

# Online material for: “Aging of the Exploring Mind: Older Adults Deviate more from Optimality in Complex Choice Environments”

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Behavioral analysis

Overall scores

The tables show performance and reaction time statistics per participant and per age group.

Table 1: Score (m) and speed (sp) across 4 option blocks

id	n	m	sd	se	sp.m	sp.sd	age_group	age	sd.sc	m.sc
8	8	54.50	6.63	2.35	23.26	7.24	young	23	1.58	2.36
28	8	53	4.75	1.68	40.73	8.61	young	23	-.10	1.67
11	8	52.88	4.64	1.64	36.66	15.46	young	20	-.20	1.61
14	8	52.88	6.36	2.25	25.25	6.23	young	24	1.34	1.61
10	8	51.50	5.50	1.95	42.39	21.61	young	22	.57	.98
13	8	51.50	6.12	2.16	26.08	26.88	young	24	1.12	.98
2	8	51.50	5.61	1.98	28.46	6.87	young	26	.66	.98
9	8	51.50	4.57	1.61	21.76	11.76	young	26	-.27	.98
19	8	51.38	4.60	1.62	24.32	10.50	young	22	-.24	.92
20	8	51.12	4.73	1.67	30.75	8.05	young	25	-.12	.80
5	8	51.12	6.45	2.28	25.02	12.22	young	30	1.42	.80
22	8	50.88	5.46	1.93	21.82	5.37	young	30	.54	.69
12	8	50.38	7.33	2.59	17.77	3.40	young	27	2.21	.46
7	8	50.38	5.95	2.10	39.15	38.74	young	26	.97	.46
25	8	50.25	5.60	1.98	117.57	66.72	young	22	.66	.40
3	8	50.25	7.46	2.64	30.57	37.56	young	29	2.33	.40
17	8	49.88	4.49	1.59	61.08	52.39	young	29	-.34	.22
16	8	49.75	3.33	1.18	53.35	10.81	young	25	-1.38	.17
1	8	49.50	3.74	1.32	31.78	28.82	young	27	-1.01	.05
23	8	48.88	5.62	1.99	40.67	23.41	young	24	.67	-.24
24	8	48.88	4.94	1.75	42.37	13.09	young	23	.07	-.24
27	8	48.88	4.32	1.53	19.17	5.62	young	27	-.49	-.24
6	8	48.62	5.37	1.90	26.41	7.67	young	19	.45	-.35
15	8	48.12	3.36	1.19	81.63	60.11	young	22	-1.35	-.59
26	8	47.75	4.23	1.50	50.73	9.90	young	23	-.57	-.76
21	8	47.38	3.16	1.12	21.30	10.05	young	22	-1.53	-.93
4	8	47	4.50	1.59	22.61	7.77	young	21	-.32	-1.11
18	8	46.75	3.62	1.28	50.34	20.71	young	20	-1.12	-1.22
29	8	46.62	3.25	1.15	31.52	20.35	young	24	-1.45	-1.28
130	8	55.62	5.37	1.90	4398	32.23	old	65	.45	2.89
106	8	51.75	3.62	1.28	56.33	12.68	old	73	-1.12	1.09
115	8	51.75	4.74	1.68	28.12	8.48	old	72	-.11	1.09
124	8	51.75	4.13	1.46	87.67	40.36	old	70	-.66	1.09
105	8	50.75	5.87	2.08	46.44	18.99	old	71	.90	.63
109	8	50.75	5.60	1.98	60.17	37.49	old	71	.66	.63
101	8	50.25	5.01	1.77	73.87	47.00	old	67	.13	.40
104	8	50	4.07	1.44	164.35	33.68	old	70	-.71	.28
108	8	50	5.98	2.11	56.77	27.89	old	73	1.00	.28
126	8	49.62	5.21	1.84	27.42	7.56	old	73	.31	.11
110	8	49.38	5.73	2.03	18.23	4.36	old	71	.78	-.01
131	8	49.12	6.20	2.19	19.57	14.93	old	67	1.19	-.12
114	8	49	4.14	1.46	43.69	16.49	old	72	-.65	-.18
121	8	49	6.82	2.41	34.55	13.64	old	73	1.76	-.18
107	8	48.88	2.95	1.04	81.52	29.41	old	69	-1.72	-.24
127	8	48.50	5.18	1.83	146.98	79.92	old	65	.28	-.41
120	8	48.38	4.63	1.64	42.11	24.22	old	72	-.21	-.47
123	8	47.88	2.70	.95	76.55	27.29	old	74	-1.94	-.70
119	8	47.62	4.66	1.65	35.66	33.84	old	71	-.19	-.82
111	8	47.50	4.28	1.51	80.64	21.79	old	73	-.53	-.88
112	8	47.50	3.82	1.35	62.01	13.38	old	68	-.94	-.88
118	8	47.50	5.29	1.87	68.97	6.77	old	71	.38	-.88
116	8	47.25	3.96	1.40	46.80	9.93	old	71	-.82	-.99
125	8	47.25	3.69	1.31	79.97	112.84	old	69	-1.05	-.99
122	8	47.12	4.73	1.67	64.07	11.61	old	69	-.12	-1.05
113	8	47	4.04	1.43	62.25	28.58	old	72	-.74	-1.11
128	8	47	6	2.12	68.45	8.94	old	73	1.02	-1.11
129	8	46.88	4.52	1.60	47.92	16.65	old	73	-.31	-1.16
132	8	46.75	3.92	1.39	90.96	13.71	old	65	-.85	-1.22
102	8	46.62	6.25	2.21	30.17	6.64	old	73	1.25	-1.28
103	8	46.12	5.17	1.83	56.27	30.01	old	71	.27	-1.51
117	8	45.38	2.83	1.00	62.38	14.98	old	68	-1.83	-1.86

