Final Project

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Research Question

Do children differentiate the complexity of the information they teach based on the maturity of the audience?

Description of each variable in our preliminary analysis

Age: five-years-old and seven-years-old

Response: basic or complex information

Trials: number of trials per participant

Model and the priors

Model:

$$
\begin{aligned}
z_j^A &\sim \text{Bin}(N_j^A, \theta_j^A) \\
z_j^B &\sim \text{Bin}(N_j^B, \theta_j^B) \\
\theta_j^A &\sim \text{Beta2}(\mu, \kappa) \\
\theta_j^B &= \Phi(q_j) \\
q_j &= \Phi^{-1}(\theta_j^A) + \delta_j \\
\delta_j &\sim N(\mu_\delta, \tau_\delta)
\end{aligned}
$$

Prior:

$$
\begin{aligned}
\mu &\sim \text{Beta}(2, 2) \\
\kappa &\sim \text{Gamma}(0.01, 0.01) \\
\mu_\delta &\sim N(0, 1) \\
\tau_\delta &\sim N(0, 1)
\end{aligned}
$$

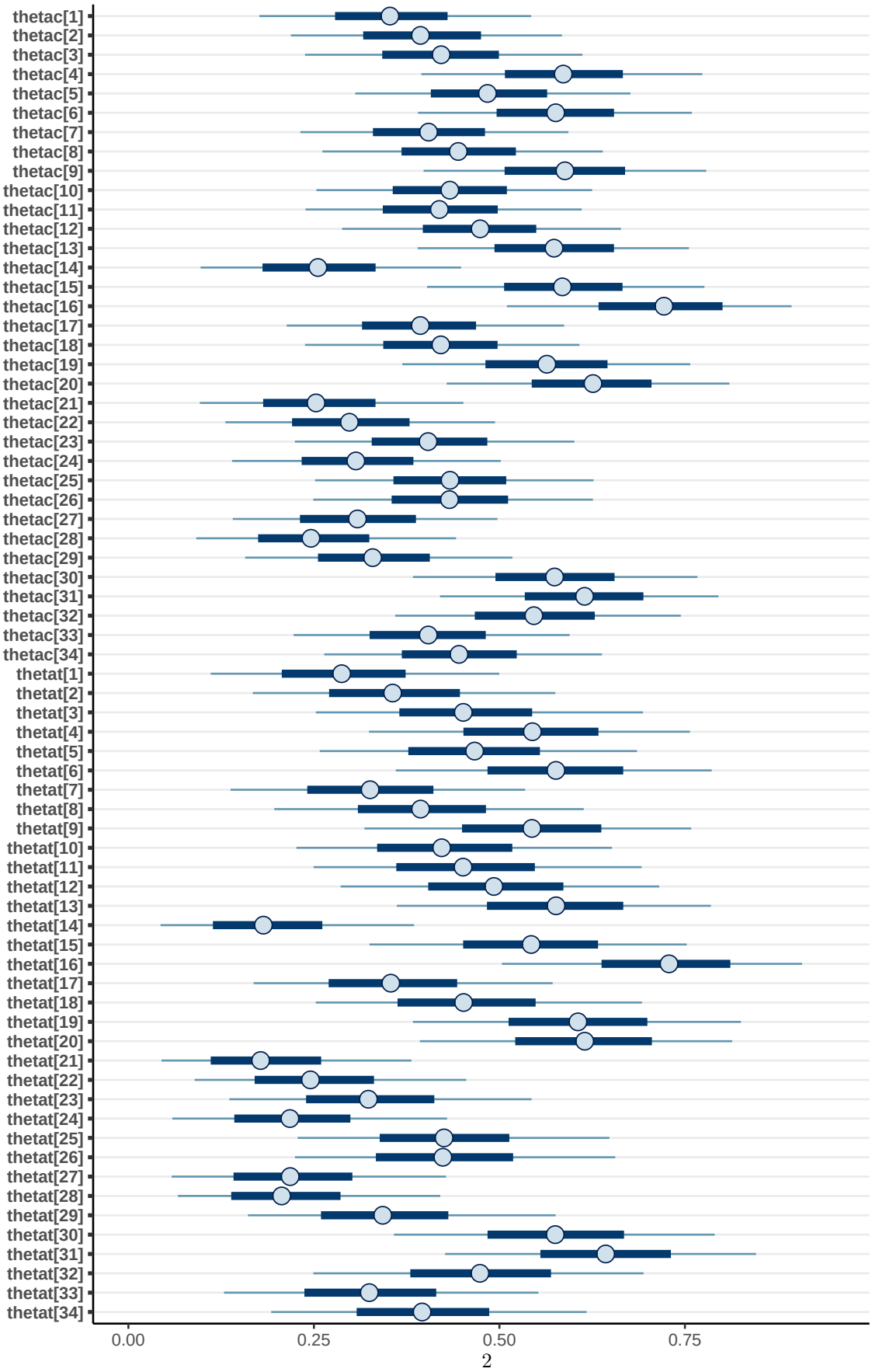
j:subject (subject 1, 2, ..., 68)

