

Supplemental Materials

Accompanying the manuscript “Adult Age Differences in the Integration of Values for Self and Others”

Methods

Recruitment and exclusion criteria

Participants were recruited via different databases of the TU Dresden and flyers and newspaper announcements in Dresden (Germany). Additionally, OA were recruited from local sports, language, and university courses and choirs. A-priori inclusion criteria were defined as follows: right-handed, fMRI suitable (e.g., no magnetic implants), fluency in German with normal or corrected-to-normal vision, no hearing deficits, no color-blindness, no self-reported psychological or neurological diseases presently or within the past 12 months, and no history of drug abuse. Additionally, participants were not allowed to consume more than five cups of coffee per day, more than five cigarettes per day, more than 12g (women)/24g (men) pure alcohol per day, or illegal drugs more than twice per month. OA underwent an additional screening for mild cognitive impairments with the German version of the Montreal Cognitive Assessment (MOCA; Nasreddine et al., 2005). Only OA with a score of at least 26 points (out of 30) were included (see also Stietz et al., 2021). During or after the third session of the experiment, a total of 15 participants were excluded based on the following reasons: inability to undergo the scanning procedure ($n = 8$), neuromorphological abnormalities detected through MRI ($n = 4$), missing rate in our experimental task higher than 10% ($n = 3$). The final sample included 63 YA (31 females, age range = 18-30, $M = 24.42$ years, $SD = 3.30$) and 48 OA (24 females, age range = 65-78, $M = 69.71$ years, $SD = 3.84$)

Results

Mixed effect model of choice behavior and RTs

Table S1

Mixed effect model of choice behavior predicted by age group x €self x €other interaction.

	DF	F-value	p-value	Beta
Intercept				2.32
age group	109.00	10.55	0.002**	-0.16
€self	109.00	214.14	< 0.001***	0.21
€other	109.02	129.65	< 0.001***	0.16
age group x €self	109.00	39.05	< 0.001***	-0.09
age group x €other	109.02	63.05	< 0.001***	-0.11
€self x €other	109.02	41.11	< 0.001***	0.02
age group x €self x €other	109.02	30.80	< 0.001***	0.02

Table S2

Post-hoc mixed effect models of choice behavior predicted by €self x €other interaction

separately in YA and OA

Younger Adults					Older Adults			
	DF	F-value	p-value	Beta	DF	F-value	p-value	Beta
Intercept				2.48				2.16
€Self	61.99	276.90	< 0.001***	0.30	47.00	27.70	< 0.001***	0.12
€Other	62.00	191.09	< 0.001***	0.28	47.03	6.32	0.02*	0.05
€Self x €Other	61.99	62.71	< 0.001***	0.04	47.10	0.57	0.46	0.003

Table S3

Mixed effect model of RTs predicted by age group x ϵ_{self} x ϵ_{other} interaction.

	DF	F-value	p-value	Beta
Intercept				1.57
age group	108.98	3.24	0.08	0.05
ϵ_{self}	108.95	18.08	< 0.001***	-0.02
ϵ_{other}	108.72	0.01	0.94	-0.0004
Trial	19447.14	2731.61	< 0.001***	-0.003
age group x ϵ_{self}	108.95	0.23	0.64	0.002
age group x ϵ_{other}	108.73	7.88	0.01**	0.02
ϵ_{self} x ϵ_{other}	108.94	12.03	< 0.001***	-0.005
age group x ϵ_{self} x ϵ_{other}	108.94	18.30	< 0.001***	0.007

Table S4

Post-hoc mixed effect model RTs predicted by ϵ_{self} x ϵ_{other} interaction separately in YA and

OA

Younger Adults					Older Adults			
	DF	F-value	p-value	Beta	DF	F-value	p-value	Beta
Intercept				1.52				1.62
ϵ_{Self}	61.99	11.53	0.001**	-0.02	46.92	7.48	0.009**	-0.02
ϵ_{Other}	61.82	3.64	0.06	-0.01	47.05	5.73	0.02*	0.01
Trial	11037.27	1749.98	< 0.001***	-0.004	8417.95	1003.55	< 0.001***	-0.003
ϵ_{Self} x ϵ_{Other}	61.96	27.37	< 0.001***	-0.01	46.95	0.44	0.51	0.001

Moderation Regression Analyses on Choice Behavior and Reaction Times

Moderation effect of inhibitory control on reaction times

No significant main or interaction effects involving the moderator of inhibitory control on RTs were observed in OA or YA (all $ps > 0.07$, see Table S6)

Moderation effect of cognitive functioning on choice behavior

Composite of fluid abilities. We did not observe significant main or interaction effects, including the composite score of fluid abilities, in YAs' choice behavior (all adj. $ps > 0.39$, see Table S5), nor in OA (all adj. $ps > 0.07$, see Table S5).

Composite of verbal abilities. For both, YA (all adj. $ps > 0.07$, see Table S5) and OA (all adj. $ps > 0.08$, see Table S1) we did not find significant main or interaction effects for the composite score of verbal abilities.

Moderation effect of cognitive functioning on reaction times

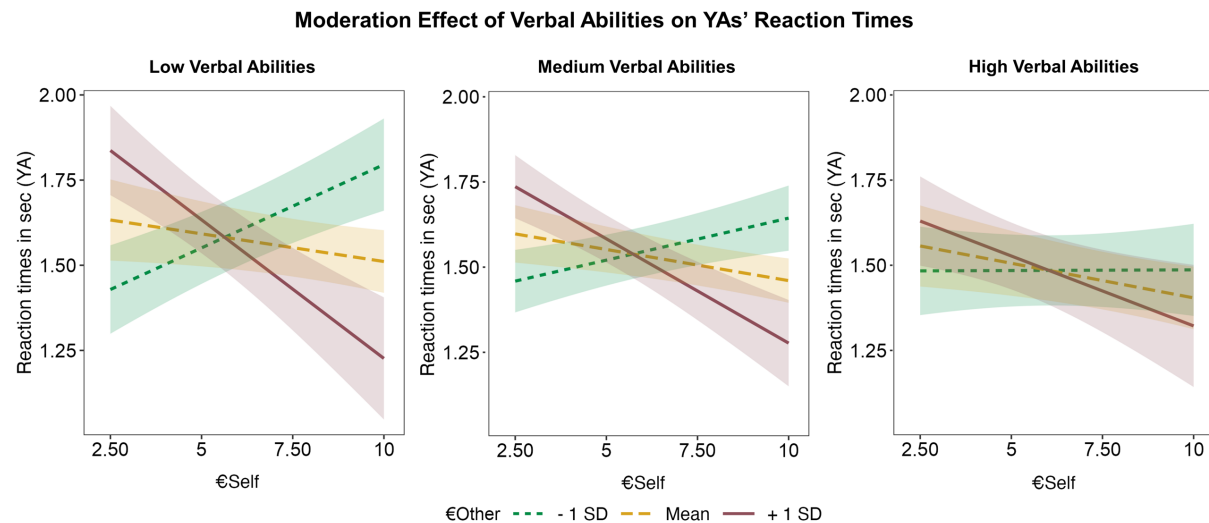
Composite of fluid abilities. We did not find significant main or interaction effects, including the composite score of fluid abilities in YA (all adj. $ps > 0.14$, see Table S6) and OA (all adj. $ps > 0.10$, see Table S6).

Composite of verbal abilities. No main or interaction effects involving the SAW as a measure of verbal abilities were found for OAs' RTs (all adj. $ps > 0.42$, see Table S6). Interestingly, for YAs' RTs, a significant moderation effect in terms of a significant 3-way interaction of SAW \times €self \times €other was observed ($F(60.95) = 8.29$, adj. $p = 0.01$, see Figure S1 and Table S6). As indicated in Figure S1, both groups showed the same pattern, meaning quicker RTs when values for self and other were either both high or both low, and slower RTs when there was a conflict, i.e., only one of them was high and the other low (or vice versa). However, the RT differences were particularly pronounced in YA with lower verbal abilities, who showed a slowing of RTs with higher €other (simple slope SAW - 1SD & €other - 1SD: $\beta = 0.05$,

95% interval = [0.03, 0.07]; simple slope SAW -1SD & €other + 1SD: $\beta = -0.08$, 95% interval = [-0.11, -0.05], see Figure S1, left panel), compared to YA with higher verbal abilities (simple slope SAW + 1SD & €other - 1SD: $\beta = -0.001$, 95% interval = [-0.02, 0.02]; simple slope SAW +1SD & €other + 1SD: $\beta = -0.04$, 95% interval = [-0.07, -0.01], see Figure S1, right panel). No further main or interaction effects involving SAW were observed in YA (all adj. $ps > 0.14$, see Table S6).

Figure S1

Significant moderation effect of verbal abilities (SAW) in YAs' RTs on the integration of €self × €other



Note. In YA with lower verbal abilities (left panel), the interaction of €self × €other was more pronounced compared (right panel) to YA with higher verbal abilities. The shaded areas around the lines represent the 95% confidence intervals.

Moderation effect of empathy, compassion, and theory of mind on choice behavior

Empathy & compassion. No statistically significant main or interaction effects, including empathy or compassion, were observed in YAs' (all adj. $ps > 0.06$, see Table S7) and OAs' choice behavior (all adj. $ps > 0.30$, see Table S7).

Theory of mind. For both YAs' and OAs' choice behavior, no significant main or interaction effects involving ToM were observed (all adj. $ps > 0.10$, see Table S7).