Table 2: Score (m) and speed (sp) across groups

age_group	n	m	m.sc	sd	sd.sc	se	sp.m	age
old	32	48.75	-.30	4.72	-.13	1.67	61.40	70.47
young	29	50.10	.33	5.02	.14	1.78	37.40	24.31

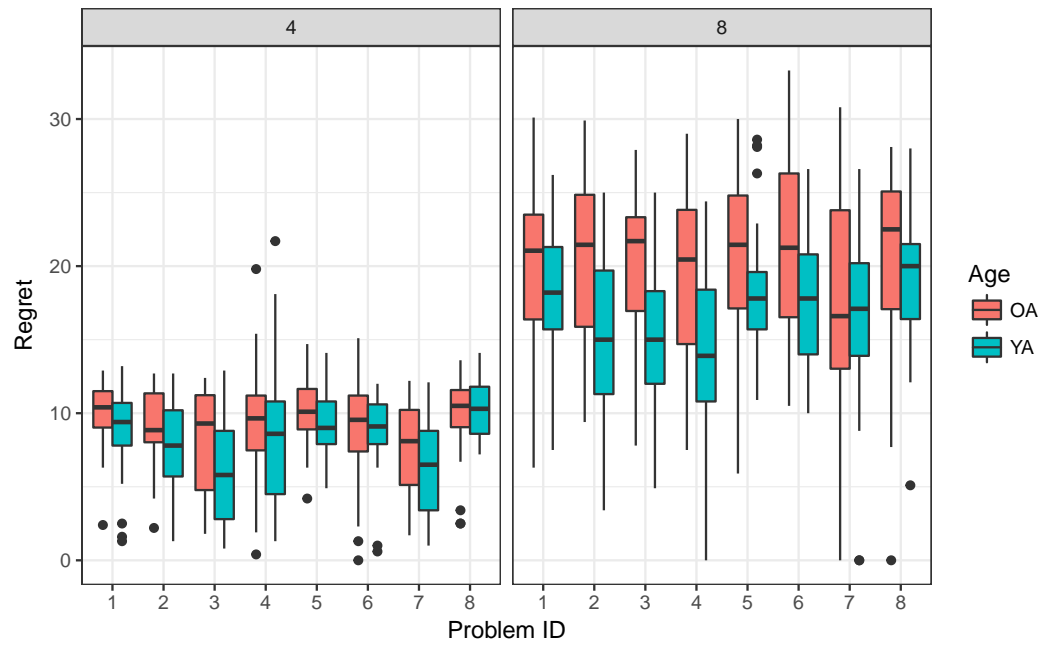
Table 3: Score (m) and speed (sp) across 8 option blocks

