|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Datasets | Dataset Components | | | Models | | | | |
| Correlation Matrix | Regression Coefficients | Variables | MPR | DPR | HPR | LPR | HLR-NS |
| Nh.fc.mo | Full-rank | Non-hierarchical | Measured only | 0.004 ± 0.48 | -0.015 ± 0.25 | -0.013 ± 0.34 | 0.011 ± 1.56 | -0.010 ± 0.26 |
| Nh.fc.mu | Full-rank | Non-hierarchical | Measured + unmeasured | 0.029 ± 0.41 | 0.045 ± 0.47 | 0.031 ± 0.54 | -0.052 ± 1.13 | 0.023 ± 0.42 |
| Hi.fc.mo | Full-rank | Hierarchical | Measured only | 0.029 ± 0.59 | -0.006 ± 0.36 | -0.074 ± 0.43 | 0.186 ± 1.72 | -0.004 ± 0.30 |
| Hi.fc.mu | Full-rank | Hierarchical | Measured + unmeasured | -0.029 ± 0.56 | -0.023 ± 0.69 | -0.058 ± 0.74 | -0.100 ± 1.21 | -0.033 ± 0.55 |
| Nh.ac.mo | Low-rank | Non-hierarchical | Measured only | -0.005 ± 0.44 | -0.000 ± 0.24 | 0.006 ± 0.29 | 0.103 ± 1.69 | -0.006 ± 0.24 |
| Nh.ac.mu | Low-rank | Non-hierarchical | Measured + unmeasured | 0.030 ± 0.40 | 0.034 ± 0.44 | 0.030 ± 0.50 | -0.077 ± 1.24 | 0.028 ± 0.40 |
| Hi.ac.mo | Low-rank | Hierarchical | Measured only | 0.038 ± 0.59 | -0.020 ± 0.34 | -0.065 ± 0.66 | 0.176 ± 1.82 | 0.010 ± 0.33 |
| Hi.ac.mu | Low-rank | Hierarchical | Measured + unmeasured | -0.020 ± 0.59 | -0.021 ± 0.70 | -0.013 ± 0.70 | 0.068 ± 1.18 | -0.015 ± 0.55 |

Table 1: Regression coefficients, mean +/- sd difference from true value

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Datasets | Dataset Components | | | Models | | | | |
| Correlation Matrix | Regression Coefficients | Variables | MPR | DPR | HPR | LPR | HLR-NS |
| Nh.fc.mo | Full-rank | Non-hierarchical | Measured only | 0.014 ± 0.21 | 0.016 ± 0.22 | 0.025 ± 0.38 | 0.015 ± 0.32 | 0.017 ± 0.26 |
| Nh.fc.mu | Full-rank | Non-hierarchical | Measured + unmeasured | 0.014 ± 0.36 | 0.011 ± 0.31 | 0.029 ± 0.38 | 0.015 ± 0.50 | 0.015 ± 0.31 |
| Hi.fc.mo | Full-rank | Hierarchical | Measured only | 0.010 ± 0.23 | 0.014 ± 0.25 | 0.032 ± 0.36 | -0.003 ± 0.31 | 0.018 ± 0.27 |
| Hi.fc.mu | Full-rank | Hierarchical | Measured + unmeasured | 0.068 ± 0.34 | 0.047 ± 0.30 | 0.010 ± 0.36 | 0.076 ± 0.47 | 0.056 ± 0.31 |
| Nh.ac.mo | Low-rank | Non-hierarchical | Measured only | -0.023 ± 0.24 | -0.021 ± 0.24 | -0.042 ± 0.45 | 0.002 ± 0.29 | -0.035 ± 0.32 |
| Nh.ac.mu | Low-rank | Non-hierarchical | Measured + unmeasured | -0.033 ± 0.38 | -0.033 ± 0.34 | -0.038 ± 0.44 | -0.027 ± 0.51 | -0.030 ± 0.36 |
| Hi.ac.mo | Low-rank | Hierarchical | Measured only | -0.027 ± 0.25 | -0.017 ± 0.24 | -0.032 ± 0.44 | -0.017 ± 0.29 | -0.034 ± 0.32 |
| Hi.ac.mu | Low-rank | Hierarchical | Measured + unmeasured | 0.046 ± 0.38 | 0.024 ± 0.34 | -0.060 ± 0.42 | 0.078 ± 0.50 | 0.016 ± 0.36 |