θ_j: individual subject's prob of transmitting complex info

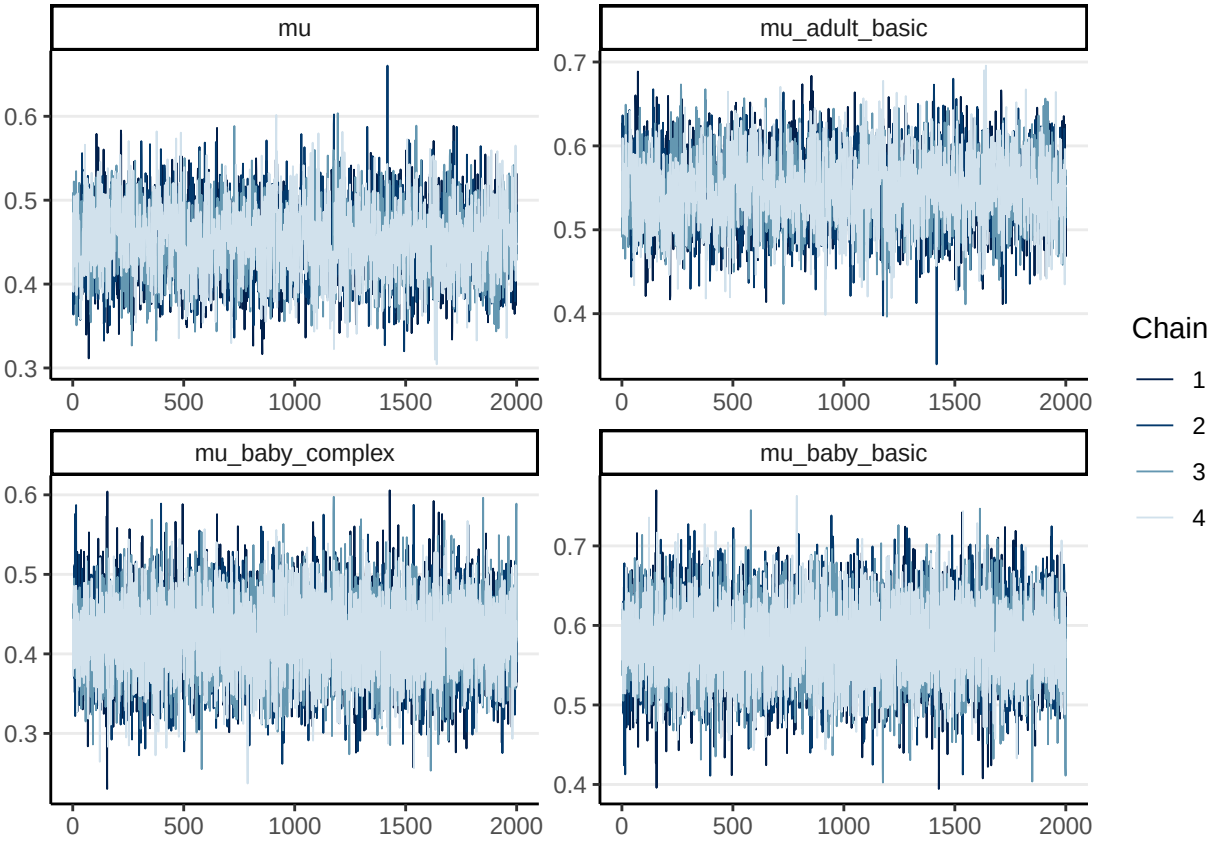
N_j:the number of trails

5-year-olds

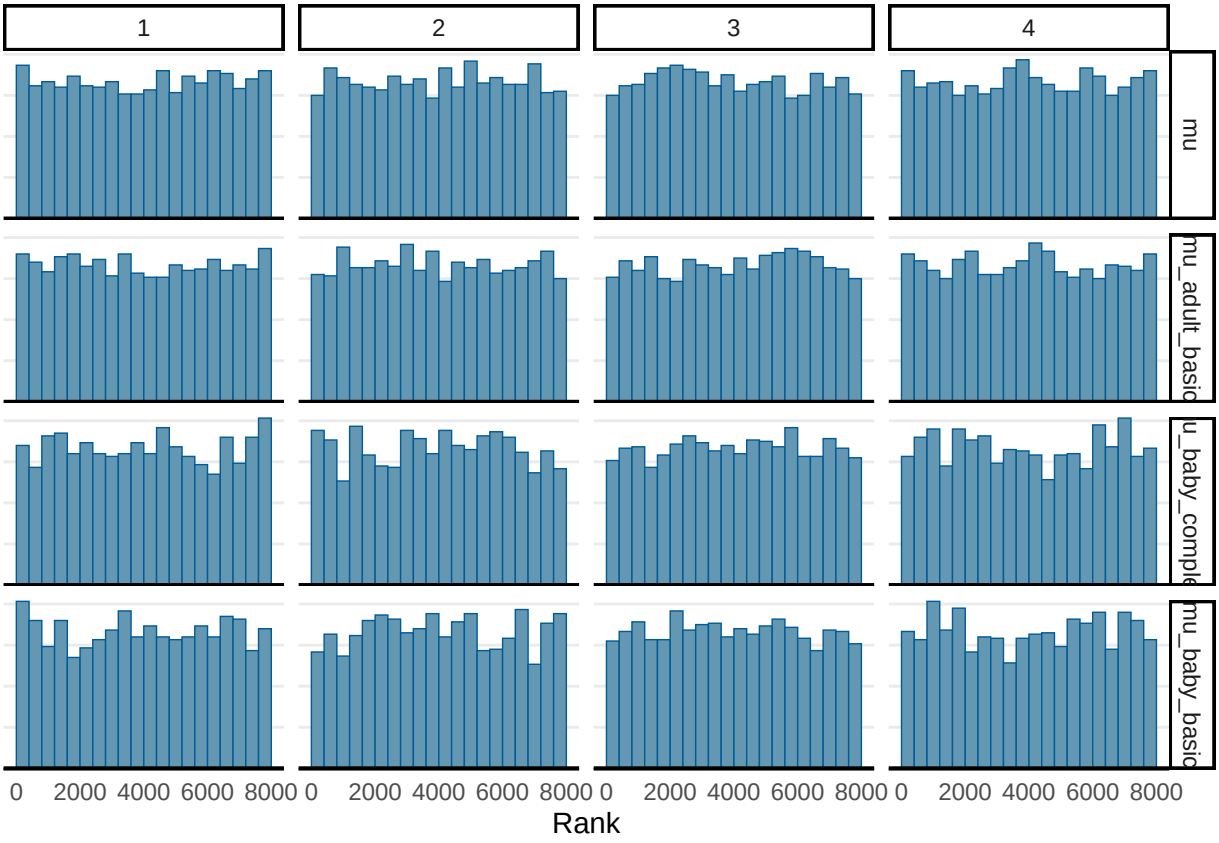
Convergence Check for 5yos



Trace plots of key parameters



Rank histograms of key parameters



Posterior distribution of key model parameter mu:

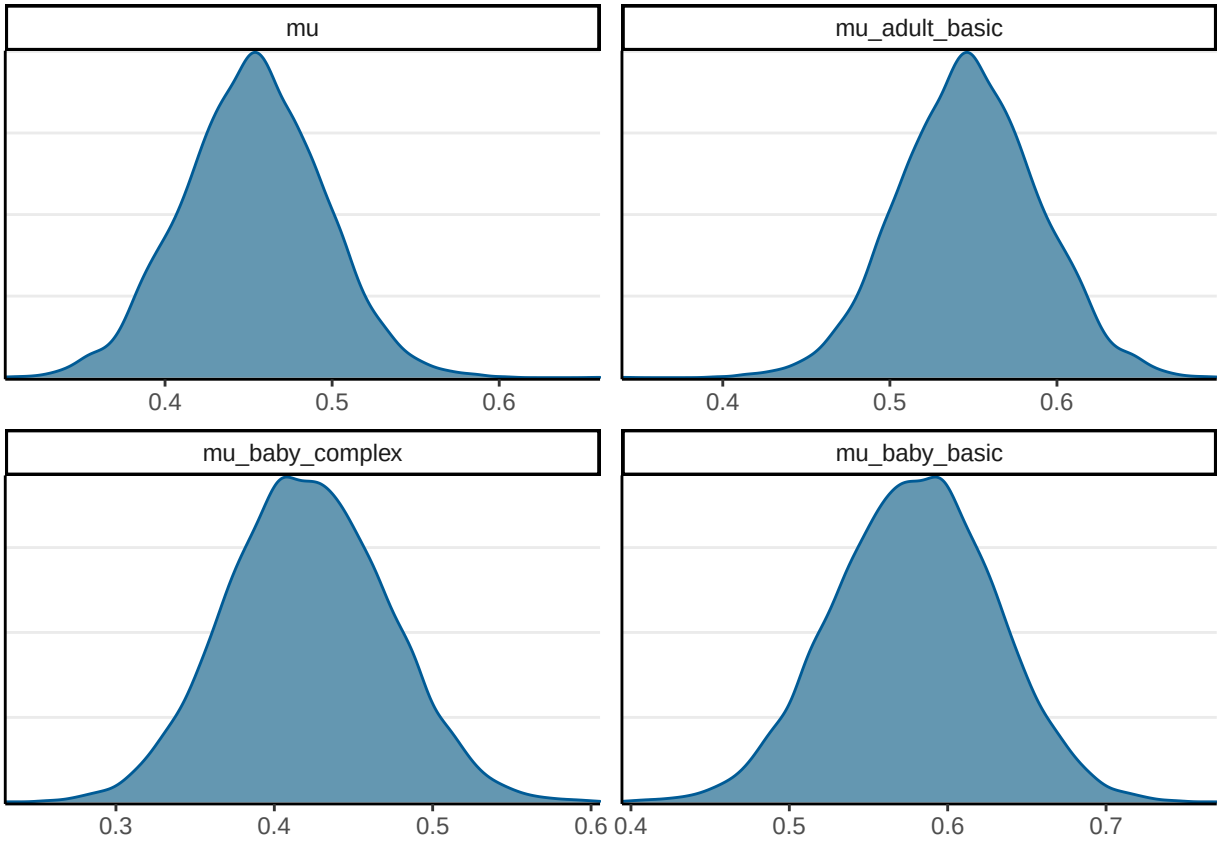


Table of the posterior distributions of key parameters

variable	mean	median	sd	mad	q5	q95	rhat	ess_bulk	ess_tail
thetac[1]	0.36	0.35	0.11	0.11	0.18	0.54	1	7206.23	5026.22
thetac[2]	0.40	0.39	0.11	0.12	0.22	0.58	1	7639.00	5860.15
thetac[3]	0.42	0.42	0.11	0.12	0.24	0.61	1	7854.83	5631.89
thetac[4]	0.59	0.59	0.11	0.12	0.39	0.77	1	5983.12	5171.05
thetac[5]	0.49	0.48	0.11	0.12	0.31	0.68	1	7747.05	5883.32
thetac[6]	0.57	0.58	0.11	0.12	0.39	0.76	1	5831.53	5742.61
thetac[7]	0.41	0.40	0.11	0.11	0.23	0.59	1	7633.47	5220.74
thetac[8]	0.45	0.44	0.11	0.11	0.26	0.64	1	9533.23	5424.54
thetac[9]	0.59	0.59	0.12	0.12	0.40	0.78	1	6588.40	5543.72
thetac[10]	0.43	0.43	0.11	0.11	0.25	0.62	1	7941.43	5456.83
thetac[11]	0.42	0.42	0.11	0.11	0.24	0.61	1	8013.16	5220.96
thetac[12]	0.47	0.47	0.11	0.11	0.29	0.66	1	8213.63	5459.74
thetac[13]	0.57	0.57	0.11	0.12	0.39	0.76	1	5835.88	6113.57
thetac[14]	0.26	0.26	0.11	0.11	0.10	0.45	1	3877.12	4591.98
thetac[15]	0.59	0.58	0.11	0.12	0.40	0.78	1	4938.04	5436.14
thetac[16]	0.71	0.72	0.12	0.12	0.51	0.89	1	3018.06	4141.62
thetac[17]	0.39	0.39	0.11	0.11	0.21	0.59	1	8332.77	6116.79
thetac[18]	0.42	0.42	0.11	0.11	0.24	0.61	1	7090.58	5612.61
thetac[19]	0.56	0.56	0.12	0.12	0.37	0.76	1	5962.87	5702.15
thetac[20]	0.62	0.63	0.12	0.12	0.43	0.81	1	4610.20	5641.08
thetac[21]	0.26	0.25	0.11	0.11	0.10	0.45	1	4043.27	4792.57
thetac[22]	0.30	0.30	0.11	0.12	0.13	0.49	1	5212.53	4715.96