id	n	m	sd	se	sp.m	sp.sd	age_group	age	sd.sc	m.sc
19	8	49	8.80	3.11	23.69	3.05	young	22	2.11	1.74
17	8	48.25	5.06	1.79	45.93	21.67	young	29	-.48	1.56
14	8	47.12	6.06	2.14	37.20	32.14	young	24	.21	1.28
11	8	47	6.50	2.30	41.21	10.76	young	20	.52	1.24
28	8	47	6.14	2.17	53.69	18.50	young	23	.27	1.24
3	8	46.88	5.64	1.99	20.51	9.98	young	29	-.08	1.21
5	8	46.75	4.65	1.64	25.46	2.97	young	30	-.76	1.18
9	8	46.62	5.34	1.89	23.52	5.86	young	26	-.29	1.15
6	8	46.38	7.82	2.76	38.69	29.99	young	19	1.43	1.09
23	8	45.38	5.53	1.95	35.07	8.45	young	24	-.16	.84
13	8	45.12	6.83	2.42	20.25	8.04	young	24	.75	.78
27	8	44.88	6.13	2.17	21.24	3.66	young	27	.26	.71
22	8	44.62	7.39	2.61	29.46	18.49	young	30	1.13	.65
1	8	44.12	9.30	3.29	27.70	12.21	young	27	2.45	.53
2	8	44	5.78	2.04	40.05	12.09	young	26	.02	.50
25	8	43.75	6.32	2.23	106.01	30.35	young	22	.39	.43
7	8	43.62	5.18	1.83	33.89	4.03	young	26	-.40	.40
15	8	43.25	5.82	2.06	72.30	18.28	young	22	.05	.31
16	8	42.88	5.62	1.99	67.07	23.10	young	25	-.10	.21
24	8	42.88	5.79	2.05	46.79	10.30	young	23	.03	.21
8	8	42.25	5.42	1.92	41.05	39.53	young	23	-.23	.06
12	8	41.25	3.33	1.18	27.16	12.69	young	27	-1.68	-.19
20	8	41	4.04	1.43	37.23	29.10	young	25	-1.19	-.25
26	8	39.75	3.99	1.41	55.61	22.90	young	23	-1.22	-.57
10	8	39.25	4.03	1.42	70.26	27.45	young	22	-1.20	-.69
29	8	37.75	5.55	1.96	36.02	11.71	young	24	-.14	-1.06
21	8	37	4.07	1.44	20.03	4.35	young	22	-1.17	-1.25
18	8	36.62	5.88	2.08	60.30	38.46	young	20	.08	-1.35
4	8	36.12	5.17	1.83	34.84	31.10	young	21	-.41	-1.47
101	8	47.25	8.38	2.96	69.53	45.68	old	67	1.82	1.31
126	8	46.62	6.14	2.17	32.94	14.94	old	73	.27	1.15
131	8	46.50	5.90	2.09	22.16	9.94	old	67	.10	1.12
105	8	46.25	6.39	2.26	40.88	5.57	old	71	.44	1.06
104	8	45.62	7.46	2.64	201.58	34.88	old	70	1.18	.90
124	8	45.38	6.59	2.33	159.14	63.89	old	70	.58	.84
109	8	45.12	8.01	2.83	58.07	7.88	old	71	1.56	.78
115	8	45	3.66	1.30	24.43	1.69	old	72	-1.45	.74
111	8	43.62	5.24	1.85	78.99	9.60	old	73	-.36	.40
121	8	43.25	6.58	2.33	34.07	8.54	old	73	.57	.31
130	8	42.38	4.24	1.50	60.92	46.59	old	65	-1.05	.09
102	8	42.12	6.15	2.17	49.61	42.62	old	73	.27	.03
107	8	42	6.99	2.47	86.65	18.52	old	69	.85	-.004
127	8	41.38	7.82	2.76	131.49	30.43	old	65	1.43	-.16
106	8	41.25	6.67	2.36	63.09	13.34	old	73	.63	-.19
108	8	40.75	8.48	3.00	63.05	41.80	old	73	1.89	-.32
128	8	40.38	5.66	2.00	73.37	17.43	old	73	-.07	-.41
113	8	40.25	6.54	2.31	57.27	8.21	old	72	.54	-.44
123	8	39.50	5.63	1.99	71.27	8.08	old	74	-.09	-.63
120	8	39.38	7.98	2.82	44.47	32.72	old	72	1.54	-.66
118	8	38.38	6.21	2.20	76.11	20.41	old	71	.31	-.91
116	8	37.62	5.01	1.77	53.76	22.60	old	71	-.51	-1.10
122	8	37.50	4.78	1.69	63.57	14.94	old	69	-.68	-1.13
125	8	37.50	4.69	1.66	49.62	11.36	old	69	-.74	-1.13
129	8	37.50	4.57	1.61	38.78	9.06	old	73	-.82	-1.13
110	8	37.38	5.60	1.98	25.19	14.17	old	71	-.10	-1.16
112	8	37	4.28	1.51	73.75	76.97	old	68	-1.02	-1.25
114	8	36.12	4.42	1.56	46.80	25.87	old	72	-.92	-1.47
119	8	36	4.07	1.44	28.97	15.15	old	71	-1.17	-1.50
117	8	35.75	3.06	1.08	60.75	8.44	old	68	-1.87	-1.56
103	8	34.12	3.04	1.08	46.56	13.42	old	71	-1.88	-1.97
132	8	33.62	3.70	1.31	111.76	37.00	old	65	-1.42	-2.09

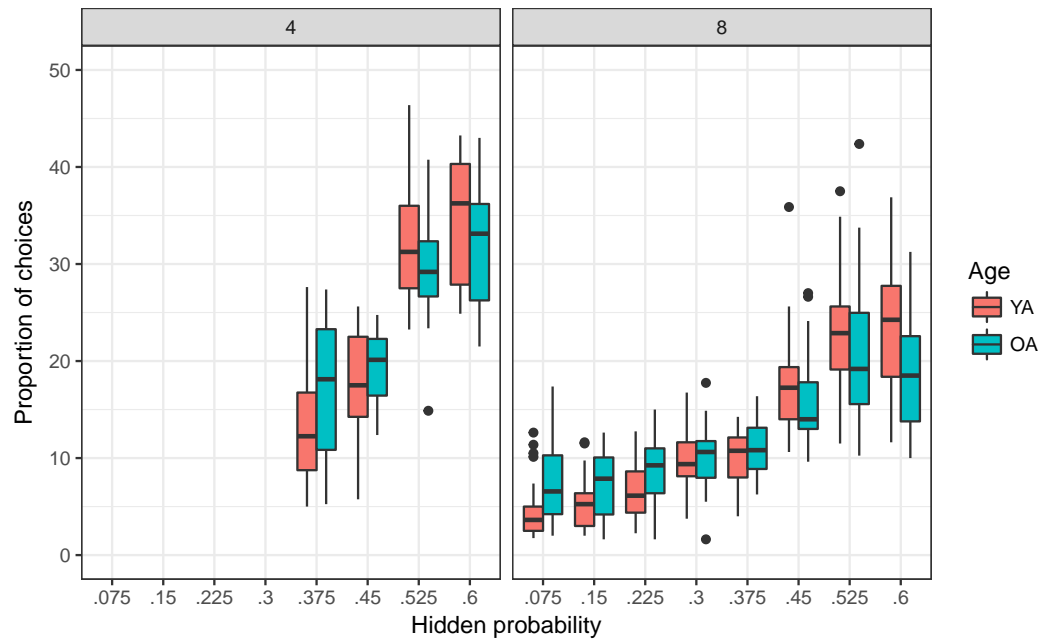
Table 4: Score (m) and speed (sp) across groups

age_group	n	m	m.sc	sd	sd.sc	se	sp.m	age
old	32	40.70	-.33	5.75	-.01	2.03	65.58	70.47
young	29	43.47	.36	5.76	.01	2.04	41.11	24.31