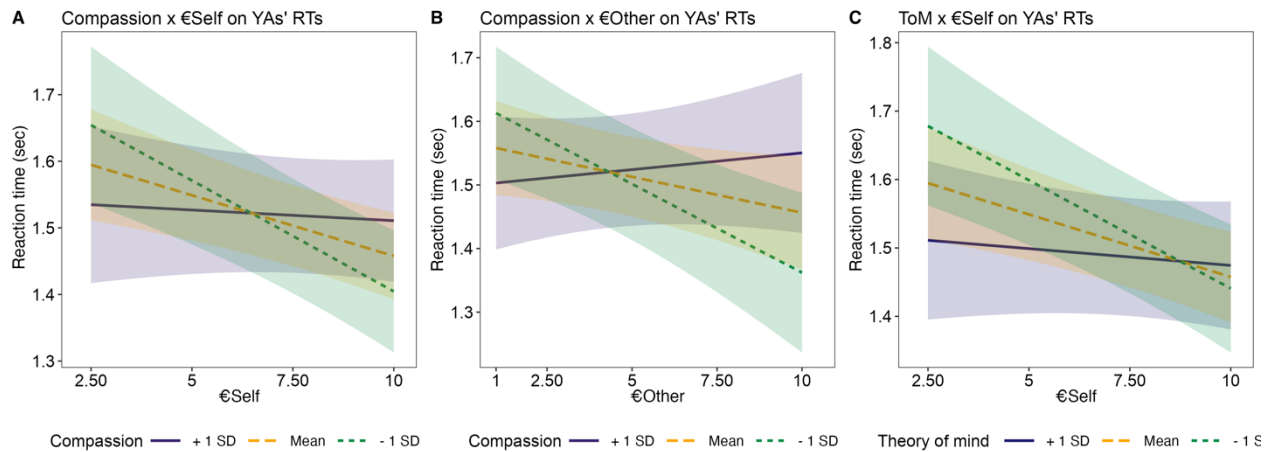
Moderation effect of empathy, compassion, and theory of mind on reaction times

Empathy & compassion. No significant main or interaction effects with respect to empathy were found on both YAs' and OAs' RTs (all adj. $ps > 0.08$, see Table S8). However, we observed a significant $\epsilon_{\text{self}} \times \text{compassion}$ and $\epsilon_{\text{other}} \times \text{compassion}$ interaction on YAs' RTs (see Table S8). While participants, in general, reacted quicker with higher ϵ_{self} (main effect ϵ_{self} : $F(60.97) = 7.34$, $p = 0.009$), YAs with higher compassion scores showed less of this speeding with increasing ϵ_{self} ($F(61.01) = 7.19$, $p = 0.009$, adj. $p = 0.02$, see Figure S2A) and even slower RTs with higher ϵ_{other} ($F(60.87) = 7.32$, $p = 0.009$, adj. $p = 0.03$, see Figure S2B). We did not find any main or interaction effect involving compassion in OA (all adj. $ps > 0.47$, see Table S8 for the full output of the model).

Theory of mind. A significant 2-way interaction of $\epsilon_{\text{self}} \times \text{ToM}$ was observed concerning YAs' RTs ($F(60.90) = 7.08$, $p = 0.01$, adj. $p = 0.02$). Interestingly, with lower ToM, RTs were more strongly influenced by ϵ_{self} (see Figure S2C). No further main or interaction effects with regard to YAs' ToM abilities were found (all adj. $ps > 0.21$, see Table S8). With respect to OAs' RTs and ToM abilities, we did not observe any significant main or interaction effect (all adj. $ps > 0.52$, see Table S8).

Figure S2

RTs in YA as a function of either ϵ_{self} or ϵ_{other} and different socio-affective measures.



Note. (A) and (B) Compassion \times $\epsilon_{\text{self}}/\epsilon_{\text{other}}$ on YAs' RTs. Generally, participants reacted quicker the higher ϵ_{self} (main effect ϵ_{self} : $F(60.97) = 7.34$, $p = 0.009$). However, YAs with higher compassion scores showed less of this effect of ϵ_{self} (i.e., less speeding with higher ϵ_{self}) on RTs ($F(61.01) = 7.19$, $p = 0.009$, adj. $p = 0.02$, see Figure A), and in fact descriptively, even slower RTs with higher ϵ_{other} ($F(60.87) = 7.32$, $p = 0.009$, adj. $p = 0.03$, see Figure B). (C) ToM accuracy \times ϵ_{self} on YAs' RTs. As stated above, in general, participants reacted quicker the higher ϵ_{self} (main effect ϵ_{self} : $F(60.97) = 19.17$, $p < 0.001$). However, this effect was flattened in YA who scored high in ToM ($F(60.90) = 7.08$, $p = 0.01$, adj. $p = 0.02$).

130 **Table S5**

131 *Moderator of cognitive measures regarding the interaction of €Self x €Other in YAs and OAs choice behavior.*

Choice Behavior	Younger Adults			Older Adults				
Inhibitory Control	DF	F-value	p-value	DF	F-value	p-value		
€Self	57.98	320.02	< 0.001***	42.00	26.21	< 0.001***		
€Other	58.00	190.96	< 0.001***	42.02	6.75	0.01*		
Inhibition	58.02	1.12	0.30	41.99	5.18	0.03*		
€Self x €Other	57.99	58.69	< 0.001***	42.11	0.64	0.43		
€Self x Inhibition	58.01	1.32	0.26	42.00	1.38	0.25		
€Other x Inhibition	58.01	0.14	0.71	42.00	0.67	0.42		
€Self x €Other x Inhibition	58.01	0.00	0.97	42.04	6.27	0.02*		
Choice Behavior	Younger Adults			Older Adults				
Fluid Intelligence	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.99	275.76	< 0.001***		45.00	28.66	< 0.001***	
€Other	61.00	189.35	< 0.001***		45.02	6.41	0.02*	
Fluid Intelligence	61.02	0.74	0.39	0.39	44.99	3.27	0.08	0.15
€Self x €Other	60.99	61.72	< 0.001***		45.09	0.67	0.42	
€Self x Fluid	61.01	0.75	0.39	0.39	45.01	3.79	0.06	0.08
€Other x Fluid	61.01	0.43	0.51	0.51	45.01	4.75	0.03*	0.07
€Self x €Other x Fluid	61.01	0.02	0.89	0.89	45.10	1.81	0.19	0.37
Verbal Intelligence	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.99	292.67	< 0.001***		45.01	28.29	< 0.001***	
€Other	61.00	194.02	< 0.001***		45.03	5.80	0.02*	
SAW	60.99	1.43	0.24	0.39	44.99	0.33	0.57	0.57
€Self x €Other	60.99	61.86	< 0.001***		45.10	0.64	0.43	
€Self x SAW	60.97	4.54	0.04*	0.07	44.99	3.16	0.08	0.08

€Other x SAW	60.99	1.95	0.17	0.34	45.01	0.02	0.90	0.90
€Self x €Other x SAW	60.89	0.17	0.68	0.89	45.03	0.01	0.94	0.94

Notes. Fluid = Composite of fluid intelligence. SAW = Spot a word test. Adj. p = p value adjusted for the false discovery rate.

*** p < 0.001, ** p < 0.01, * p < 0.05

136 **Table S6**

137 *Moderator analyses of cognitive measures regarding the interaction of €Self x €Other in YAs and OAs RTs.*

Reaction Times		Younger Adults			Older Adults		
Inhibitory Control	DF	F-value	p-value		DF	F-value	p-value
€Self	57.98	11.57	0.001**		41.94	5.16	0.03*
€Other	57.82	3.70	0.06		42.05	4.30	0.04*
Inhibition	57.98	1.96	0.17		41.98	0.04	0.84
Trial	10510.24	1566.59	< 0.001***		7716.80	873.85	< 0.001***
€Self x €Other	57.96	27.89	< 0.001***		41.94	0.14	0.71
€Self x Inhibition	58.07	0.58	0.45		41.90	0.13	0.72
€Other x Inhibition	57.86	0.30	0.59		41.92	0.57	0.45
€Self x €Other x Inhibition	57.99	0.14	0.71		41.85	3.50	0.07

Younger Adults					Older Adults			
Fluid Intelligence	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.99	11.40	0.001**		45.92	7.33	0.01**	
€Other	60.85	3.64	0.06		46.06	5.83	0.02*	
Fluid Intelligence	61.00	3.18	0.08	0.14	46.00	0.38	0.54	0.54
Trial	11035.87	1748.65	< 0.001***		8417.66	1003.24	< 0.001***	
€Self x €Other	60.96	26.92	< 0.001***		45.94	0.47	0.50	
€Self x Fluid	61.10	0.32	0.57	0.75	45.93	0.02	0.88	0.88
€Other x Fluid	60.92	1.03	0.31	0.31	46.08	1.88	0.18	0.35
€Self x €Other x Fluid	60.99	0.00	0.98	0.98	45.96	4.13	0.048*	0.10
Verbal Intelligence	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.99	11.37	0.001**		45.92	7.44	0.01**	
€Other	60.83	3.67	0.06		46.05	5.61	0.02*	
SAW	60.94	2.27	0.14	0.14	45.99	1.61	0.21	0.42

Trial	11038.96	1750.42	< 0.001***		8416.33	1004.83	< 0.001***	
€Self x €Other	60.98	30.58	< 0.001***		45.95	0.43	0.51	
€Self x SAW	60.93	0.11	0.75	0.75	45.85	0.74	0.40	0.79
€Other x SAW	60.79	1.60	0.21	0.31	45.94	0.00	0.98	0.98
€Self x €Other x SAW	60.95	8.29	0.005**	0.01*	45.87	0.54	0.47	0.47

Notes. Fluid = Composite of fluid intelligence. SAW = Spot a word test. Adj. p = p value adjusted for the false discovery rate.

*** p < 0.001, ** p < 0.01, * p < 0.05

Table S7

Moderator analyses of socio-affective and -cognitive processes regarding the interaction of €Self x €Other in YAs versus OAs choice behavior.

Choice Behavior		Younger Adults			Older Adults			
Empathy	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.99	283.75	< 0.001***		46.01	27.20	< 0.001***	
€Other	61.00	190.83	< 0.001***		46.02	6.77	0.01*	
Empathy	61.00	1.34	0.25	0.25	46.00	0.78	0.38	0.94
€Self x €Other	60.99	61.63	< 0.001***		46.10	0.57	0.46	
€Self x Empathy	60.99	2.30	0.13	0.20	46.00	0.06	0.81	0.996
€Other x Empathy	61.00	0.77	0.39	0.58	46.01	2.65	0.11	0.31
€Self x €Other x Empathy	60.99	0.05	0.83	0.83	46.05	0.08	0.78	0.78
Compassion	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.99	253.00	< 0.001***		46.00	25.24	< 0.001***	
€Other	61.00	175.50	< 0.001***		46.02	5.50	0.02*	
Compassion	61.01	5.86	0.02*	0.06	46.00	0.13	0.72	0.94
€Self x €Other	60.99	62.90	< 0.001***		46.07	0.29	0.59	
€Self x Compassion	61.00	4.56	0.04*	0.11	46.00	0.00	0.99	0.996
€Other x Compassion	61.00	0.02	0.88	0.88	46.02	0.04	0.84	0.84
€Self x €Other x Compassion	61.00	1.18	0.28	0.42	46.02	0.48	0.49	0.74
Theory of mind	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.98	234.22	< 0.001***		46.01	21.22	< 0.001***	
€Other	61.00	139.17	< 0.001***		46.04	8.00	0.01**	
ToM	60.98	1.81	0.18	0.25	45.99	0.01	0.94	0.94
€Self x €Other	60.99	39.28	< 0.001***		46.13	1.41	0.24	
€Self x ToM	60.97	1.10	0.30	0.30	46.00	0.08	0.78	0.996

€Other x ToM	60.99	2.11	0.15	0.46	46.02	1.64	0.21	0.31
€Self x €Other x ToM	60.98	4.74	0.03*	0.10	46.04	1.09	0.30	0.74

Notes. ToM = Theory of mind. Adj. p = p value adjusted for the false discovery rate.