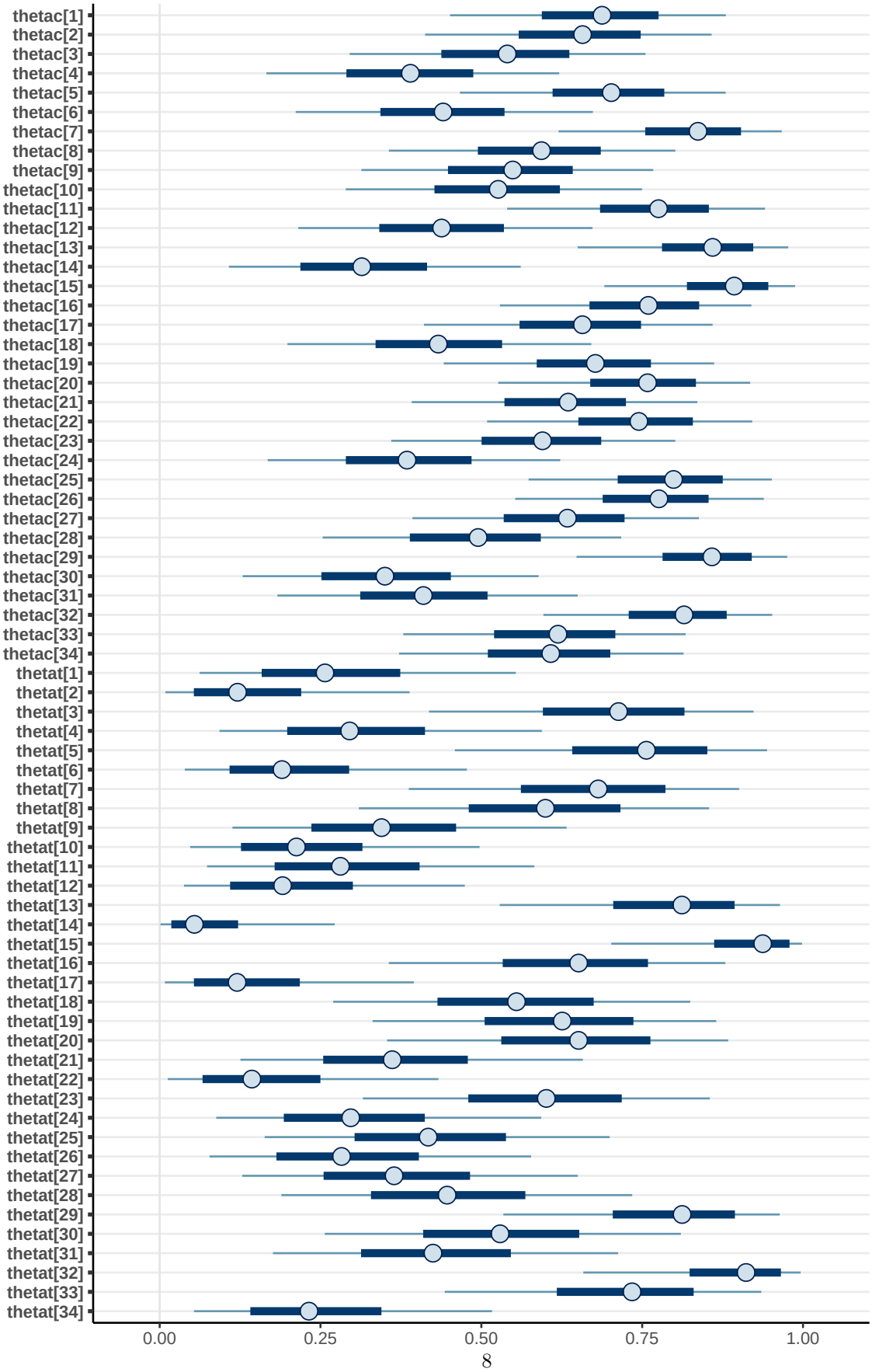
variable	mean	median	sd	mad	q5	q95	rhat	ess_bulk	ess_tail
thetac[23]	0.41	0.40	0.11	0.12	0.22	0.60	1	7940.21	5260.18
thetac[24]	0.31	0.31	0.11	0.11	0.14	0.50	1	5393.37	4753.12
thetac[25]	0.43	0.43	0.11	0.11	0.25	0.63	1	8575.57	5563.25
thetac[26]	0.43	0.43	0.11	0.12	0.25	0.63	1	8922.44	5920.28
thetac[27]	0.31	0.31	0.11	0.12	0.14	0.50	1	5208.66	5067.39
thetac[28]	0.25	0.25	0.11	0.11	0.09	0.44	1	3854.26	5045.19
thetac[29]	0.33	0.33	0.11	0.11	0.16	0.52	1	6728.32	5243.91
thetac[30]	0.57	0.57	0.12	0.12	0.38	0.77	1	6232.34	5176.87
thetac[31]	0.61	0.61	0.11	0.12	0.42	0.80	1	4659.41	5438.53
thetac[32]	0.55	0.55	0.12	0.12	0.36	0.74	1	6789.20	5297.52
thetac[33]	0.41	0.40	0.11	0.12	0.22	0.59	1	8324.60	5721.29
thetac[34]	0.45	0.45	0.11	0.11	0.26	0.64	1	8463.44	5703.00
mu	0.45	0.45	0.04	0.04	0.38	0.52	1	3423.69	5336.02
kappa	11.04	8.62	12.20	3.78	4.36	23.41	1	1419.11	1307.95
eta[1]	-0.31	-0.33	0.91	0.92	-1.76	1.20	1	10001.57	6410.41
eta[2]	-0.05	-0.07	0.92	0.89	-1.53	1.47	1	10443.67	5757.41
eta[3]	0.51	0.52	0.93	0.92	-1.04	2.01	1	7046.94	6035.63
eta[4]	-0.11	-0.10	0.91	0.87	-1.60	1.36	1	10214.35	6126.35
eta[5]	0.07	0.08	0.91	0.92	-1.39	1.55	1	10451.64	6165.37
eta[6]	0.24	0.25	0.90	0.89	-1.26	1.69	1	9435.37	5912.10
eta[7]	-0.40	-0.41	0.92	0.91	-1.87	1.14	1	8482.35	5729.57
eta[8]	-0.15	-0.16	0.91	0.90	-1.62	1.37	1	10779.08	5774.51
eta[9]	-0.12	-0.12	0.92	0.90	-1.62	1.42	1	9642.29	5703.79
eta[10]	0.17	0.18	0.92	0.91	-1.34	1.68	1	9777.31	5365.75
eta[11]	0.51	0.52	0.93	0.92	-1.07	2.01	1	7312.57	4958.34
eta[12]	0.40	0.41	0.89	0.88	-1.12	1.85	1	8996.76	6067.56
eta[13]	0.24	0.26	0.92	0.90	-1.33	1.74	1	10493.12	5622.23
eta[14]	-0.49	-0.48	0.99	1.01	-2.10	1.14	1	7027.84	4778.98
eta[15]	-0.12	-0.12	0.92	0.90	-1.64	1.38	1	10020.39	5263.92
eta[16]	0.28	0.30	0.92	0.90	-1.24	1.79	1	7809.74	5589.35
eta[17]	-0.06	-0.06	0.91	0.91	-1.58	1.44	1	10802.06	6085.28
eta[18]	0.51	0.53	0.94	0.91	-1.09	2.04	1	7641.10	6118.57
eta[19]	0.57	0.59	0.94	0.92	-1.01	2.08	1	6560.39	4918.65
eta[20]	0.14	0.16	0.90	0.90	-1.38	1.60	1	8871.37	5879.78
eta[21]	-0.51	-0.53	0.97	0.94	-2.06	1.13	1	7766.20	5617.07
eta[22]	-0.22	-0.22	0.92	0.91	-1.71	1.31	1	10026.08	5306.56
eta[23]	-0.41	-0.41	0.93	0.93	-1.94	1.13	1	7997.04	5932.48
eta[24]	-0.58	-0.59	0.97	0.97	-2.12	1.03	1	6001.77	5664.71
eta[25]	0.18	0.19	0.91	0.90	-1.33	1.68	1	10192.36	5862.70
eta[26]	0.19	0.21	0.90	0.89	-1.35	1.65	1	10524.85	5987.95
eta[27]	-0.59	-0.60	0.98	0.96	-2.16	1.06	1	7627.24	5382.32
eta[28]	-0.12	-0.13	0.93	0.91	-1.63	1.42	1	9536.96	5345.20
eta[29]	0.38	0.38	0.92	0.91	-1.15	1.86	1	8908.95	5536.17
eta[30]	0.23	0.24	0.93	0.91	-1.31	1.74	1	8143.98	5496.07
eta[31]	0.48	0.49	0.93	0.91	-1.07	1.98	1	7950.64	5598.36
eta[32]	-0.33	-0.35	0.91	0.90	-1.79	1.19	1	9100.13	5344.15
eta[33]	-0.39	-0.40	0.93	0.90	-1.90	1.16	1	8782.00	5668.00
eta[34]	-0.15	-0.15	0.92	0.89	-1.69	1.36	1	10109.20	5799.17
mu_delta	-0.08	-0.08	0.14	0.14	-0.31	0.15	1	4002.94	5198.53
tau_delta	0.28	0.27	0.18	0.19	0.03	0.59	1	1640.29	2650.77
thetat[1]	0.29	0.29	0.12	0.12	0.11	0.50	1	11108.78	6019.13
thetat[2]	0.36	0.36	0.13	0.13	0.17	0.58	1	13079.89	6232.82