# Exploratory plots

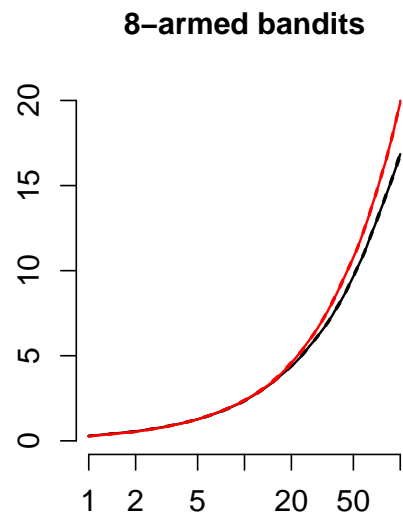
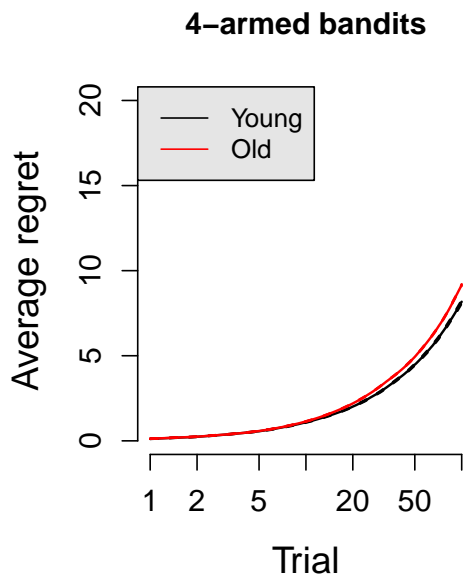
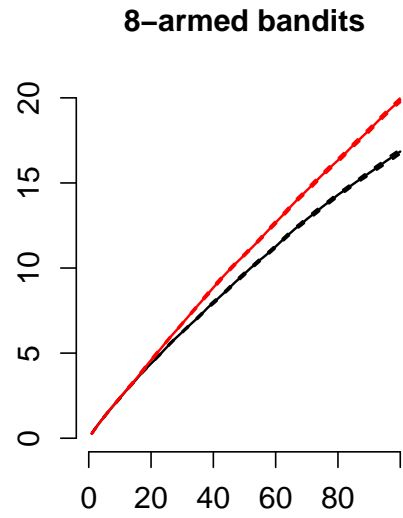
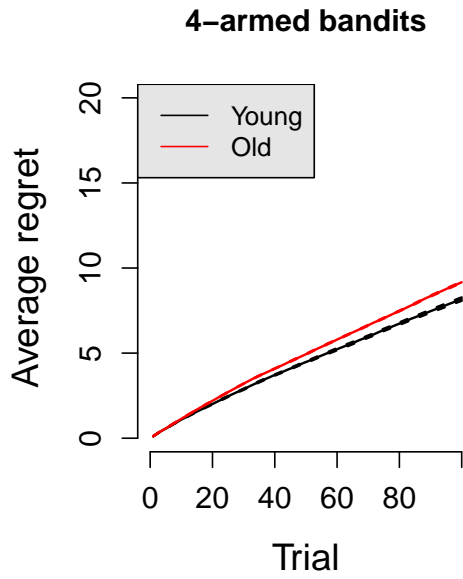