*** p < 0.001, ** p < 0.01, * p < 0.05

149 **Table S8**
150 *Moderator analyses of socio-affective and -cognitive processes regarding the interaction of €Self x €Other in YAs*
151 *versus OAs reaction times.*

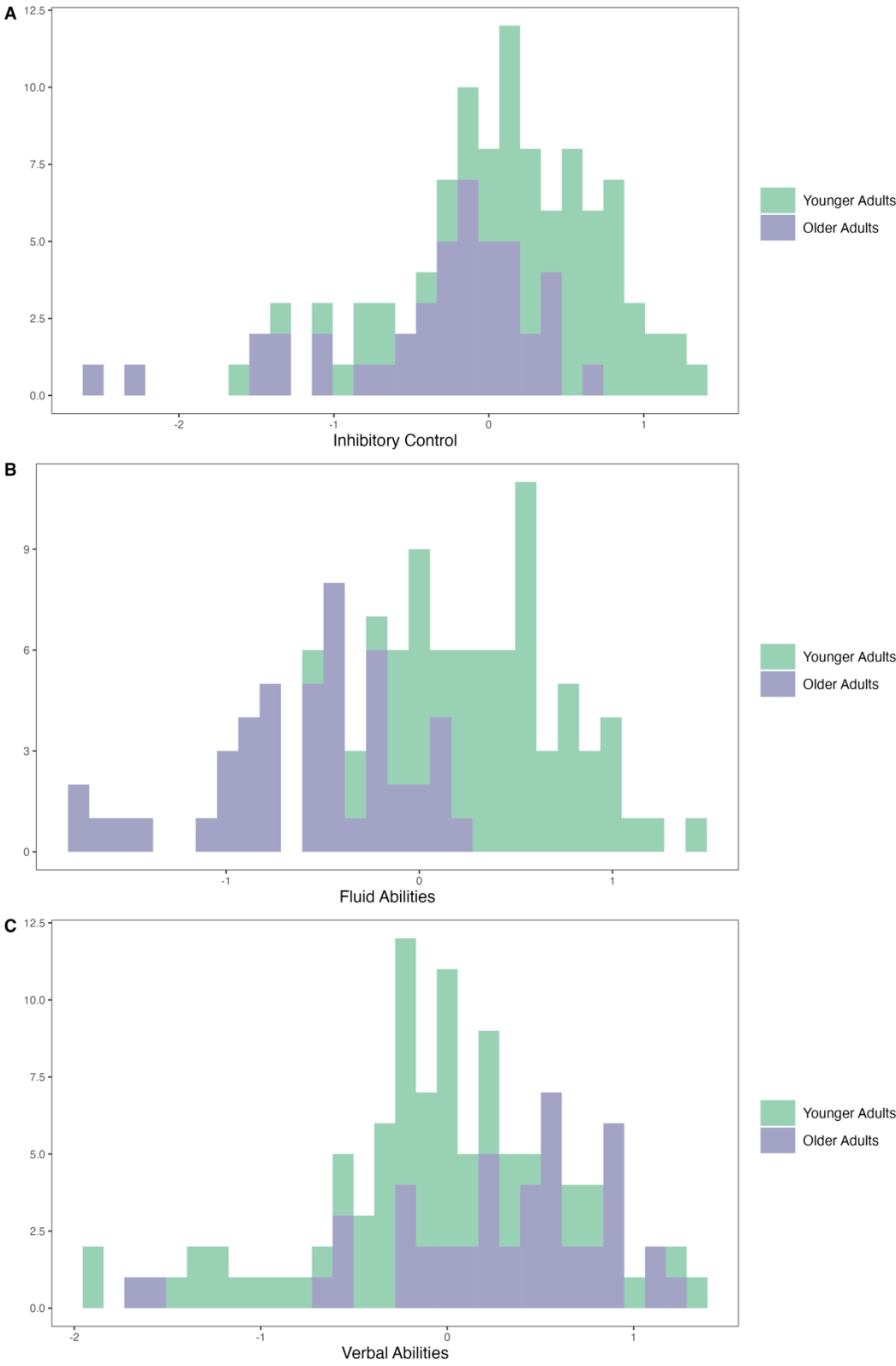
Reaction Times		Younger Adults			Older Adults			
Empathy	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.98	12.21	<0.001***		45.93	7.28	0.01**	
€Other	60.84	3.84	0.06		46.06	5.57	0.02*	
Empathy	60.97	1.30	0.26	0.50	46.00	0.00	0.97	0.97
Trial	11033.92	1747.78	< 0.001***		8415.42	1003.76	< 0.001***	
€Self x €Other	60.97	27.98	< 0.001***		45.95	0.40	0.53	
€Self x Empathy	61.01	3.17	0.08	0.08	45.91	0.14	0.71	0.84
€Other x Empathy	60.85	2.21	0.14	0.21	46.01	0.53	0.47	0.71
€Self x €Other x Empathy	60.98	1.69	0.20	0.30	45.89	0.94	0.94	0.50
Compassion	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.97	7.34	0.01**		45.91	7.21	0.01*	
€Other	60.85	1.44	0.23		46.02	4.13	0.048*	
Compassion	60.97	0.00	0.98	0.98	46.00	2.07	0.16	0.47
Trial	11037.45	1749.30	< 0.001***		8415.31	1004.50	< 0.001***	
€Self x €Other	60.97	21.99	< 0.001***		45.92	0.33	0.57	
€Self x Compassion	61.01	7.19	0.01**	0.02*	45.89	0.08	0.78	0.84
€Other x Compassion	60.87	7.32	0.01**	0.03*	46.00	1.14	0.29	0.71
€Self x €Other x Compassion	60.99	2.17	0.15	0.30	45.86	0.05	0.82	0.82
Theory of mind	DF	F-value	p-value	Adj. p	DF	F-value	p-value	Adj. p
€Self	60.97	19.17	< 0.001***		45.95	4.89	0.03*	
€Other	60.80	5.23	0.03*		46.12	3.60	0.06	
ToM	60.94	0.94	0.34	0.50	46.00	0.04	0.84	0.97

Trial	11035.93	1750.22	< 0.001***		8417.12	1003.92	< 0.001***	
€Self x €Other	60.96	26.12	< 0.001***		45.99	0.00	0.96	
€Self x ToM	60.90	7.08	0.01**	0.02*	45.88	0.04	0.84	0.84
€Other x ToM	60.77	1.63	0.21	0.21	46.01	0.06	0.80	0.80
€Self x €Other x ToM	60.94	0.99	0.32	0.32	45.86	1.42	0.24	0.50

Notes. ToM = Theory of mind. Adj. p = p value adjusted for the false discovery rate.

*** p < 0.001, ** p < 0.01, * p < 0.05

154 **Figure S3.**
155 *Histograms of cognitive variables.*



157 **Figure S4.**
158 *Histogram of EmpaToM Variables.*

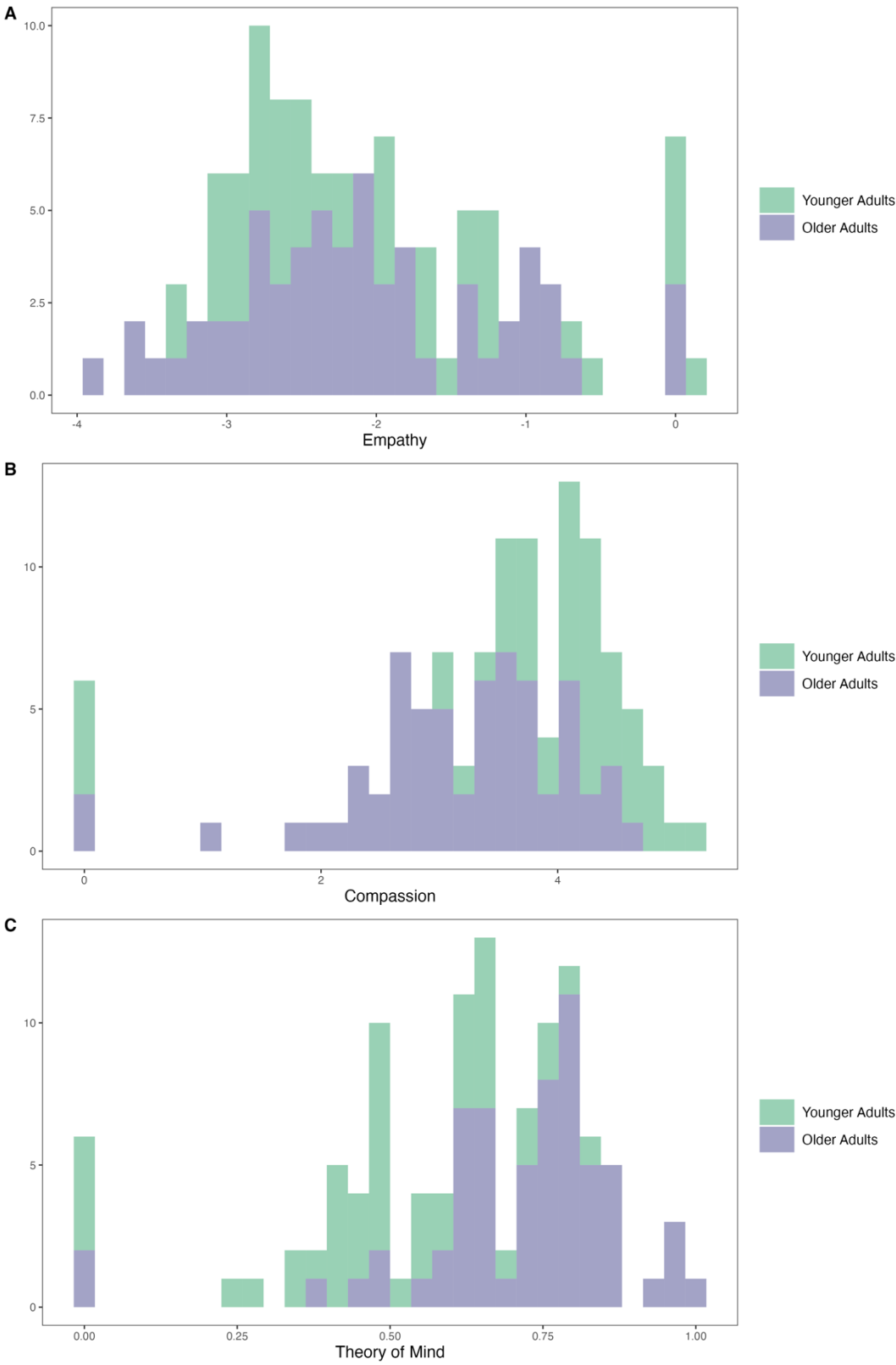


Table S9

Overview of the models estimated (separately for YA and OA) and their DIC (deviance information criterion) values.