Table 2: Correlation coefficients, mean +/- sd difference from true value

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Datasets | Dataset Components | | | Models | | | | |
| Correlation Matrix | Regression Coefficients | Variables | MPR | DPR | HPR | LPR | HLR-NS |
| Nh.fc.mo | Full-rank | Non-hierarchical | Measured only | 0.481 | 0.255 | 0.342 | 1.560 | 0.261 |
| Nh.fc.mu | Full-rank | Non-hierarchical | Measured + unmeasured | 0.413 | 0.473 | 0.543 | 1.128 | 0.421 |
| Hi.fc.mo | Full-rank | Hierarchical | Measured only | 0.591 | 0.363 | 0.436 | 1.726 | 0.304 |
| Hi.fc.mu | Full-rank | Hierarchical | Measured + unmeasured | 0.562 | 0.690 | 0.746 | 1.217 | 0.555 |
| Nh.ac.mo | Low-rank | Non-hierarchical | Measured only | 0.435 | 0.236 | 0.295 | 1.688 | 0.236 |
| Nh.ac.mu | Low-rank | Non-hierarchical | Measured + unmeasured | 0.400 | 0.442 | 0.505 | 1.246 | 0.405 |
| Hi.ac.mo | Low-rank | Hierarchical | Measured only | 0.590 | 0.340 | 0.666 | 1.826 | 0.326 |
| Hi.ac.mu | Low-rank | Hierarchical | Measured + unmeasured | 0.586 | 0.701 | 0.702 | 1.180 | 0.546 |

Table 3: Regression coefficients, RMSE

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Datasets | Dataset Components | | | Models | | | | |
| Correlation Matrix | Regression Coefficients | Variables | MPR | DPR | HPR | LPR | HLR-NS |
| Nh.fc.mo | Full-rank | Non-hierarchical | Measured only | 0.210 | 0.225 | 0.378 | 0.321 | 0.256 |
| Nh.fc.mu | Full-rank | Non-hierarchical | Measured + unmeasured | 0.356 | 0.311 | 0.376 | 0.499 | 0.311 |
| Hi.fc.mo | Full-rank | Hierarchical | Measured only | 0.228 | 0.249 | 0.363 | 0.314 | 0.271 |
| Hi.fc.mu | Full-rank | Hierarchical | Measured + unmeasured | 0.344 | 0.305 | 0.363 | 0.475 | 0.314 |
| Nh.ac.mo | Low-rank | Non-hierarchical | Measured only | 0.244 | 0.241 | 0.454 | 0.286 | 0.323 |
| Nh.ac.mu | Low-rank | Non-hierarchical | Measured + unmeasured | 0.386 | 0.343 | 0.442 | 0.514 | 0.358 |
| Hi.ac.mo | Low-rank | Hierarchical | Measured only | 0.250 | 0.243 | 0.443 | 0.292 | 0.320 |
| Hi.ac.mu | Low-rank | Hierarchical | Measured + unmeasured | 0.383 | 0.345 | 0.427 | 0.511 | 0.365 |