EV plots



Regret

Regret per trial



Regret per participant

Table 5: Regret across 4 option blocks

id	n	m	sd	se	m.sc	sd.sc	age_group
18	8	11.29	.89	.32	1.40	-1.56	young
21	8	11.02	1.43	.51	1.25	-1.10	young
4	8	10.88	1.77	.63	1.18	-.80	young
24	8	10.75	5.02	1.77	1.11	1.97	young
29	8	10.69	1.54	.54	1.07	-1.01	young
26	8	10.53	1.15	.41	.99	-1.34	young
12	8	9.43	4.08	1.44	.40	1.17	young
6	8	9.37	5.35	1.89	.37	2.26	young
1	8	9.01	2.16	.76	.17	-.48	young
16	8	8.86	2.04	.72	.09	-.58	young
15	8	8.73	2.16	.76	.02	-.48	young
23	8	8.68	2.62	.93	-.01	-.08	young
7	8	8.40	2.42	.86	-.16	-.25	young
10	8	7.98	3.10	1.09	-.39	.33	young
27	8	7.87	2.17	.77	-.44	-.46	young
20	8	7.87	1.76	.62	-.44	-.81	young
25	8	7.74	3.06	1.08	-.51	.29	young
2	8	7.47	2.79	.99	-.66	.07	young
5	8	7.39	3.96	1.40	-.70	1.07	young
17	8	7.19	3.52	1.24	-.81	.69	young
3	8	7.03	3.89	1.37	-.90	1.01	young
9	8	6.94	2.68	.95	-.95	-.03	young
19	8	6.78	1.98	.70	-1.03	-.62	young
22	8	6.75	3.66	1.29	-1.05	.81	young
13	8	6.58	3.62	1.28	-1.14	.77	young
14	8	5.72	3.76	1.33	-1.60	.89	young
11	8	5.65	3.55	1.26	-1.64	.72	young
28	8	5.43	3.59	1.27	-1.76	.75	young
8	8	5.02	4.36	1.54	-1.98	1.41	young
132	8	11.67	.64	.23	1.61	-1.78	old
103	8	11.65	1.83	.65	1.60	-.75	old
117	8	11.56	1.29	.46	1.54	-1.22	old
122	8	11.42	.96	.34	1.47	-1.50	old
118	8	11.01	1.74	.61	1.25	-.83	old
112	8	10.99	1.08	.38	1.24	-1.40	old
128	8	10.91	1.91	.68	1.20	-.69	old
116	8	10.58	1.96	.69	1.02	-.65	old
129	8	10.58	1.60	.57	1.02	-.95	old
125	8	10.52	1.58	.56	.98	-.97	old
113	8	10.51	2.60	.92	.98	-.10	old
119	8	10.39	2.02	.71	.91	-.60	old
114	8	9.63	3.18	1.12	.50	.40	old
123	8	9.36	.53	.19	.36	-1.87	old
120	8	9.35	2.11	.75	.35	-.52	old
126	8	9.35	5.56	1.97	.35	2.44	old
102	8	9.10	3.84	1.36	.22	.96	old
107	8	9.08	1.72	.61	.21	-.85	old
111	8	8.90	1.78	.63	.11	-.80	old
104	8	8.83	3.18	1.13	.07	.40	old
110	8	8.82	2.19	.78	.07	-.44	old
108	8	8.82	3.99	1.41	.07	1.09	old
127	8	8.56	3.05	1.08	-.07	.29	old
131	8	7.91	4.24	1.50	-.42	1.31	old
121	8	7.60	3.67	1.30	-.59	.82	old
106	8	7.51	2.27	.80	-.64	-.38	old
101	8	7.43	3.81	1.35	-.68	.94	old
115	8	7.06	3.09	1.09	-.88	.33	old
105	8	6.96	3.67	1.30	-.94	.82	old
109	8	6.55	3.67	1.30	-1.15	.82	old
124	8	6.50	3.41	1.21	-1.18	.60	old
130	8	4.15	3.24	1.15	-2.45	.45	old

Table 6: Score (m) and speed (sp) across groups

age_group	n	m	m.sc	sd	sd.sc	se
old	32	9.16	.25	2.54	-.14	.90
young	29	8.17	-.28	2.90	.16	1.03