Model	Formula	DIC YA	DIC OA
1	-	28176.608501	20887.705342
2	$v \sim \text{preference}$	27346.090520	20009.521163
3	$v \sim \text{€Self}$	25771.078511	18752.344631
4	$v \sim \text{€Other}$	26435.657037	19104.879521
5	$v \sim \text{€Self} + \text{€Other}$	20648.228821	17758.972883
6	$v \sim \text{€Self} \times \text{€Other}$	19497.977667	17636.234019
7	$a \sim \text{condition}$	27058.214950	20728.503024
8	$z \sim \text{condition}$	23057.155640	19253.280078
9	$a \sim \text{condition}, z \sim \text{condition}$	22800.553506	19099.650121
10	$v \sim \text{€Self} \times \text{€Other}, a \sim \text{condition}$	19314.506888	17535.854681
11	$v \sim \text{€Self} \times \text{€Other}, z \sim \text{condition}$	19181.718398	17575.996704
12	$v \sim \text{€Self} \times \text{€Other}, a \sim \text{condition.}, z \sim \text{condition}$	19066.287519	17479.187347

Notes. The winning model is indicated by bold font. 1 = baseline model, i.e., no modulation by experimental variables, 2 = v is modulated by preference variable (postdoc defined variable whereas the choices of 1 and 4 were classified as strong preference, and 2 and 3 were classified as weaker preference), 3 = v is modulated by €Self, 4 = v is modulated by €Other, 5 = v is modulated by €Self, and additionally varies by €Other, 6 = v is modulated by an interaction of €Self x €Other, 7 = a varies by choice option, 8 = z varies by choice option, 9 = a and z vary by choice option, 10 = v is modulated by an interaction of €Self x €Other, and a vary by choice option, 11 = v is modulated by an interaction of €Self x €Other, and z vary by choice option, 12 = v is modulated by an interaction of €Self x €Other, and a and z vary by choice option.

Moderation Analyses on HDDM parameters

V-Parameter: Drift Rate

The mean group posteriors of the drift rate (based on the interaction of $\epsilon_{\text{self}} \times \epsilon_{\text{other}}$) were not significantly predicted by any of the pre-defined moderators (all (adj.) $ps > 0.15$, see Table S10).

Z-Parameter: Initial Bias

The mean group posteriors of the initial biases (separately for other-serving, self-serving, and rational conditions) were not significantly predicted by any of the pre-defined moderators (all (adj.) $ps > 0.09$, see Table S11).

A-Parameter: Boundary Separation

In YA, the mean group posteriors of boundary separation for the other-serving and rational condition were significantly predicted by ToM-abilities (other-serving: $b = -0.83$, adj. $p = 0.048$; rational: $b = -0.84$, adj. $p = 0.048$, see Table S12). Both effects showed a negative association, indicating that YA with higher ToM-abilities need to accumulate less evidence to reach a decision in the other-serving and rational condition (i.e., reduced boundary separation). No further significant associations between boundary separation and the pre-defined moderators were observed with respect to YA, irrespective of the condition (all adj. $ps > 0.45$, see Table S12). In OA, across all three conditions (other-serving, self-serving, and rational), significant negative associations were found between boundary separation and fluid abilities, as well as between boundary separation and verbal abilities ($-0.35 > b > -0.24$, all adj. $ps < 0.046$, see Table S12). All effects showed a negative relationship, illustrating that OA with better cognitive functioning showed reduced boundary separation (in all three conditions), i.e., they had to accumulate less evidence to reach a decision.

Table S10

Linear models predicting drift rates (v-parameter). Inhibitory control, fluid abilities, verbal abilities, empathy, compassion, and theory of mind predicting drift rate of €Self x €Other

	Younger adults							Older adults						
	b	SE	DF	t	p	adj. p	r	b	SE	DF	t	p	adj. p	r
Inhibition	0.01	0.01	58	0.75	0.46		0.10	0.01	0.01	42	1.35	0.19		0.20
Fluid intelligence	-0.002	0.01	61	-0.21	0.83	0.83	-0.03	0.01	0.01	46	1.82	0.08	0.15	0.26
Verbal intelligence	0.004	0.01	61	0.47	0.64	0.83	0.06	-0.0003	0.01	46	-0.05	0.96	0.96	-0.01
Empathy	0.003	0.01	61	0.45	0.66	0.78	0.06	-0.01	0.004	46	-1.16	0.25	0.43	-0.17
Compassion	-0.002	0.01	61	-0.28	0.78	0.78	-0.04	-0.001	0.003	46	0.14	0.89	0.89	0.02
Theory of mind	0.02	0.03	61	0.74	0.46	0.78	0.09	0.02	0.02	46	1.07	0.29	0.43	0.16

Note. Fluid intelligence = Composite of fluid intelligence. Verbal Intelligence = Composite of verbal intelligence.

* p < 0.05

Table S11

Linear models predicting initial bias (z-parameter). Inhibitory control, fluid abilities, verbal abilities, empathy, compassion, and theory of mind predicting the initial starting bias, separately for generous, selfish, and rational choice options.

		Younger Adults							Older Adults						
		b	SE	DF	t	p	adj. p	r	b	SE	DF	t	p	adj. p	r
Generous	Inhibition	0.002	0.01	58	0.20	0.84		0.03	0.01	0.02	42	0.51	0.61		0.08
Generous	Fluid int.	-0.004	0.01	61	-0.27	0.79	0.79	-0.04	0.02	0.02	46	1.22	0.23	0.46	0.18
Generous	Verbal Int.	0.003	0.01	61	0.28	0.78	0.79	0.04	0.001	0.01	46	0.07	0.94	0.94	0.01
Generous	Empathy	0.01	0.01	61	0.79	0.43	0.43	0.10	0.01	0.01	46	1.10	0.28	0.73	0.16
Generous	Compassion	-0.01	0.01	61	-0.94	0.35	0.43	-0.12	-0.003	0.01	46	-0.34	0.73	0.73	-0.05
Generous	ToM	-0.07	0.05	61	-1.48	0.14	0.43	-0.19	-0.03	0.05	46	-0.51	0.61	0.73	-0.07
Selfish	Inhibition	-0.02	0.02	58	-1.16	0.25		-0.15	0.003	0.03	42	0.12	0.91		0.02
Selfish	Fluid int.	0.001	0.02	61	0.04	0.97	0.97	0	0.02	0.03	46	0.78	0.44	0.63	0.11
Selfish	Verbal Int.	0.04	0.02	61	2.06	0.04*	0.09	0.26	0.01	0.02	46	0.49	0.63	0.63	0.07
Selfish	Empathy	0.02	0.01	61	1.11	0.27	0.27	0.15	0.02	0.02	46	1.26	0.22	0.47	0.18
Selfish	Compassion	-0.02	0.01	61	-1.20	0.24	0.27	-0.15	-0.01	0.01	46	-0.41	0.69	0.69	-0.06
Selfish	ToM	-0.11	0.07	61	-1.49	0.14	0.27	-0.19	-0.08	0.08	46	-1.02	0.31	0.47	-0.15
Rational	Inhibition	-0.01	0.03	58	-0.29	0.77		-0.04	0.02	0.02	42	0.88	0.38		0.14
Rational	Fluid int.	0.02	0.03	61	0.46	0.65	0.65	0.06	0.03	0.02	46	1.26	0.22	0.43	0.18
Rational	Verbal In.	-0.03	0.03	61	-0.99	0.33	0.65	-0.13	0.01	0.02	46	0.58	0.56	0.56	0.09
Rational	Empathy	0.02	0.02	61	1.16	0.25	0.74	0.15	0.01	0.01	46	0.86	0.40	0.74	0.13
Rational	Compassion	-0.01	0.02	61	-0.34	0.74	0.74	-0.04	0.002	0.01	46	0.21	0.84	0.84	0.03
Rational	ToM	0.07	0.11	61	0.65	0.52	0.74	0.08	0.04	0.06	46	0.69	0.49	0.74	0.10

Note. Fluid int. = Composite of fluid intelligence. Verbal Int. = Composite of verbal intelligence. ToM = Theory of mind.

* p < 0.05

Table S12. Linear models predicting boundary separation (a-parameter). Inhibitory control, fluid abilities, verbal abilities, empathy, compassion, and theory of mind predicting boundary separation, separately for generous, selfish, and rational choice options.

		Younger Adults							Older Adults						
		b	SE	DF	t	p	adj. p	r	b	SE	DF	t	p	adj. p	r
Generous	Inhibition	0.001	0.08	58	0.01	0.99		0	-0.25	0.14	42	-1.80	0.09		-0.27
Generous	Fluid int.	-0.08	0.11	61	-0.76	0.45	0.45	-0.10	-0.35	0.15	46	-2.28	0.03*	0.045*	-0.32
Generous	Verbal int.	-0.08	0.09	61	-0.83	0.41	0.45	-0.10	-0.24	0.12	46	-2.06	0.045*	0.045*	-0.29
Generous	Empathy	0.03	0.07	61	0.49	0.63	0.63	0.06	0.02	0.09	46	-0.23	0.82	0.82	-0.03
Generous	Compassion	-0.05	0.07	61	-0.73	0.47	0.63	-0.09	0.08	0.07	46	1.12	0.27	0.40	0.16
Generous	ToM	-0.83	0.34	61	-2.47	0.02*	0.048*	-0.30	0.55	0.42	46	1.33	0.19	0.40	0.19
Selfish	Inhibition	-0.01	0.08	58	-0.15	0.88		-0.02	-0.27	0.14	42	-1.95	0.06		-0.29
Selfish	Fluid int.	-0.01	0.10	61	-0.19	0.85	0.85	-0.02	-0.35	0.16	46	-2.27	0.03*	0.03*	-0.32
Selfish	Verbal Int.	-0.02	0.08	61	-0.28	0.78	0.85	-0.04	-0.26	0.12	46	-2.25	0.03*	0.03*	-0.32
Selfish	Empathy	-0.001	0.06	61	-0.02	0.99	0.99	0	-0.04	0.09	46	-0.41	0.69	0.69	-0.06
Selfish	Compassion	-0.03	0.06	61	-0.45	0.65	0.98	-0.06	0.09	0.07	46	1.25	0.22	0.33	0.18
Selfish	ToM	-0.41	0.31	61	-1.29	0.20	0.60	-0.16	0.065	0.42	46	1.55	0.13	0.33	0.22
Rational	Inhibition	0.01	0.09	58	0.07	0.94		0.01	-0.25	0.14	42	-1.81	0.08		-0.27
Rational	Fluid int.	-0.08	0.11	61	-0.74	0.46	0.46	-0.09	-0.35	0.15	46	-2.30	0.03*	0.046*	-0.32
Rational	Verbal int.	-0.08	0.11	61	-0.87	0.39	0.46	-0.11	-0.24	0.12	46	-2.05	0.046*	0.046*	-0.29
Rational	Empathy	0.04	0.07	61	0.57	0.57	0.57	0.07	-0.02	0.09	46	-0.22	0.83	0.83	-0.03
Rational	Compassion	-0.05	0.07	61	-0.77	0.45	0.57	-0.10	0.08	0.07	46	1.11	0.27	0.41	0.16
Rational	ToM	-0.84	0.34	61	-2.47	0.02*	0.048*	-0.30	0.55	0.42	46	1.32	0.20	0.41	0.19

Note. Fluid int. = Composite of fluid intelligence. Verbal Intelligence = Composite of verbal intelligence. ToM = Theory of mind.