variable	mean	median	sd	mad	q5	q95	rhat	ess_bulk	ess_tail
thetat[3]	0.46	0.45	0.13	0.13	0.25	0.69	1	8252.22	5666.86
thetat[4]	0.54	0.54	0.13	0.14	0.32	0.76	1	9873.99	5796.09
thetat[5]	0.47	0.47	0.13	0.13	0.26	0.69	1	13575.73	6200.23
thetat[6]	0.57	0.58	0.13	0.14	0.36	0.79	1	11951.19	6547.53
thetat[7]	0.33	0.33	0.12	0.13	0.14	0.53	1	9094.25	6070.51
thetat[8]	0.40	0.39	0.13	0.13	0.20	0.61	1	13527.48	6238.19
thetat[9]	0.54	0.54	0.13	0.14	0.32	0.76	1	11355.51	5962.81
thetat[10]	0.43	0.42	0.13	0.13	0.23	0.65	1	11841.70	6175.80
thetat[11]	0.46	0.45	0.13	0.14	0.25	0.69	1	9199.85	5715.05
thetat[12]	0.50	0.49	0.13	0.14	0.29	0.72	1	10243.70	5850.16
thetat[13]	0.57	0.58	0.13	0.14	0.36	0.78	1	10808.50	6168.52
thetat[14]	0.19	0.18	0.11	0.11	0.04	0.39	1	6765.78	5636.76
thetat[15]	0.54	0.54	0.13	0.13	0.32	0.75	1	10860.68	6774.78
thetat[16]	0.72	0.73	0.12	0.13	0.50	0.91	1	7303.66	5456.65
thetat[17]	0.36	0.35	0.12	0.13	0.17	0.57	1	13577.40	6713.26
thetat[18]	0.46	0.45	0.13	0.14	0.25	0.69	1	9569.91	5824.80
thetat[19]	0.61	0.61	0.13	0.14	0.38	0.83	1	9240.02	5994.64
thetat[20]	0.61	0.61	0.13	0.14	0.39	0.81	1	8823.85	5916.22
thetat[21]	0.19	0.18	0.10	0.11	0.04	0.38	1	6581.01	5888.66
thetat[22]	0.26	0.25	0.11	0.12	0.09	0.46	1	8956.21	6578.85
thetat[23]	0.33	0.32	0.12	0.13	0.14	0.54	1	10160.63	6150.00
thetat[24]	0.23	0.22	0.11	0.12	0.06	0.43	1	6633.90	6369.39
thetat[25]	0.43	0.43	0.13	0.13	0.23	0.65	1	13796.61	6407.79
thetat[26]	0.43	0.42	0.13	0.14	0.22	0.66	1	13588.60	5985.87
thetat[27]	0.23	0.22	0.11	0.12	0.06	0.43	1	7570.08	6228.74
thetat[28]	0.22	0.21	0.11	0.11	0.07	0.42	1	8566.18	5959.55
thetat[29]	0.35	0.34	0.13	0.13	0.16	0.58	1	9289.48	6030.33
thetat[30]	0.57	0.58	0.13	0.14	0.36	0.79	1	11851.91	5994.65
thetat[31]	0.64	0.64	0.13	0.13	0.43	0.85	1	8077.97	5501.39
thetat[32]	0.47	0.47	0.14	0.14	0.25	0.69	1	8821.94	5861.92
thetat[33]	0.33	0.32	0.13	0.13	0.13	0.55	1	10680.20	5781.28
thetat[34]	0.40	0.40	0.13	0.13	0.19	0.62	1	12274.42	6217.93
mu_adult_basic	0.55	0.55	0.04	0.04	0.48	0.62	1	3423.69	5336.02
mu_adult_diff_basic_complex	-0.09	-0.09	0.08	0.08	-0.23	0.04	1	3423.69	5336.02
mu_baby_complex	0.42	0.42	0.05	0.05	0.34	0.50	1	10695.55	6139.32
mu_adult_chance	-0.05	-0.05	0.04	0.04	-0.12	0.02	1	3423.69	5336.02
mu_baby_basic	0.58	0.58	0.05	0.05	0.50	0.66	1	10695.55	6139.32
mu_baby_diff_basic_complex	-0.16	-0.16	0.10	0.10	-0.32	0.01	1	10695.55	6139.32
mu_baby_chance	-0.08	-0.08	0.05	0.05	-0.16	0.00	1	10695.55	6139.32
mu_complex_babyadult	0.03	0.03	0.05	0.05	-0.06	0.12	1	3965.72	5077.45
mu_basic_babyadult	-0.03	-0.03	0.05	0.05	-0.12	0.06	1	3965.72	5077.45
lp___	-312.81	-313.10	9.01	8.51	-326.71	-297.85	1	1024.95	1464.19

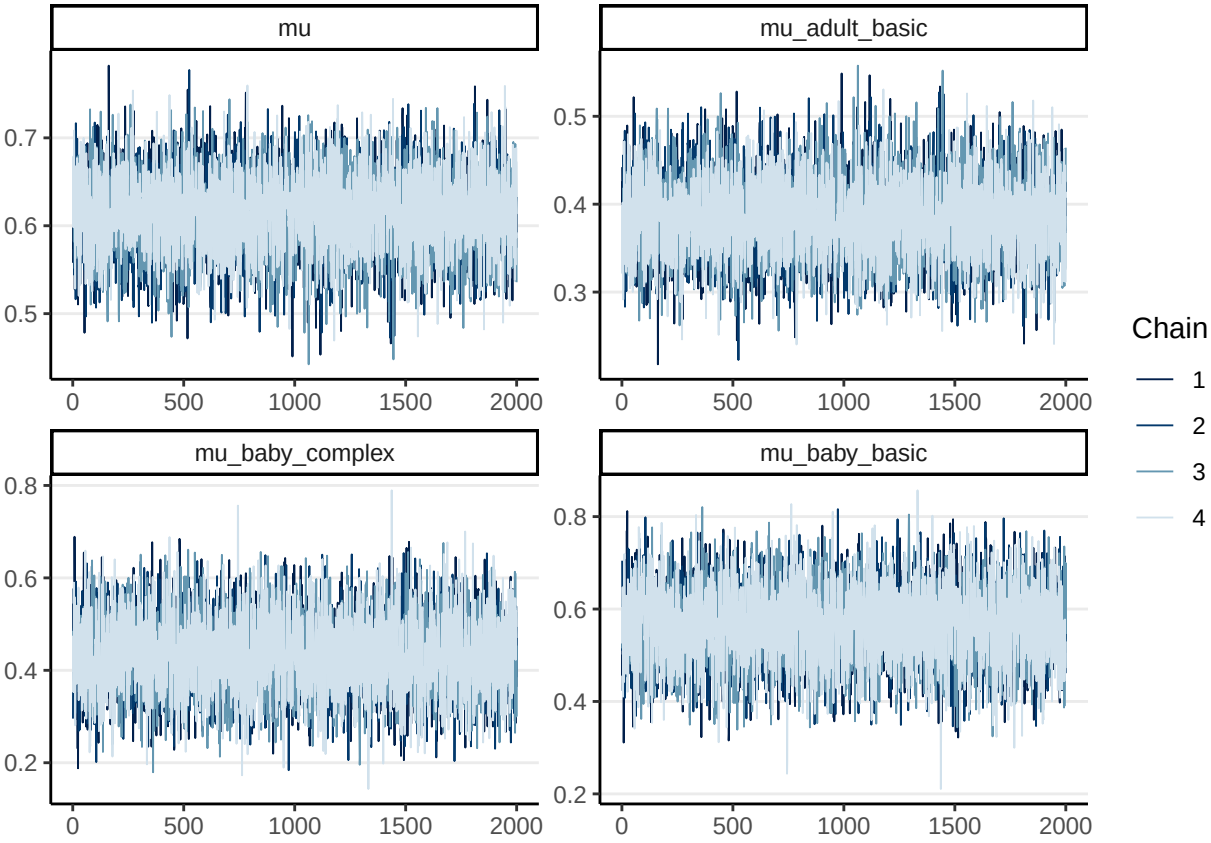
From the trace plots and the rank histograms, it seems like there is good mixing of the 4 chains as they frequently cross each other. The histograms for the four chains have similar average ranks and are roughly uniform, which also suggests good mixing. The ess_bulk for all of the key parameters is larger than 1000, and the rhat value for all key parameters are less than 1.01.