Table 7: Regret across 8 option blocks

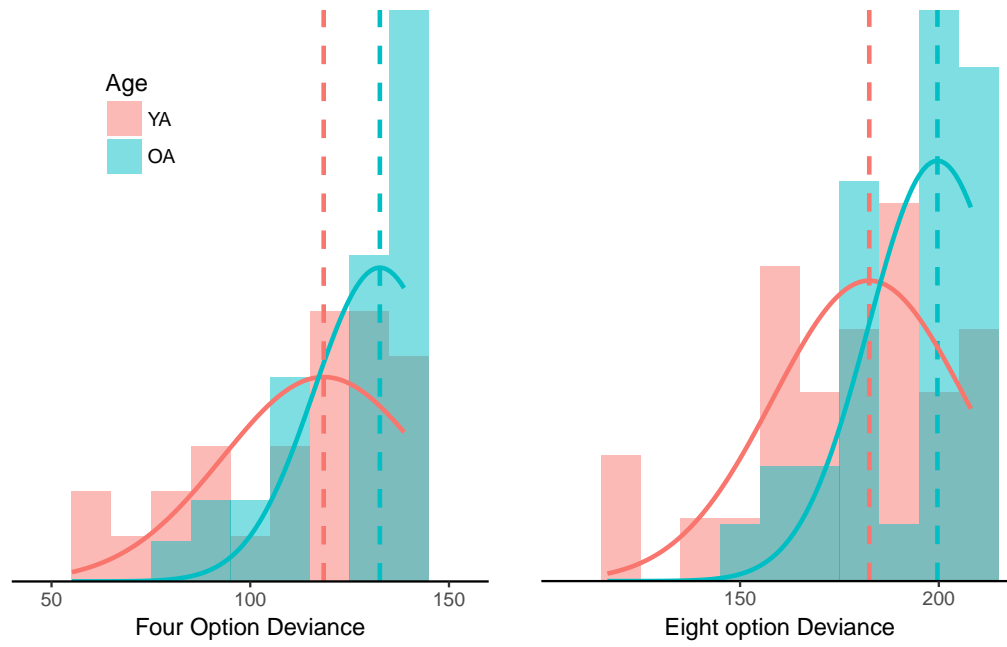
id	n	m	sd	se	sd.sc	age_group
29	8	25.33	2.08	.73	-1.07	young
4	8	24.56	3.05	1.08	-.52	young
21	8	24.43	1.61	.57	-1.34	young
18	8	23.29	2.53	.89	-.81	young
26	8	21.10	2.80	.99	-.66	young
10	8	20.95	3.71	1.31	-.14	young
1	8	18.38	5.41	1.91	.83	young
12	8	18.22	4.01	1.42	.03	young
20	8	18.09	3.25	1.15	-.40	young
15	8	18.05	2.34	.83	-.92	young
16	8	17.80	1.89	.67	-1.18	young
8	8	16.99	3.22	1.14	-.42	young
7	8	16.72	2.97	1.05	-.56	young
23	8	16.58	2.84	1.01	-.63	young
2	8	16.57	3.09	1.09	-.49	young
24	8	16.39	3.69	1.30	-.15	young
27	8	16.07	3.11	1.10	-.48	young
22	8	15.68	4.46	1.58	.29	young
25	8	15.19	5.52	1.95	.89	young
9	8	14.45	2.04	.72	-1.09	young
3	8	13.92	4.00	1.41	.03	young
13	8	13.87	6.99	2.47	1.73	young
5	8	13.39	4.53	1.60	.33	young
6	8	12.94	7.20	2.55	1.85	young
11	8	12.23	4.09	1.44	.07	young
17	8	12.10	5.31	1.88	.77	young
28	8	12.09	4.04	1.43	.05	young
14	8	11.60	5.84	2.06	1.07	young
19	8	11.48	6.01	2.12	1.17	young
103	8	27.76	1.81	.64	-1.23	old
132	8	27.75	1.95	.69	-1.15	old
117	8	25.64	1.29	.45	-1.52	old
119	8	25.44	3.32	1.17	-.36	old
129	8	25.11	2.32	.82	-.93	old
112	8	24.43	1.12	.39	-1.62	old
114	8	24.19	2.07	.73	-1.07	old
122	8	24.18	3.49	1.23	-.26	old
110	8	23.80	4.22	1.49	.15	old
125	8	22.76	.93	.33	-1.73	old
116	8	22.57	2.80	.99	-.66	old
118	8	22.17	2.73	.97	-.70	old
113	8	21.87	5.56	1.97	.92	old
123	8	21.56	2.63	.93	-.75	old
127	8	19.62	5.45	1.93	.86	old
120	8	19.27	6.95	2.46	1.71	old
128	8	19.26	5.35	1.89	.80	old
107	8	19.09	5.53	1.95	.90	old
102	8	18.71	5.07	1.79	.64	old
106	8	18.18	4.08	1.44	.07	old
130	8	17.53	6.14	2.17	1.25	old
108	8	17.50	9.18	3.24	2.98	old
111	8	17.11	3.15	1.12	-.46	old
121	8	17.06	3.45	1.22	-.29	old
104	8	15.44	4.62	1.63	.38	old
109	8	15.26	7.18	2.54	1.84	old
115	8	14.92	3.77	1.33	-.11	old
131	8	14.73	2.71	.96	-.71	old
105	8	14.20	4.11	1.45	.09	old
124	8	14.18	4.54	1.61	.33	old
101	8	13.18	4.85	1.72	.51	old
126	8	11.23	7.22	2.55	1.87	old

Table 8: Score (m) and speed (sp) across groups

age_group	n	m	sd	sd.sc	se
old	32	19.87	4.05	.05	1.43
young	29	16.84	3.85	-.06	1.36