Table 4: Correlation coefficients, RMSE

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Datasets | Dataset Components | | | Models | | | | |
| Correlation Matrix | Regression Coefficients | Variables | MPR | DPR | HPR | LPR | HLR-NS |
| Nh.fc.mo | Full-rank | Non-hierarchical | Measured only | 0.317 ± 0.36 | 0.195 ± 0.16 | 0.259 ± 0.22 | 1.229 ± 0.96 | 0.196 ± 0.17 |
| Nh.fc.mu | Full-rank | Non-hierarchical | Measured + unmeasured | 0.316 ± 0.27 | 0.356 ± 0.31 | 0.412 ± 0.35 | 0.832 ± 0.76 | 0.314 ± 0.28 |
| Hi.fc.mo | Full-rank | Hierarchical | Measured only | 0.408 ± 0.43 | 0.268 ± 0.25 | 0.302 ± 0.32 | 1.413 ± 0.76 | 0.232 ± 0.20 |
| Hi.fc.mu | Full-rank | Hierarchical | Measured + unmeasured | 0.412 ± 0.38 | 0.508 ± 0.47 | 0.550 ± 0.51 | 0.905 ± 0.82 | 0.414 ± 0.37 |
| Nh.ac.mo | Low-rank | Non-hierarchical | Measured only | 0.297 ± 0.32 | 0.181 ± 0.15 | 0.227 ± 0.19 | 1.334 ± 1.04 | 0.182 ± 0.15 |
| Nh.ac.mu | Low-rank | Non-hierarchical | Measured + unmeasured | 0.290 ± 0.27 | 0.331 ± 0.29 | 0.385 ± 0.33 | 0.911 ± 0.85 | 0.305 ± 0.27 |
| Hi.ac.mo | Low-rank | Hierarchical | Measured only | 0.387 ± 0.45 | 0.252 ± 0.23 | 0.443 ± 0.50 | 1.467 ± 1.09 | 0.242 ± 0.22 |
| Hi.ac.mu | Low-rank | Hierarchical | Measured + unmeasured | 0.429 ± 0.40 | 0.516 ± 0.48 | 0.521 ± 0.47 | 0.896 ± 0.77 | 0.401 ± 0.37 |

Table 5: Regression coefficients, mean +/- sd absolute difference from true value

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Datasets | Dataset Components | | | Models | | | | |
| Correlation Matrix | Regression Coefficients | Variables | MPR | DPR | HPR | LPR | HLR-NS |
| Nh.fc.mo | Full-rank | Non-hierarchical | Measured only | 0.160 ± 0.14 | 0.168 ± 0.15 | 0.290 ± 0.24 | 0.245 ± 0.21 | 0.197 ± 0.16 |
| Nh.fc.mu | Full-rank | Non-hierarchical | Measured + unmeasured | 0.272 ± 0.23 | 0.234 ± 0.20 | 0.284 ± 0.25 | 0.395 ± 0.31 | 0.235 ± 0.20 |
| Hi.fc.mo | Full-rank | Hierarchical | Measured only | 0.175 ± 0.15 | 0.185 ± 0.17 | 0.278 ± 0.23 | 0.236 ± 0.21 | 0.206 ± 0.18 |
| Hi.fc.mu | Full-rank | Hierarchical | Measured + unmeasured | 0.265 ± 0.22 | 0.234 ± 0.20 | 0.273 ± 0.24 | 0.372 ± 0.29 | 0.240 ± 0.20 |
| Nh.ac.mo | Low-rank | Non-hierarchical | Measured only | 0.186 ± 0.16 | 0.183 ± 0.16 | 0.355 ± 0.28 | 0.217 ± 0.19 | 0.254 ± 0.20 |
| Nh.ac.mu | Low-rank | Non-hierarchical | Measured + unmeasured | 0.298 ± 0.25 | 0.264 ± 0.22 | 0.350 ± 0.27 | 0.395 ± 0.33 | 0.281 ± 0.22 |
| Hi.ac.mo | Low-rank | Hierarchical | Measured only | 0.186 ± 0.16 | 0.186 ± 0.16 | 0.350 ± 0.27 | 0.220 ± 0.19 | 0.251 ± 0.20 |
| Hi.ac.mu | Low-rank | Hierarchical | Measured + unmeasured | 0.297 ± 0.24 | 0.267 ± 0.22 | 0.334 ± 0.27 | 0.394 ± 0.32 | 0.286 ± 0.23 |

Table 6: Correlation coefficients, mean +/- sd absolute difference from true value