* p < 0.05

Table S13

Sensitivity analyses with respect to the preference variable and the post-hoc dichotomization of choice behavior.

	Younger Adults		Older Adults	
Accept ~ €Self x €Other x Preference	F-Value (DF = 1)	p-value	F-value (DF = 1)	p-value
€Self	2355.36***	< 0.001	319.86***	< 0.001
€Other	2145.37***	< 0.001	48.26***	< 0.001
Preference	127.16***	< 0.001	106.43***	< 0.001
€Self x €Other	445.27***	< 0.001	0.38	0.537
€Self x Preference	27.81***	< 0.001	14.11***	< 0.001
€Other x Preference	16.73***	< 0.001	12.03***	< 0.001
€Self x €Other x Preference	2.51	0.113	1.81	0.179
RT ~ Accept x preference	F-Value (DF)	p-value	F-value (DF)	p-value
Accept	98.37 (11205.4)***	< 0.001	17.75 (8531.99)***	< 0.001
Preference	1233.32 (11221.38) ***	< 0.001	87.25 (8512.52)***	< 0.001
Accept x Preference	0.67 (11202.50)	0.413	9.27 (8532.19)**	0.002
RT ~ Accept x Preference x Offer	F-Value (DF)	p-value	F-value (DF)	p-value
Accept	17.79 (11174.07)***	< 0.001	3.39 (8498.67)	0.066
Preference	475.33 (11184.60)***	< 0.001	78.86 (8488.54)***	< 0.001
Offer	21.00 (11139.54)***	< 0.001	24.79 (8461.17)***	< 0.001
Accept x Preference	5.55 (11161.24)*	0.018	10.80 (8498.71)**	0.001
Accept x Offer	6.64 (11146.62)***	< 0.001	14.43 (8467.41)***	< 0.001
Preference x Offer	3.91 (11139.09)***	< 0.001	1.73 (8463.41)	0.086
Accept x Preference x Offer	2.04 (11139.87)*	0.038	2.14 (8464.37)*	0.029
RT ~ Accept x Preference x €Self x €Other	F-Value (DF)	p-value	F-value (DF)	p-value
Accept	21.31 (11180.23)***	< 0.001	2.38 (8505.54)	.123
Preference	274.82 (11183.80)***	< 0.001	27,50 (8526.00)***	< 0.001

Self	4.75 (11172.98)*	0.029	44.12 (8481.88)***	< 0.001
Other	22.02 (11177.71)***	< 0.001	14.41 (8481.59)***	< 0.001
Accept x Preference	1.46 (11169.15)	0.227	6.20 (8505.64)*	0.013
Accept x Self	41.91 (11174.38)***	< 0.001	58.56 (8491.80)	< 0.001
Preference x Self	12.46 (11161.57)***	< 0.001	0.09 (8484.58)	0.762
Accept x Other	45.54 (11179.79)***	< 0.001	0.09 (8490.60)	0.763
Preference x Other	13.89 (11168.98)***	< 0.001	1.35 (8484.74)	0.246
Self x Other	3.63 (11167.21)	0.057	0.06 (8481.63)	0.812
Accept x Preference x Self	12.17 (11162.37)***	< 0.001	4.89 (8485.90)*	0.027
Accept x Preference x Other	5.97 (11167.57)*	0.015	5.11 (8486.05)	0.024
Accept x Self x Other	3.37 (11165.82)	0.066	0.04 (8482.16)	0.851
Preference x Self x Other	5.87 (11163.02)*	0.015	4.49 (8483.27)*	0.034
Accept x Preference x Self x Other	0.05 (11158.99)	0.823	0.16 (8482.17)	0.690

Note. Accept: 0 = reject, 1 = accept, binary variable. €Self = value for oneself. €Other = value for other person. Preference: high (pressing 1 or 4 on Likert-scale) versus low (pressing 2 or 3 on Likert-scale). RT = reaction time. Offer = proposed offers 1 – 9

Table S14*Posterior Predictive Checks – Younger Adults*

stat	observed	mean	std	SEM	MSE	credible	quantile	mahalanobis
accuracy	0.41484055	0.410117	0.19519164	2.231191e-05	0.038122084	True	53.850792	0.024199544
mean_ub	1.6124573	1.6109482	0.30236858	2.2774611e-06	0.09142904	True	49.764	0.0049910145
std_ub	0.60123223	0.61172855	0.2601872	0.00011017308	0.067807555	True	53.88271	0.040341478
10q_ub	0.9433377	1.0585057	0.21848434	0.013263663	0.060999066	True	30.301952	0.5271223
30q_ub	1.2328377	1.2707397	0.23328803	0.0014365626	0.055859867	True	44.707745	0.16246875
50q_ub	1.4964293	1.4579648	0.26016888	0.0014795191	0.06916737	True	58.01112	0.14784442
70q_ub	1.8383183	1.7104921	0.329158	0.016339546	0.12468455	True	68.682915	0.38834307
90q_ub	2.4429584	2.3209476	0.56425464	0.014886592	0.33326986	True	61.70309	0.21623327
mean_lb	-1.586347	-1.6693641	0.3630149	0.0068918355	0.13867165	True	58.92381	0.2286878
std_lb	0.6136045	0.6024849	0.24526753	0.000123646	0.0602798	True	57.444443	0.04533671
10q_lb	0.9228095	1.1009092	0.24234481	0.03171952	0.09045053	True	23.396826	0.73490226
30q_lb	1.2040224	1.3286825	0.2685924	0.015540156	0.087682046	True	35.120636	0.46412396
50q_lb	1.4697796	1.5287895	0.30662003	0.0034821704	0.09749804	True	43.368256	0.19245291
70q_lb	1.8133596	1.7916979	0.3905396	0.00046922953	0.15299039	True	51.231747	0.055466097
90q_lb	2.4345248	2.3836374	0.62667656	0.0025895282	0.39531305	True	53.698414	0.08120203

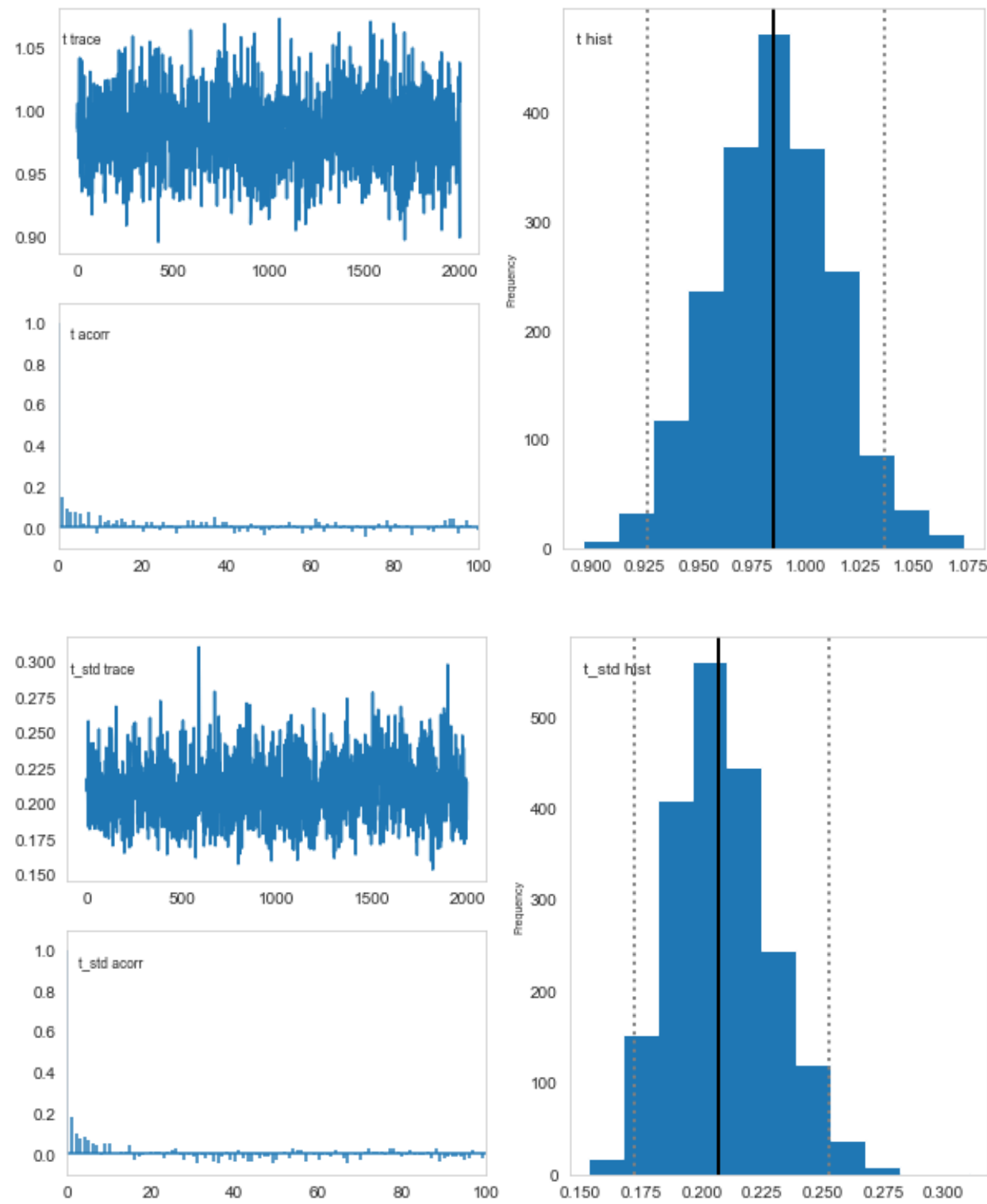
Note. Quantile comparison of the observed reaction time data with reaction time data simulated based on the drift diffusion model (500 simulations), as well as the standard deviation (std), standard error of means (SEM) and mean squared error (MSE) of the simulated data. The column *credible* indicates whether the data fall within the 95 % credible interval (if “True” the model is a 95% credible fit for the observed data). *Quantile* corresponds to the posterior predictive quantile and *mahalanobis* indicates the *mahalanobis* distance between observed and estimated reaction time indices. *ub* = upper boundary, *lb* = lower boundary.