Optimality models

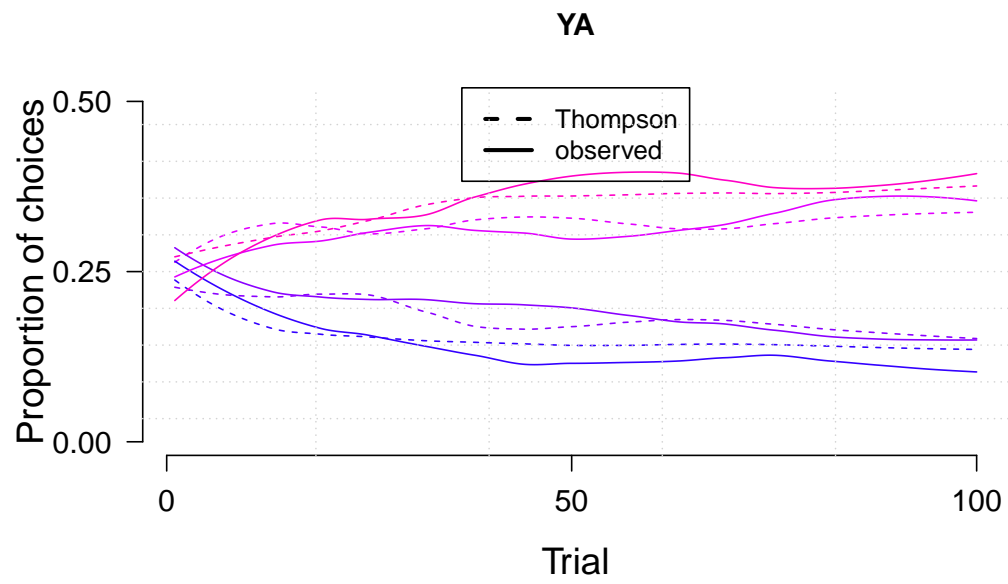
# Visual model comparison



Model fits per trial

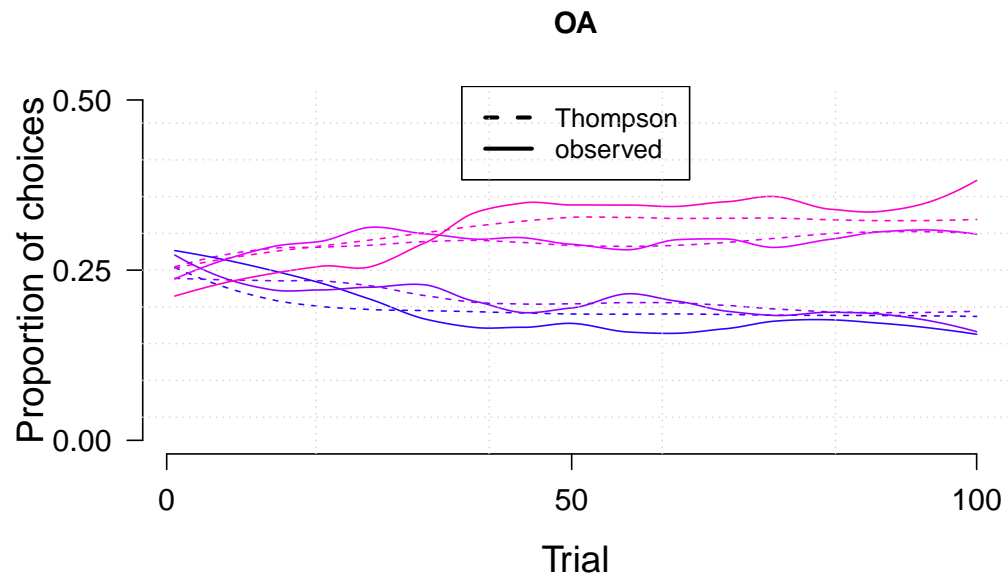
4 options

YA

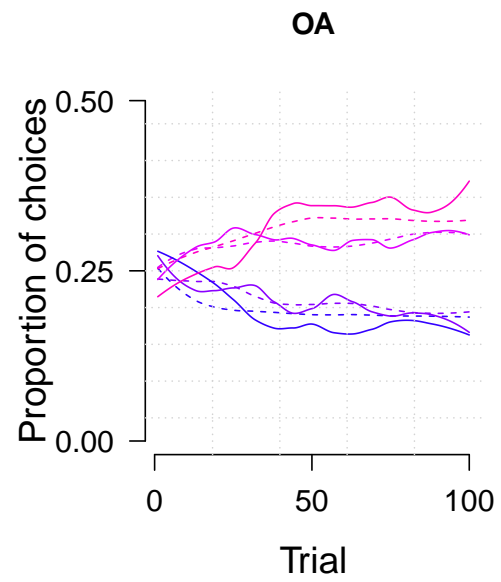
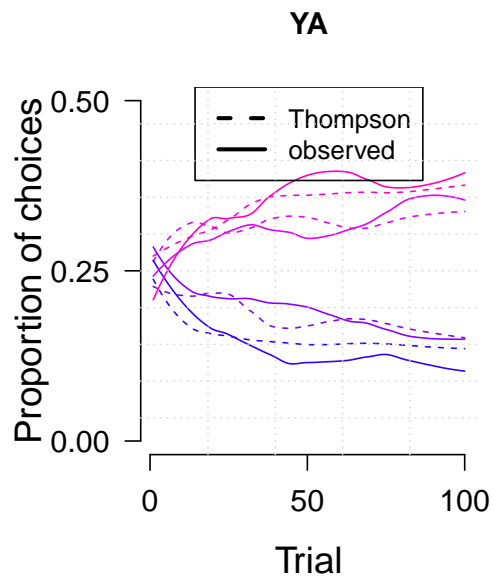


