |
| 0.00/3.75 | 125 | 10 | 0.36 | 0.34 |
| 0.00/3.75 | 125 | 20 | 0.31 | 0.32 |
| 0.00/3.75 | 125 | 40 | 0.28 | 0.29 |
| 0.00/3.75 | 250 | 10 | 0.26 | 0.27 |
| 0.00/3.75 | 250 | 20 | 0.22 | 0.24 |
| 0.00/3.75 | 250 | 40 | 0.20 | 0.23 |
| 0.00/3.75 | 500 | 10 | 0.19 | 0.19 |
| 0.00/3.75 | 500 | 20 | 0.16 | 0.17 |
| 0.00/3.75 | 500 | 40 | 0.15 | 0.16 |
| 0.00/3.75 | 1000 | 10 | 0.14 | 0.14 |
| 0.00/3.75 | 1000 | 20 | 0.12 | 0.12 |
| 0.00/3.75 | 1000 | 40 | 0.11 | 0.12 |
| 0.00/6.90 | 125 | 10 | 0.36 | 0.38 |
| 0.00/6.90 | 125 | 20 | 0.31 | 0.34 |
| 0.00/6.90 | 125 | 40 | 0.28 | 0.29 |
| 0.00/6.90 | 250 | 10 | 0.28 | 0.29 |
| 0.00/6.90 | 250 | 20 | 0.23 | 0.26 |
| 0.00/6.90 | 250 | 40 | 0.21 | 0.25 |
| 0.00/6.90 | 500 | 10 | 0.21 | 0.21 |
| 0.00/6.90 | 500 | 20 | 0.18 | 0.19 |
| 0.00/6.90 | 500 | 40 | 0.16 | 0.18 |
| 0.00/6.90 | 1000 | 10 | 0.17 | 0.16 |
| 0.00/6.90 | 1000 | 20 | 0.14 | 0.14 |
| 0.00/6.90 | 1000 | 40 | 0.13 | 0.13 |

**Table S6**

*RMSE for 2-Parameter Logistic Model When Generating b-Parameters with a Uniform Distribution*