7-year-olds

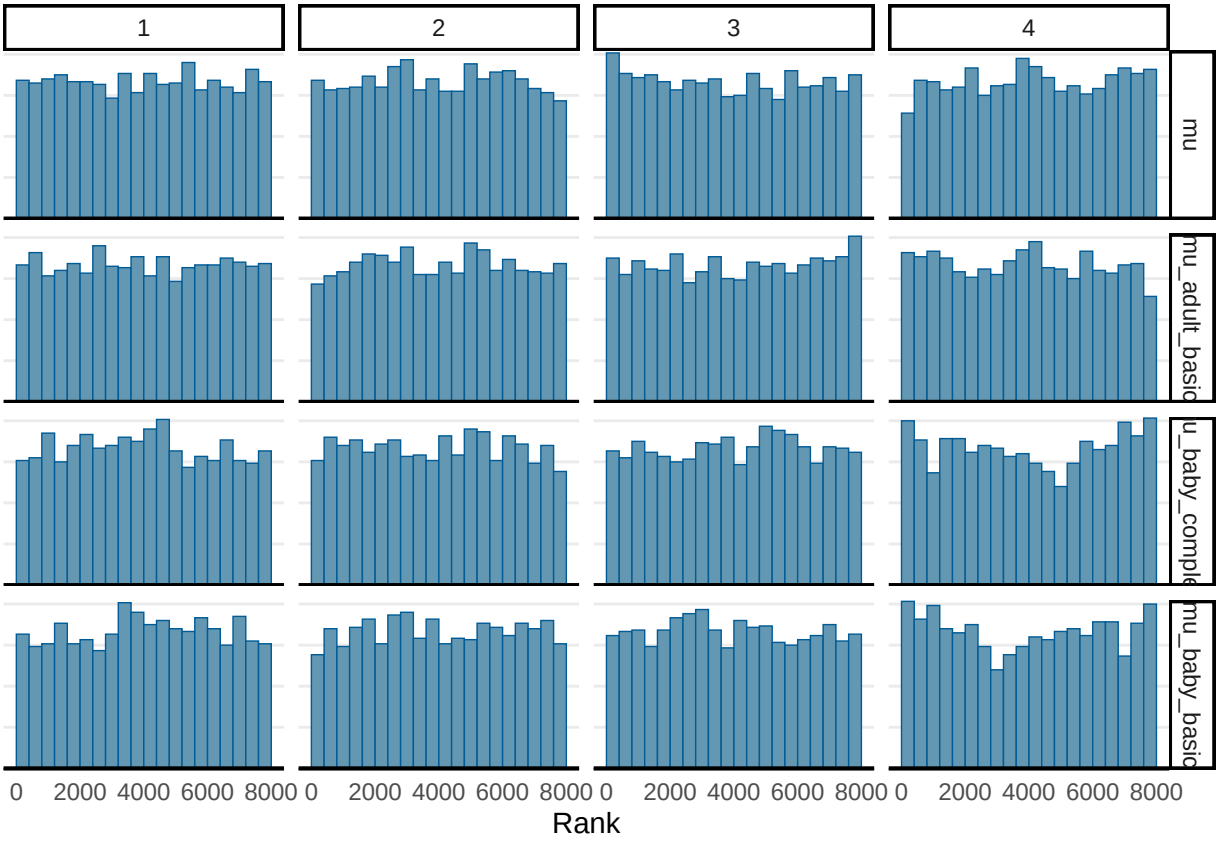
Convergence Check for 7yos



Trace plots of key parameters



Rank histograms of key parameters



Posterior distribution of key model parameter mu:

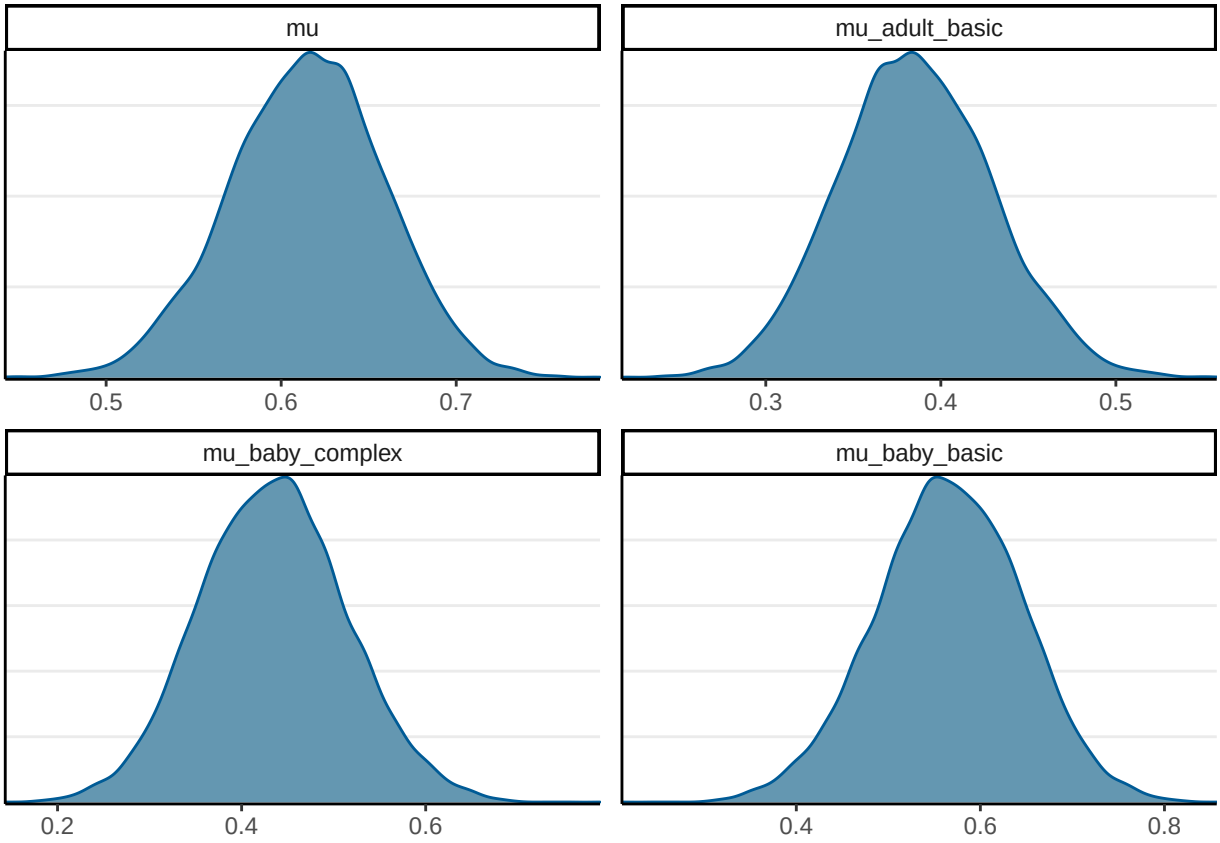


Table of the posterior distributions of key parameters

variable	mean	median	sd	mad	q5	q95	rhat	ess_bulk	ess_tail
thetac[1]	0.68	0.69	0.13	0.13	0.45	0.88	1	9615.82	5772.18
thetac[2]	0.65	0.66	0.14	0.14	0.41	0.86	1	10395.54	5733.65
thetac[3]	0.53	0.54	0.14	0.15	0.30	0.76	1	10895.04	5948.95
thetac[4]	0.39	0.39	0.14	0.15	0.17	0.62	1	8746.47	5863.85
thetac[5]	0.69	0.70	0.13	0.13	0.47	0.88	1	11270.95	6111.11
thetac[6]	0.44	0.44	0.14	0.14	0.21	0.67	1	10046.39	6249.13
thetac[7]	0.82	0.84	0.11	0.11	0.62	0.97	1	5994.51	4483.95
thetac[8]	0.59	0.59	0.14	0.14	0.36	0.80	1	10973.40	5618.93
thetac[9]	0.54	0.55	0.14	0.14	0.31	0.77	1	10657.15	5699.57
thetac[10]	0.52	0.53	0.14	0.14	0.29	0.75	1	11321.79	5752.57
thetac[11]	0.76	0.78	0.12	0.12	0.54	0.94	1	7455.28	5312.86
thetac[12]	0.44	0.44	0.14	0.14	0.22	0.67	1	9524.27	5718.47
thetac[13]	0.84	0.86	0.10	0.10	0.65	0.98	1	5846.88	5237.76
thetac[14]	0.32	0.31	0.14	0.15	0.11	0.56	1	7690.74	5157.33
thetac[15]	0.87	0.89	0.09	0.09	0.69	0.99	1	5486.69	4945.89
thetac[16]	0.75	0.76	0.12	0.13	0.53	0.92	1	8428.34	4907.61
thetac[17]	0.65	0.66	0.14	0.14	0.41	0.86	1	9309.24	5766.44
thetac[18]	0.43	0.43	0.14	0.15	0.20	0.67	1	8572.19	5325.00
thetac[19]	0.67	0.68	0.13	0.13	0.44	0.86	1	11203.04	6022.27
thetac[20]	0.74	0.76	0.12	0.12	0.53	0.92	1	9774.43	5793.07
thetac[21]	0.63	0.64	0.13	0.14	0.39	0.84	1	10202.59	5769.40
thetac[22]	0.73	0.74	0.13	0.13	0.51	0.92	1	8606.79	4628.91

variable	mean	median	sd	mad	q5	q95	rhat	ess_bulk	ess_tail
thetac[23]	0.59	0.60	0.13	0.14	0.36	0.80	1	10145.17	5871.69
thetac[24]	0.39	0.38	0.14	0.14	0.17	0.62	1	7295.95	5628.42
thetac[25]	0.79	0.80	0.12	0.12	0.57	0.95	1	6637.76	4898.27
thetac[26]	0.76	0.78	0.12	0.12	0.55	0.94	1	6830.15	4608.06
thetac[27]	0.63	0.63	0.13	0.14	0.39	0.84	1	11847.60	5869.97
thetac[28]	0.49	0.50	0.14	0.15	0.25	0.72	1	10126.72	6095.47
thetac[29]	0.84	0.86	0.10	0.10	0.65	0.98	1	6110.74	4166.03
thetac[30]	0.35	0.35	0.14	0.15	0.13	0.59	1	6758.87	5528.12
thetac[31]	0.41	0.41	0.14	0.15	0.18	0.65	1	8442.59	6361.31
thetac[32]	0.80	0.82	0.11	0.11	0.60	0.95	1	7543.32	4247.80
thetac[33]	0.61	0.62	0.13	0.14	0.38	0.82	1	11952.78	6254.44
thetac[34]	0.60	0.61	0.14	0.14	0.37	0.81	1	10473.17	5558.67
mu	0.61	0.62	0.04	0.04	0.54	0.69	1	6780.54	5955.30
kappa	5.62	4.88	3.11	2.07	2.53	11.10	1	2530.79	3659.84
eta[1]	-0.82	-0.80	0.66	0.67	-1.93	0.26	1	10436.77	6460.39
eta[2]	-1.33	-1.31	0.72	0.72	-2.53	-0.17	1	10925.27	5777.00
eta[3]	1.08	1.07	0.64	0.64	0.06	2.16	1	9889.15	6186.79
eta[4]	0.25	0.25	0.65	0.64	-0.80	1.31	1	9678.39	5970.31
eta[5]	0.73	0.73	0.66	0.64	-0.34	1.82	1	10892.77	6118.24
eta[6]	-0.32	-0.31	0.67	0.67	-1.41	0.76	1	10149.05	5833.63
eta[7]	-0.07	-0.07	0.66	0.67	-1.15	1.00	1	8504.86	6079.02
eta[8]	0.56	0.55	0.63	0.61	-0.45	1.59	1	10276.34	6491.75
eta[9]	-0.09	-0.08	0.64	0.62	-1.15	0.94	1	9091.29	6311.40
eta[10]	-0.48	-0.47	0.65	0.64	-1.55	0.58	1	9797.17	6097.81
eta[11]	-1.04	-1.03	0.66	0.64	-2.14	0.00	1	9682.40	6103.85
eta[12]	-0.31	-0.30	0.66	0.65	-1.43	0.74	1	10382.62	5910.72
eta[13]	0.29	0.30	0.70	0.69	-0.86	1.46	1	8582.06	6178.28
eta[14]	-0.79	-0.78	0.77	0.76	-2.08	0.44	1	11491.13	6414.98
eta[15]	0.88	0.87	0.78	0.77	-0.38	2.20	1	10544.19	5771.09
eta[16]	0.16	0.17	0.65	0.64	-0.90	1.24	1	10195.74	6566.33
eta[17]	-1.33	-1.32	0.72	0.71	-2.52	-0.15	1	10573.09	6251.76
eta[18]	0.90	0.90	0.64	0.62	-0.14	1.96	1	9466.03	6284.16
eta[19]	0.37	0.36	0.62	0.60	-0.65	1.40	1	10933.40	6506.04
eta[20]	0.17	0.17	0.64	0.64	-0.87	1.23	1	10192.81	6141.15
eta[21]	-0.28	-0.28	0.64	0.62	-1.33	0.76	1	10510.38	6678.49
eta[22]	-1.51	-1.49	0.72	0.72	-2.70	-0.37	1	11087.92	6200.59
eta[23]	0.55	0.55	0.63	0.61	-0.47	1.61	1	9738.58	6271.09
eta[24]	0.25	0.24	0.63	0.62	-0.79	1.29	1	8634.81	5924.16
eta[25]	-0.71	-0.70	0.65	0.63	-1.80	0.37	1	9602.41	6463.66
eta[26]	-1.03	-1.02	0.65	0.65	-2.12	0.03	1	9799.72	6662.40
eta[27]	-0.27	-0.28	0.63	0.62	-1.33	0.74	1	10338.47	6405.41
eta[28]	0.41	0.41	0.62	0.62	-0.60	1.42	1	9851.87	6565.58
eta[29]	0.30	0.29	0.69	0.68	-0.83	1.42	1	9106.94	5726.90
eta[30]	1.09	1.08	0.64	0.63	0.05	2.14	1	9054.80	6429.37
eta[31]	0.58	0.59	0.62	0.61	-0.45	1.60	1	9380.68	6823.18
eta[32]	1.08	1.05	0.74	0.74	-0.10	2.33	1	11226.09	6219.94
eta[33]	0.92	0.90	0.65	0.64	-0.14	2.00	1	10085.38	6230.68
eta[34]	-0.65	-0.64	0.65	0.63	-1.73	0.39	1	10361.30	6057.84
mu_delta	-0.46	-0.46	0.21	0.21	-0.80	-0.13	1	4837.50	5705.38
tau_delta	0.88	0.87	0.22	0.21	0.56	1.27	1	3297.36	4835.25
thetat[1]	0.28	0.26	0.15	0.16	0.06	0.55	1	12084.90	6494.27
thetat[2]	0.15	0.12	0.12	0.12	0.01	0.39	1	9880.96	5848.72