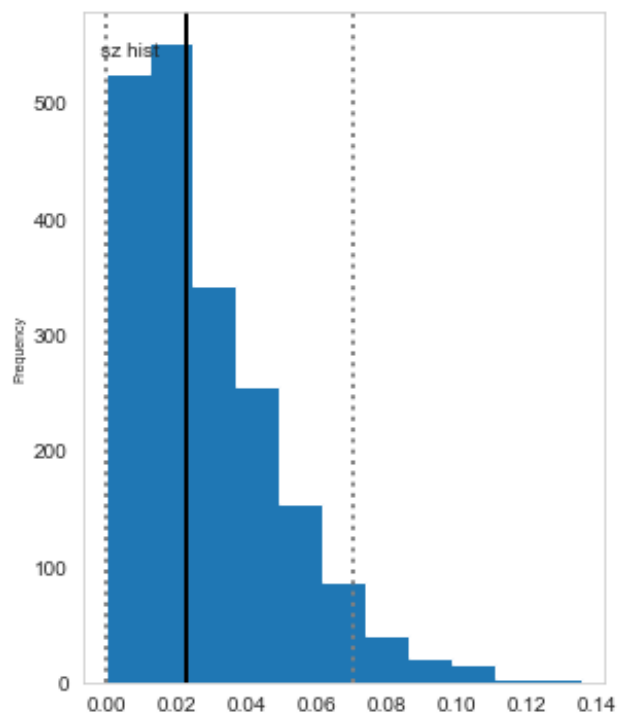
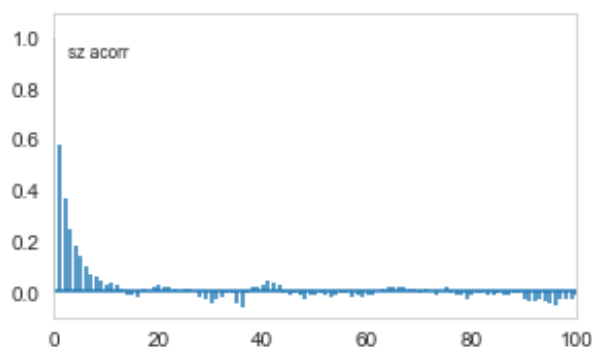
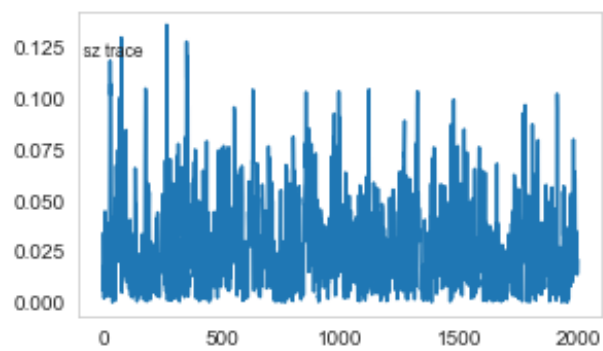
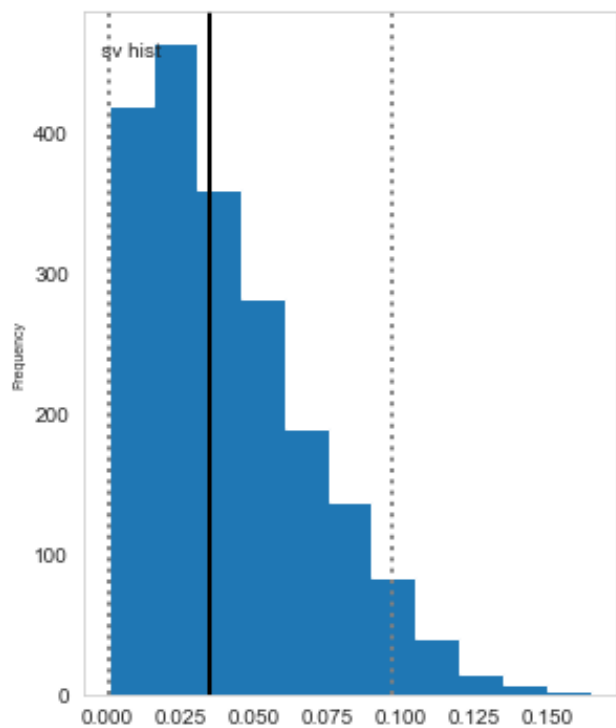
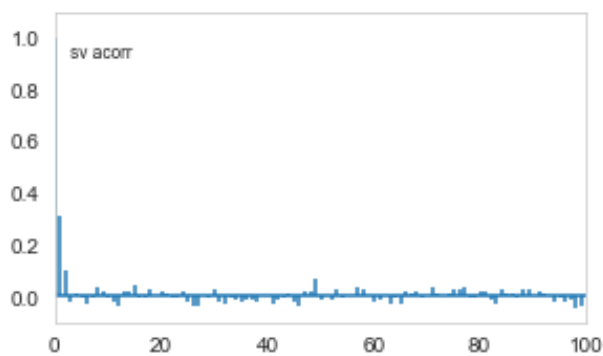
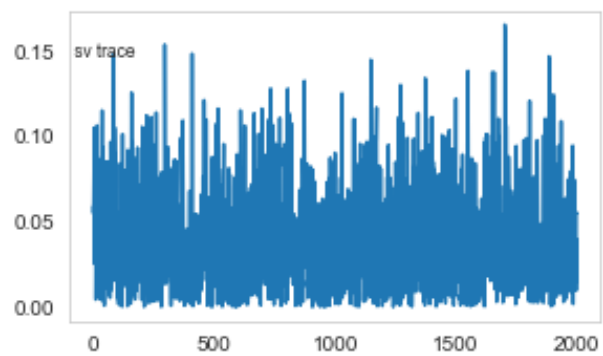
Table S15*Posterior Predictive Checks – Older Adults*

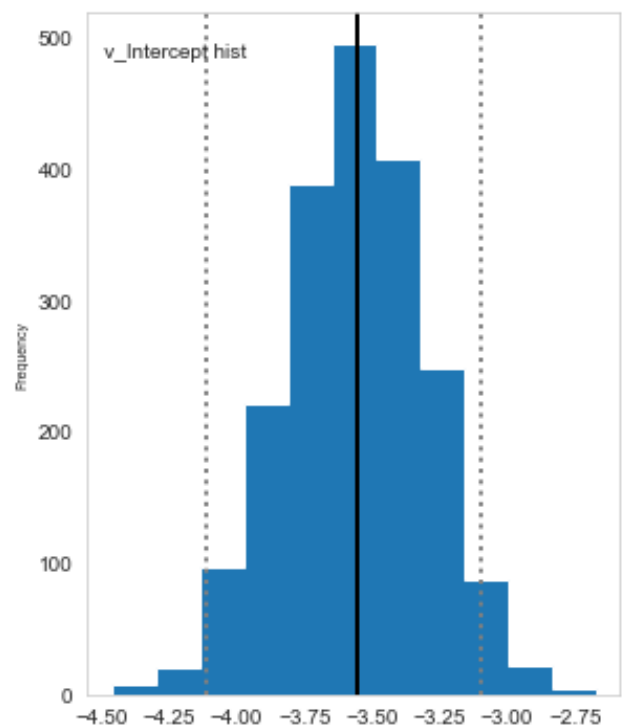
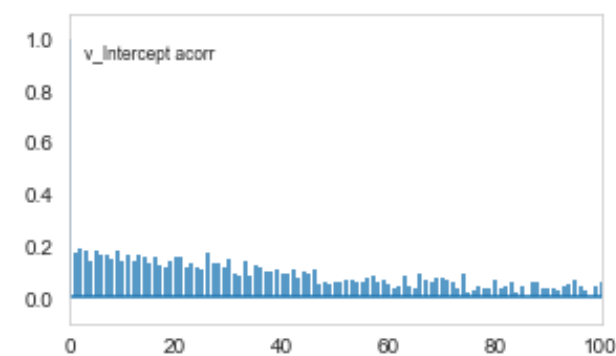
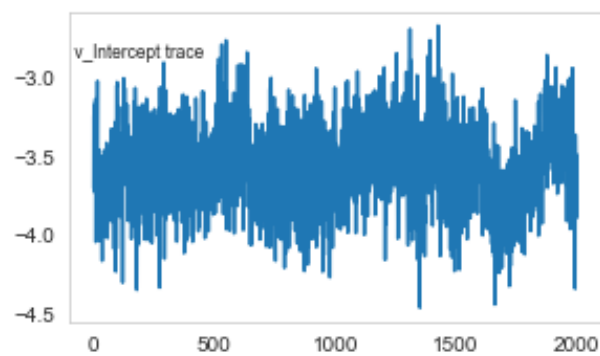
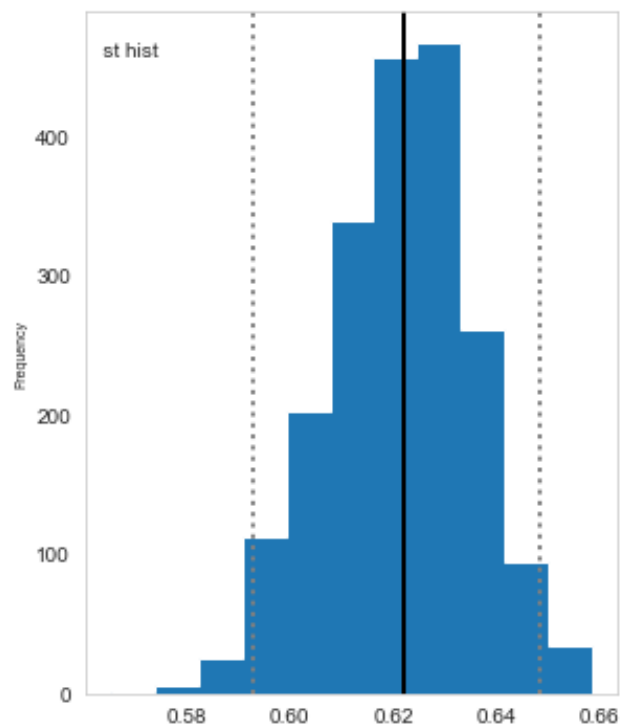
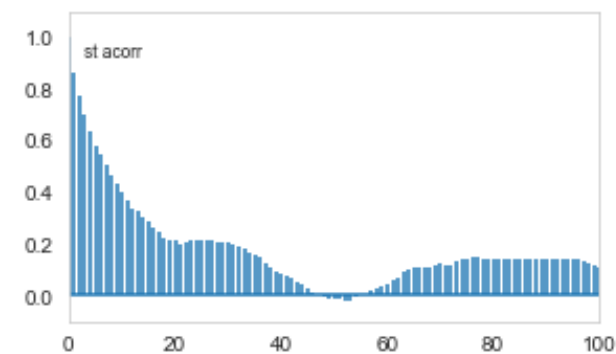
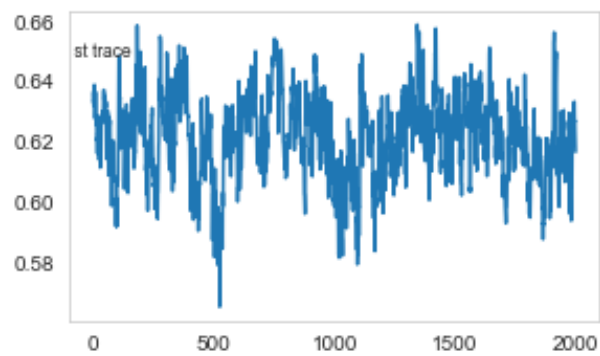
stat	observed	mean	std	SEM	MSE	credible	quantile	mahalanobis
accuracy	0.37532192	0.3800905	0.21723017	2.2739225e-05	0.047211684	True	45.0625	0.021951675
mean_ub	1.6421566	1.6395155	0.40381032	6.975271e-06	0.16306974	True	55.711765	0.0065403823
std_ub	0.6212577	0.56267816	0.2571273	0.0034315633	0.06954602	True	61.78744	0.22782312
10q_ub	0.94824	1.1116843	0.30703983	0.02671405	0.120987535	True	32.548256	0.5323229
30q_ub	1.2287391	1.3163218	0.32355967	0.007670724	0.112361595	True	43.89042	0.27068475
50q_ub	1.5283384	1.5019706	0.36238122	0.00069525937	0.13201539	True	57.049862	0.07276252
70q_ub	1.8834026	1.7576022	0.44115078	0.015825745	0.21043976	True	65.41747	0.2851642
90q_ub	2.549847	2.3188686	0.6628944	0.053350966	0.4927799	True	67.02681	0.348439
mean_lb	-1.5923958	-1.6502684	0.4032613	0.0033492476	0.16596892	True	53.595833	0.14351162
std_lb	0.6436081	0.57481575	0.22263516	0.0047323904	0.054298796	True	66.075	0.3089915
10q_lb	0.8442104	1.0951886	0.2980469	0.06299008	0.15182203	True	21.966667	0.84207636
30q_lb	1.1958085	1.3168449	0.32065377	0.014649815	0.11746865	True	37.016666	0.37746763
50q_lb	1.4852326	1.5161709	0.3575476	0.0009571777	0.12879747	True	48.425	0.08652914
70q_lb	1.8397444	1.7826067	0.4324137	0.0032647257	0.19024634	True	56.320835	0.13213684
90q_lb	2.5187798	2.3532455	0.6390194	0.027401624	0.43574736	True	63.045834	0.25904432