| Skew/Kurtosis | N | Test Length | *a* | *b* |
| --- | --- | --- | --- | --- |
| 0.00/0.00 | 125 | 10 | 0.45 | 0.44 |
| 0.00/0.00 | 125 | 20 | 0.40 | 0.43 |
| 0.00/0.00 | 125 | 40 | 0.37 | 0.38 |
| 0.00/0.00 | 250 | 10 | 0.33 | 0.34 |
| 0.00/0.00 | 250 | 20 | 0.28 | 0.31 |
| 0.00/0.00 | 250 | 40 | 0.26 | 0.30 |
| 0.00/0.00 | 500 | 10 | 0.23 | 0.23 |
| 0.00/0.00 | 500 | 20 | 0.19 | 0.21 |
| 0.00/0.00 | 500 | 40 | 0.18 | 0.20 |
| 0.00/0.00 | 1000 | 10 | 0.15 | 0.15 |
| 0.00/0.00 | 1000 | 20 | 0.13 | 0.14 |
| 0.00/0.00 | 1000 | 40 | 0.12 | 0.14 |
| 0.75/1.30 | 125 | 10 | 0.46 | 0.48 |
| 0.75/1.30 | 125 | 20 | 0.41 | 0.45 |
| 0.75/1.30 | 125 | 40 | 0.37 | 0.39 |
| 0.75/1.30 | 250 | 10 | 0.35 | 0.39 |
| 0.75/1.30 | 250 | 20 | 0.30 | 0.36 |
| 0.75/1.30 | 250 | 40 | 0.27 | 0.32 |
| 0.75/1.30 | 500 | 10 | 0.26 | 0.28 |
| 0.75/1.30 | 500 | 20 | 0.21 | 0.25 |
| 0.75/1.30 | 500 | 40 | 0.19 | 0.23 |
| 0.75/1.30 | 1000 | 10 | 0.20 | 0.21 |
| 0.75/1.30 | 1000 | 20 | 0.17 | 0.18 |
| 0.75/1.30 | 1000 | 40 | 0.14 | 0.16 |
| 1.25/1.30 | 125 | 10 | 0.51 | 0.52 |
| 1.25/1.30 | 125 | 20 | 0.43 | 0.51 |
| 1.25/1.30 | 125 | 40 | 0.36 | 0.41 |
| 1.25/1.30 | 250 | 10 | 0.43 | 0.50 |
| 1.25/1.30 | 250 | 20 | 0.35 | 0.47 |
| 1.25/1.30 | 250 | 40 | 0.29 | 0.40 |
| 1.25/1.30 | 500 | 10 | 0.36 | 0.43 |
| 1.25/1.30 | 500 | 20 | 0.29 | 0.39 |
| 1.25/1.30 | 500 | 40 | 0.24 | 0.32 |
| 1.25/1.30 | 1000 | 10 | 0.33 | 0.39 |
| 1.25/1.30 | 1000 | 20 | 0.26 | 0.33 |
| 1.25/1.30 | 1000 | 40 | 0.20 | 0.26 |
| 1.75/6.90 | 125 | 10 | 0.48 | 0.54 |
| 1.75/6.90 | 125 | 20 | 0.42 | 0.51 |
| 1.75/6.90 | 125 | 40 | 0.37 | 0.42 |
| 1.75/6.90 | 250 | 10 | 0.39 | 0.50 |
| 1.75/6.90 | 250 | 20 | 0.34 | 0.47 |
| 1.75/6.90 | 250 | 40 | 0.29 | 0.42 |
| 1.75/6.90 | 500 | 10 | 0.34 | 0.42 |
| 1.75/6.90 | 500 | 20 | 0.28 | 0.37 |
| 1.75/6.90 | 500 | 40 | 0.24 | 0.33 |
| 1.75/6.90 | 1000 | 10 | 0.30 | 0.36 |
| 1.75/6.90 | 1000 | 20 | 0.25 | 0.31 |
| 1.75/6.90 | 1000 | 40 | 0.20 | 0.25 |
| 2.25/6.90 | 125 | 10 | 0.54 | 0.60 |
| 2.25/6.90 | 125 | 20 | 0.45 | 0.56 |
| 2.25/6.90 | 125 | 40 | 0.38 | 0.45 |
| 2.25/6.90 | 250 | 10 | 0.47 | 0.64 |
| 2.25/6.90 | 250 | 20 | 0.40 | 0.63 |
| 2.25/6.90 | 250 | 40 | 0.34 | 0.53 |
| 2.25/6.90 | 500 | 10 | 0.44 | 0.65 |
| 2.25/6.90 | 500 | 20 | 0.37 | 0.62 |
| 2.25/6.90 | 500 | 40 | 0.31 | 0.50 |
| 2.25/6.90 | 1000 | 10 | 0.43 | 0.65 |
| 2.25/6.90 | 1000 | 20 | 0.35 | 0.56 |
| 2.25/6.90 | 1000 | 40 | 0.29 | 0.44 |
| 0.00/1.30 | 125 | 10 | 0.44 | 0.47 |
| 0.00/1.30 | 125 | 20 | 0.40 | 0.44 |
| 0.00/1.30 | 125 | 40 | 0.37 | 0.38 |
| 0.00/1.30 | 250 | 10 | 0.33 | 0.35 |
| 0.00/1.30 | 250 | 20 | 0.28 | 0.33 |
| 0.00/1.30 | 250 | 40 | 0.26 | 0.31 |
| 0.00/1.30 | 500 | 10 | 0.23 | 0.24 |
| 0.00/1.30 | 500 | 20 | 0.19 | 0.21 |
| 0.00/1.30 | 500 | 40 | 0.18 | 0.21 |
| 0.00/1.30 | 1000 | 10 | 0.16 | 0.16 |
| 0.00/1.30 | 1000 | 20 | 0.14 | 0.15 |
| 0.00/1.30 | 1000 | 40 | 0.12 | 0.14 |
| 0.00/1.75 | 125 | 10 | 0.45 | 0.48 |
| 0.00/1.75 | 125 | 20 | 0.41 | 0.44 |
| 0.00/1.75 | 125 | 40 | 0.37 | 0.39 |
| 0.00/1.75 | 250 | 10 | 0.33 | 0.36 |
| 0.00/1.75 | 250 | 20 | 0.28 | 0.33 |
| 0.00/1.75 | 250 | 40 | 0.26 | 0.31 |
| 0.00/1.75 | 500 | 10 | 0.23 | 0.24 |
| 0.00/1.75 | 500 | 20 | 0.20 | 0.22 |
| 0.00/1.75 | 500 | 40 | 0.18 | 0.21 |
| 0.00/1.75 | 1000 | 10 | 0.16 | 0.16 |
| 0.00/1.75 | 1000 | 20 | 0.14 | 0.15 |
| 0.00/1.75 | 1000 | 40 | 0.13 | 0.15 |
| 0.00/3.75 | 125 | 10 | 0.45 | 0.47 |
| 0.00/3.75 | 125 | 20 | 0.40 | 0.46 |
| 0.00/3.75 | 125 | 40 | 0.36 | 0.39 |
| 0.00/3.75 | 250 | 10 | 0.33 | 0.37 |
| 0.00/3.75 | 250 | 20 | 0.29 | 0.34 |
| 0.00/3.75 | 250 | 40 | 0.26 | 0.33 |
| 0.00/3.75 | 500 | 10 | 0.24 | 0.27 |
| 0.00/3.75 | 500 | 20 | 0.20 | 0.23 |
| 0.00/3.75 | 500 | 40 | 0.18 | 0.23 |
| 0.00/3.75 | 1000 | 10 | 0.18 | 0.18 |
| 0.00/3.75 | 1000 | 20 | 0.15 | 0.17 |
| 0.00/3.75 | 1000 | 40 | 0.14 | 0.16 |
| 0.00/6.90 | 125 | 10 | 0.46 | 0.53 |
| 0.00/6.90 | 125 | 20 | 0.40 | 0.48 |
| 0.00/6.90 | 125 | 40 | 0.37 | 0.40 |
| 0.00/6.90 | 250 | 10 | 0.35 | 0.40 |
| 0.00/6.90 | 250 | 20 | 0.30 | 0.37 |
| 0.00/6.90 | 250 | 40 | 0.27 | 0.35 |
| 0.00/6.90 | 500 | 10 | 0.26 | 0.29 |
| 0.00/6.90 | 500 | 20 | 0.22 | 0.26 |
| 0.00/6.90 | 500 | 40 | 0.20 | 0.25 |
| 0.00/6.90 | 1000 | 10 | 0.21 | 0.21 |
| 0.00/6.90 | 1000 | 20 | 0.18 | 0.19 |
| 0.00/6.90 | 1000 | 40 | 0.16 | 0.18 |