variable	mean	median	sd	mad	q5	q95	rhat	ess_bulk	ess_tail
thetat[3]	0.70	0.71	0.16	0.16	0.42	0.92	1	10684.72	5587.25
thetat[4]	0.31	0.30	0.15	0.16	0.09	0.59	1	12348.03	6220.81
thetat[5]	0.74	0.76	0.15	0.15	0.46	0.94	1	12757.16	5857.44
thetat[6]	0.21	0.19	0.14	0.13	0.04	0.48	1	13191.59	5995.31
thetat[7]	0.67	0.68	0.16	0.17	0.39	0.90	1	11300.49	6345.90
thetat[8]	0.59	0.60	0.16	0.17	0.31	0.85	1	12167.47	6005.88
thetat[9]	0.35	0.34	0.16	0.17	0.11	0.63	1	13006.81	6293.86
thetat[10]	0.23	0.21	0.14	0.14	0.05	0.50	1	12558.35	5659.95
thetat[11]	0.30	0.28	0.16	0.16	0.07	0.58	1	10544.44	6460.09
thetat[12]	0.22	0.19	0.14	0.14	0.04	0.47	1	13393.74	6023.43
thetat[13]	0.79	0.81	0.14	0.14	0.53	0.96	1	10555.73	6007.29
thetat[14]	0.08	0.05	0.09	0.06	0.00	0.27	1	9212.37	5497.36
thetat[15]	0.91	0.94	0.10	0.07	0.70	1.00	1	9249.98	5467.47
thetat[16]	0.64	0.65	0.16	0.17	0.36	0.88	1	12551.84	6584.41
thetat[17]	0.15	0.12	0.12	0.11	0.01	0.40	1	9694.77	5858.71
thetat[18]	0.55	0.55	0.17	0.18	0.27	0.82	1	11201.53	6453.30
thetat[19]	0.62	0.63	0.16	0.17	0.33	0.87	1	13426.07	6435.43
thetat[20]	0.64	0.65	0.16	0.17	0.35	0.88	1	11802.35	5918.56
thetat[21]	0.37	0.36	0.16	0.17	0.13	0.66	1	13017.59	6464.39
thetat[22]	0.17	0.14	0.13	0.13	0.01	0.43	1	9617.04	5935.11
thetat[23]	0.59	0.60	0.16	0.18	0.32	0.86	1	12415.94	6071.29
thetat[24]	0.31	0.30	0.16	0.16	0.09	0.59	1	13098.11	5614.44
thetat[25]	0.42	0.42	0.16	0.17	0.16	0.70	1	11333.42	6655.75
thetat[26]	0.30	0.28	0.15	0.16	0.08	0.58	1	10149.90	6587.46
thetat[27]	0.37	0.36	0.16	0.17	0.13	0.65	1	12075.72	6302.30
thetat[28]	0.45	0.45	0.17	0.18	0.19	0.73	1	12473.68	6842.95
thetat[29]	0.79	0.81	0.14	0.14	0.53	0.96	1	10442.66	5904.80
thetat[30]	0.53	0.53	0.17	0.18	0.26	0.81	1	10409.49	6396.22
thetat[31]	0.43	0.42	0.16	0.17	0.18	0.71	1	12579.11	6961.63
thetat[32]	0.88	0.91	0.11	0.10	0.66	1.00	1	9945.27	5246.51
thetat[33]	0.72	0.73	0.15	0.16	0.44	0.94	1	11086.35	6611.55
thetat[34]	0.25	0.23	0.14	0.15	0.05	0.52	1	12358.10	5793.06
mu_adult_basic	0.39	0.38	0.04	0.04	0.31	0.46	1	6780.54	5955.30
mu_adult_diff_basic_complex	0.23	0.23	0.09	0.09	0.08	0.37	1	6780.54	5955.30
mu_baby_complex	0.43	0.43	0.08	0.08	0.31	0.57	1	5658.44	5924.56
mu_adult_chance	0.11	0.12	0.04	0.04	0.04	0.19	1	6780.54	5955.30
mu_baby_basic	0.57	0.57	0.08	0.08	0.43	0.69	1	5658.44	5924.56
mu_baby_diff_basic_complex	-0.13	-0.13	0.16	0.16	-0.39	0.13	1	5658.44	5924.56
mu_baby_chance	-0.07	-0.07	0.08	0.08	-0.19	0.07	1	5658.44	5924.56
mu_complex_babyadult	0.18	0.18	0.08	0.08	0.05	0.31	1	4846.60	5744.37
mu_basic_babyadult	-0.18	-0.18	0.08	0.08	-0.31	-0.05	1	4846.60	5744.37
lp___	-293.94	-293.71	7.98	7.92	-307.72	-281.17	1	2026.17	3762.49

From the trace plots and the rank histograms, it seems like there is good mixing of the 4 chains as they frequently cross each other. The histograms for the four chains have similar average ranks and are roughly uniform, which also suggests good mixing. The ess_bulk for all of the key parameters is larger than 1000, and the rhat value for all key parameters are less than 1.01.

Interpretation of Results

Within-Group Comparisons

5-year-olds When teaching an adult, 5-year-olds were equally likely to teach basic and complex information. The estimated difference in probability is -0.09, 90% CI[-0.23, 0.04]. When teaching a baby, 5-year-olds were also equally likely to teach basic and complex information. The estimated difference in probability is -0.16, 90% CI[-0.32, 0.01].

The estimated probability for 5-year-olds teaching complex information to the adult is 0.45, 90% CI [0.38, 0.52]. Since this interval includes 0.5, it indicates that they are teaching complex information to the adult at chance. The estimated probability for 5-year-olds teaching basic information to the baby is 0.58, 90% CI [0.49, 0.66]. Since this interval includes 0.5, it indicates that they are also teaching basic information to the baby at chance.

7-year-olds When teaching an adult, 7-year-olds were more likely to teach complex information than basic information. The estimated difference in probability is 0.23, 90% CI[0.08, 0.37]. When teaching a baby, 7-year-olds were equally likely to teach basic and complex information. The estimated difference in probability is -0.13, 90% CI[-0.39, 0.13].

The estimated probability for 7-year-olds teaching complex information to the adult is 0.61, 90% CI [0.54, 0.69]. Since this interval does not include 0.5, it indicates that they are teaching complex information to the adult above chance. The estimated probability for 7-year-olds teaching basic information to the baby is 0.57, 90% CI [0.43, 0.69]. Since this interval includes 0.5, it indicates that they are teaching basic information to the baby at chance.

Age Group Comparisons From the posterior distributions, it seems like 7-year-olds are better than 5-year-olds at teaching complex information to the adult. The mean amount of complex information taught to adults for 7-year-olds is 0.61, 90% CI [0.54, 0.69], whereas the mean amount of complex information taught to adults for 5-year-olds is 0.45, 90% CI[0.38, 0.52]. However, there does not seem to be an age difference in the probability of basic information taught to the baby audience. The estimated probability of 7-year-olds teaching basic information to the baby is 0.57, 90% CI [0.43, 0.69]. Similarly, the estimated probability of 5-year-olds teaching basic information to the baby is 0.58, 90% CI [0.49. 0.66].

This indicates that compared to 5-year-olds, 7-year-olds are significantly better at teaching complex information to the adult. On the other hand, 7-year-olds and 5-year-olds were similar in their probability of teaching basic information to the baby.