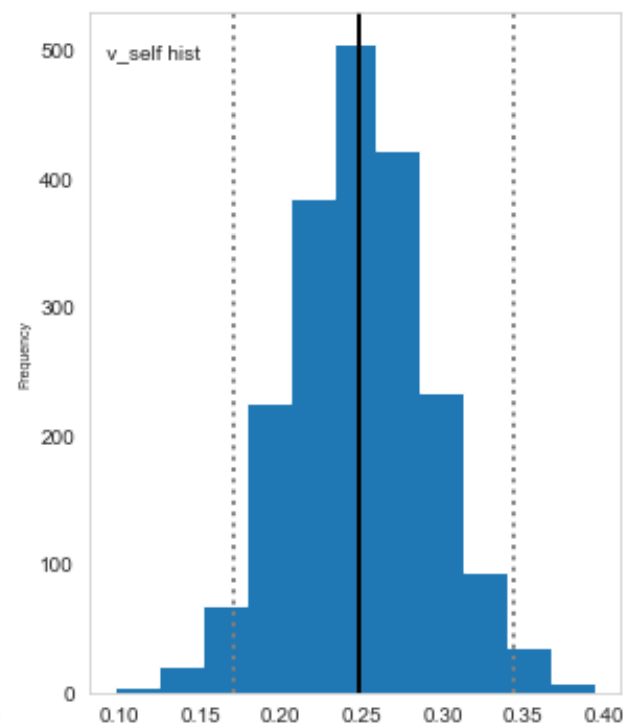
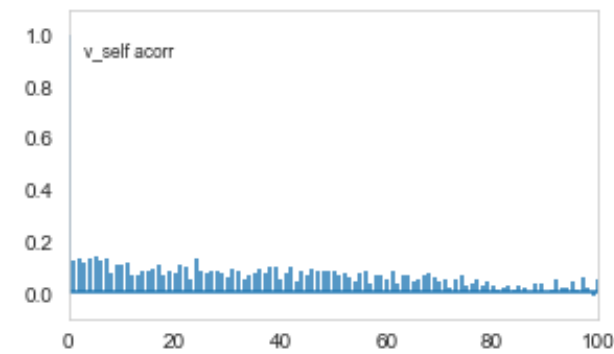
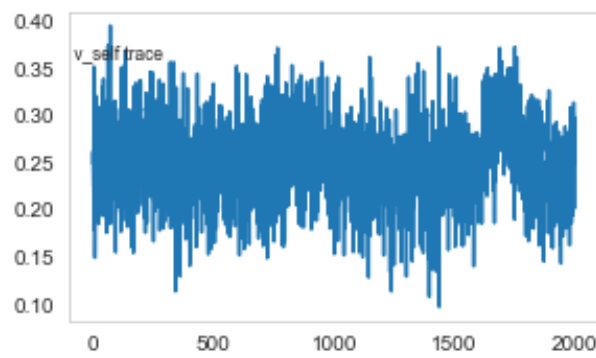
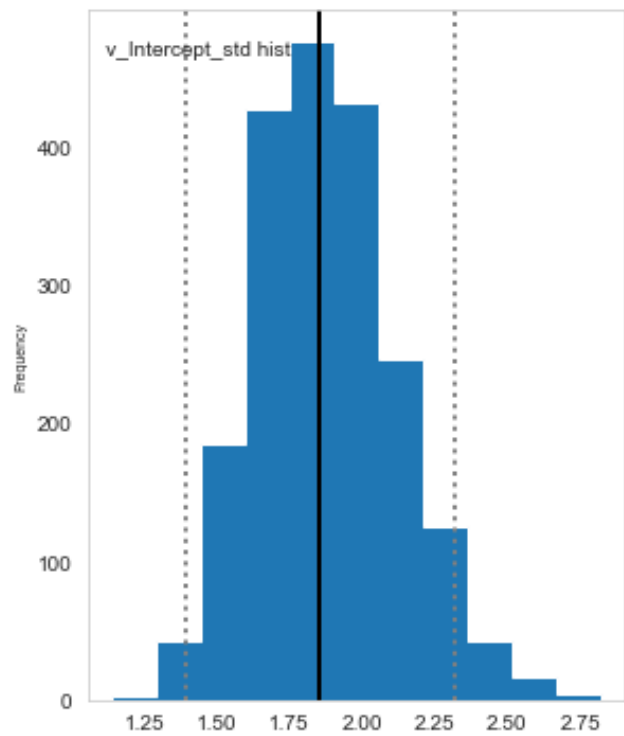
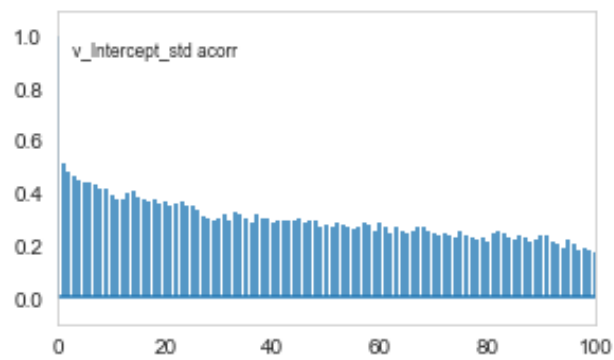
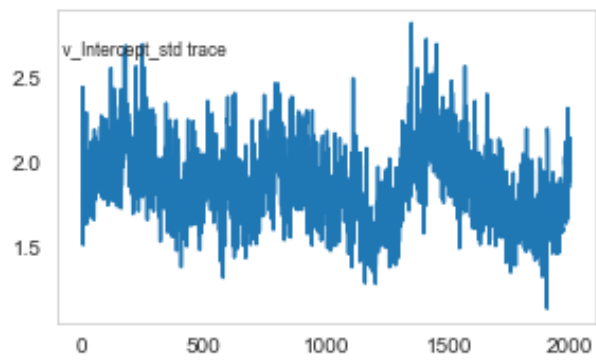
Note. Quantile comparison of the observed reaction time data with reaction time data simulated based on the drift diffusion model (500 simulations), as well as the standard deviation (std), standard error of means (SEM) and mean squared error (MSE) of the simulated data. The column *credible* indicates whether the data fall within the 95 % credible interval (if “True” the model is a 95% credible fit for the observed data). *Quantile* corresponds to the posterior predictive quantile and *mahalanobis* indicates the *mahalanobis* distance between observed and estimated reaction time indices. *ub* = upper boundary, *lb* = lower boundary.