same options

OA

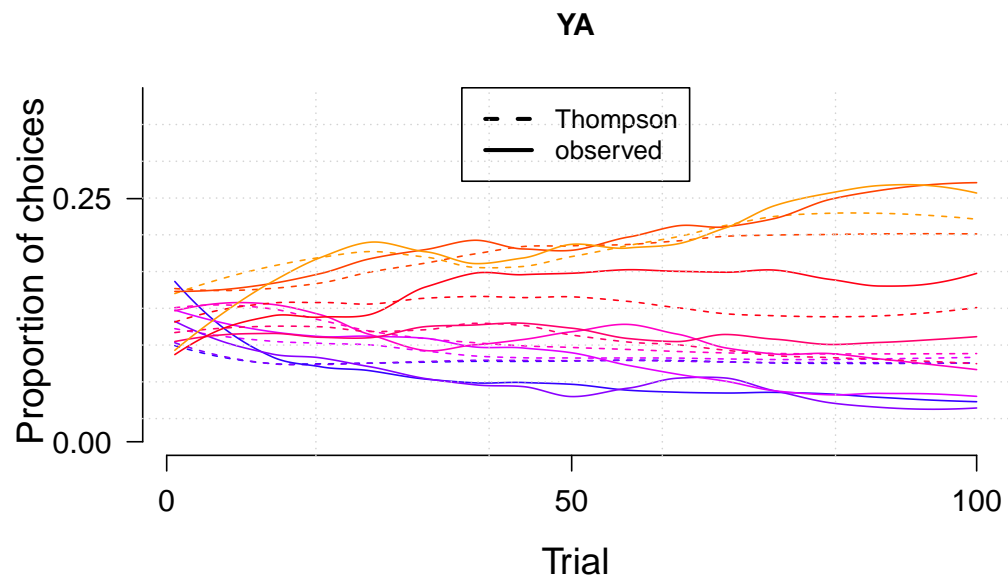


Both



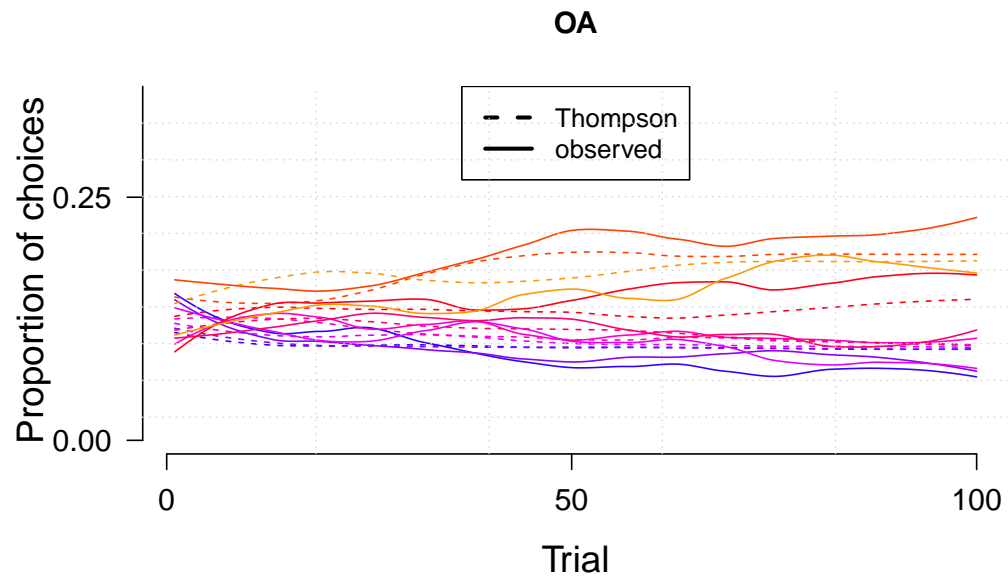
8 options

YA



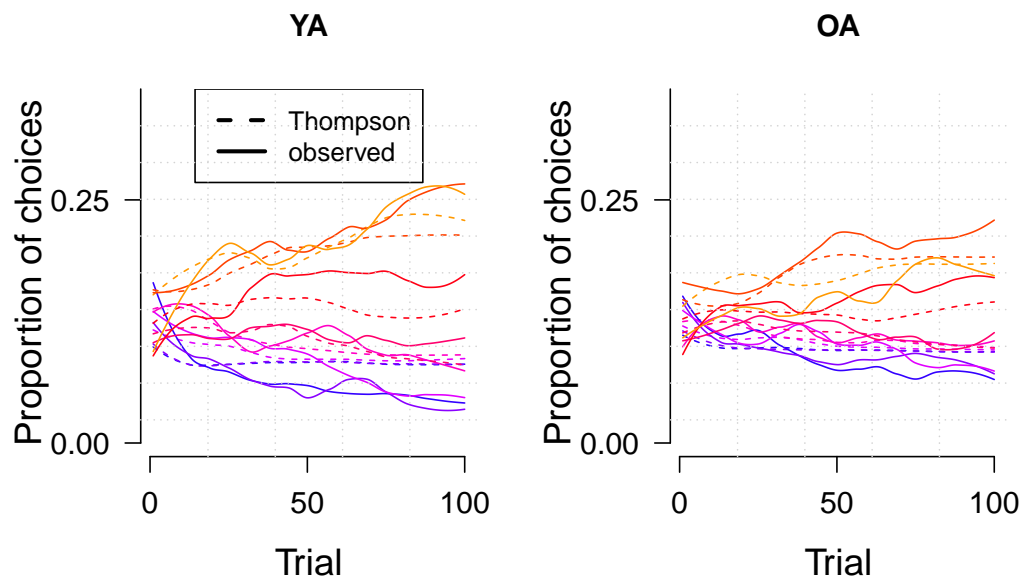
same options

OA





Both



## Acknowledgements

The manuscript has been automatically generated with R using Markdown (for word processing), knitr (for putting evaluated r code into markdown), pandoc (for converting to latex, html, and docx), and MiKTeX (for converting latex to pdf).

## Session info

R version 3.3.2 (2016-10-31) Platform: x86\_64-w64-mingw32/x64 (64-bit) Running under: Windows 10 x64 (build 14393)

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[3] LC\_MONETARY=English\_United States.1252 [4] LC\_NUMERIC=C

[5] LC\_TIME=English\_United States.1252

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[8] base

other attached packages: [1] combinat\_0.0-8 png\_0.1-7 psych\_1.6.9 stargazer\_5.2

[5] tidyr\_0.6.0 dplyr\_0.5.0 plyr\_1.8.4 ggplot2\_2.2.0

[9] effects\_3.1-2 lattice\_0.20-34 knitr\_1.15

loaded via a namespace (and not attached): [1] Rcpp\_0.12.7 nloptr\_1.0.4 tools\_3.3.2  
digest\_0.6.10

[5] lme4\_1.1-12 evaluate\_0.10 tibble\_1.2 gtable\_0.2.0

[9] nlme\_3.1-128 Matrix\_1.2-7.1 DBI\_0.5-1 yaml\_2.1.14

[13] parallel\_3.3.2 stringr\_1.1.0 nnet\_7.3-12 R6\_2.2.0

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