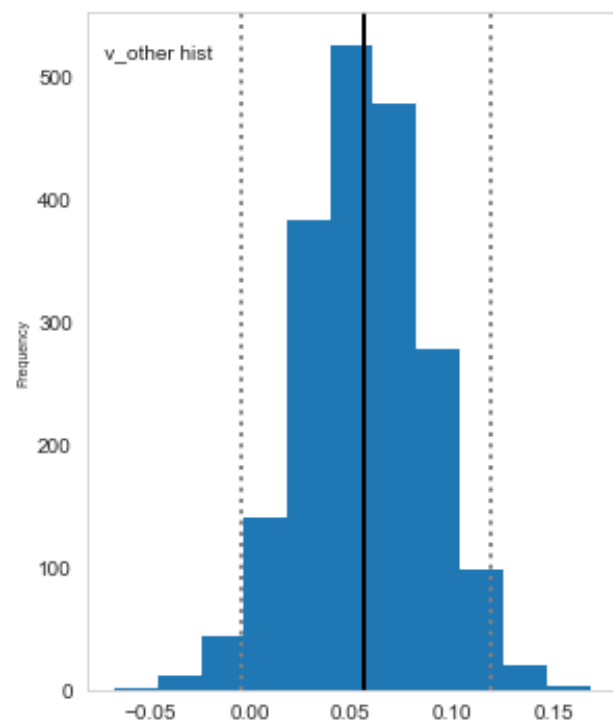
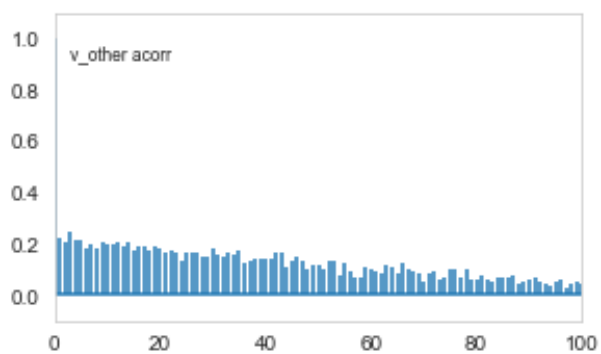
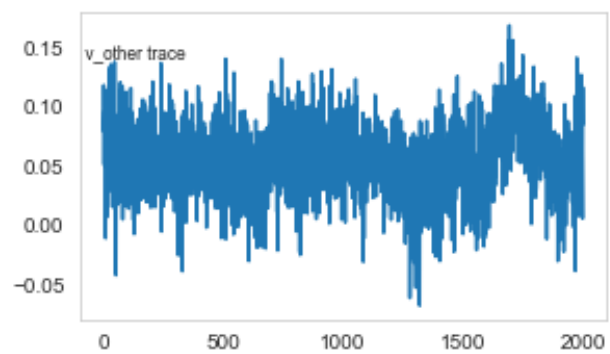
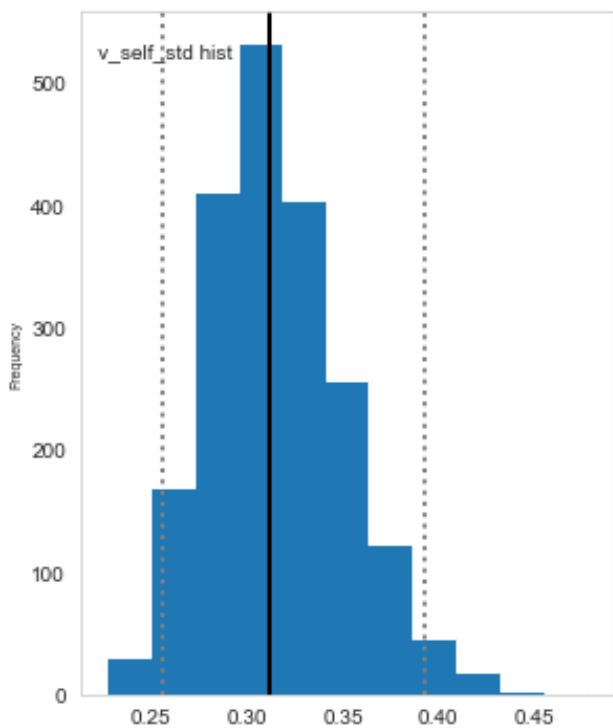
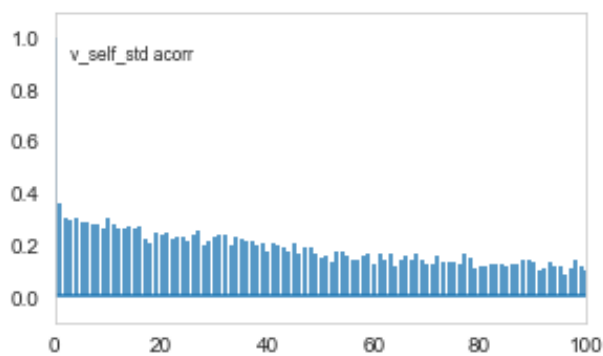
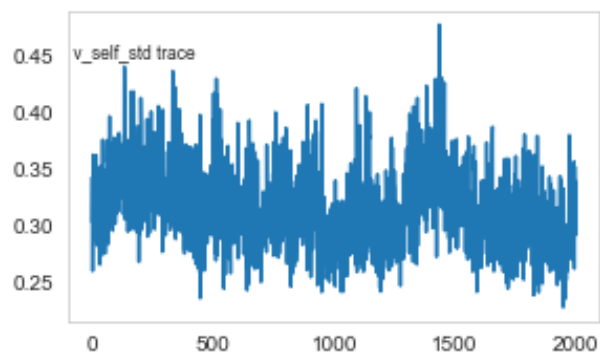
Figures S5.
Posterior predictive plots final model younger adults

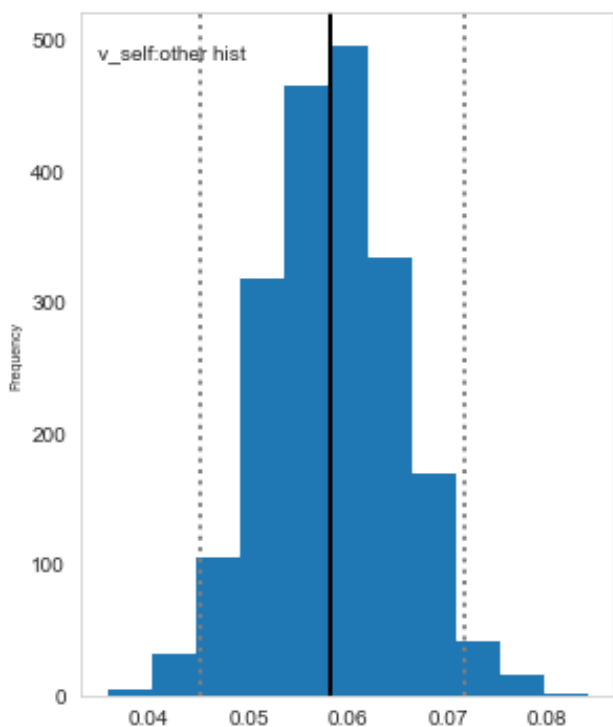
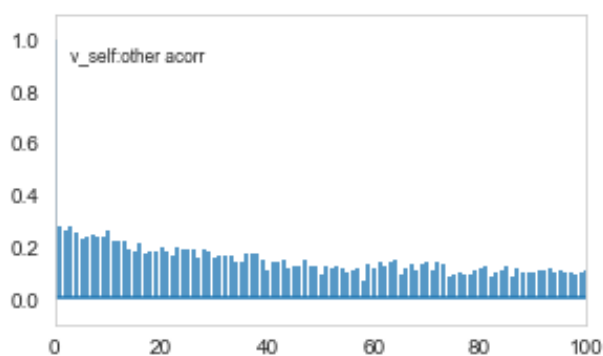
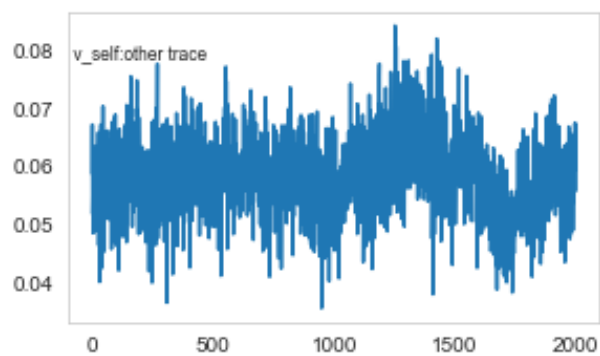
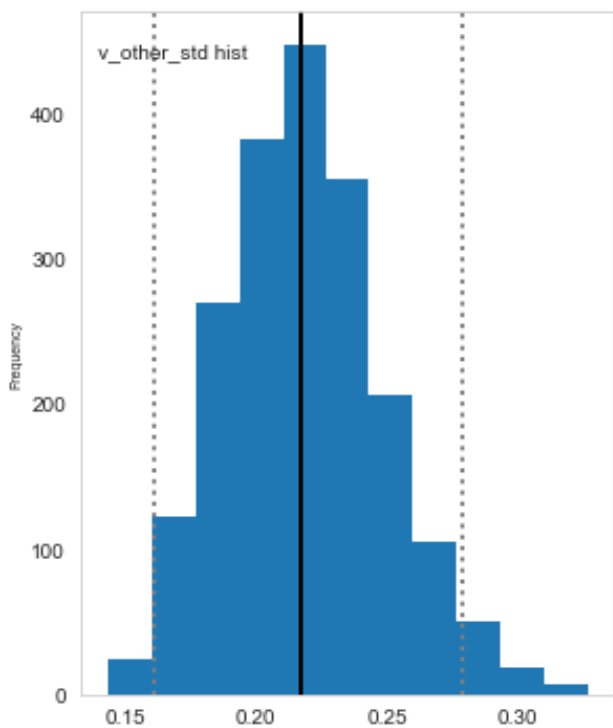
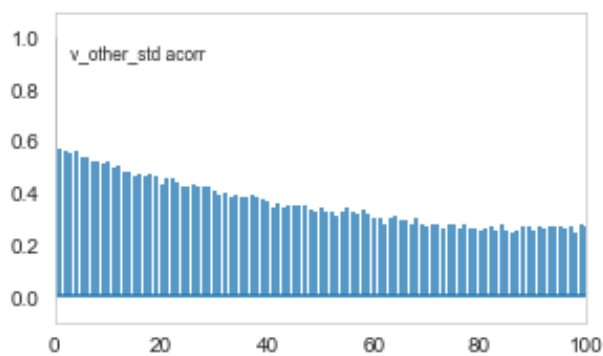
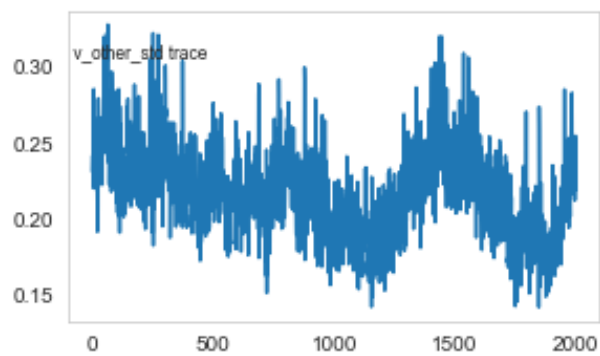


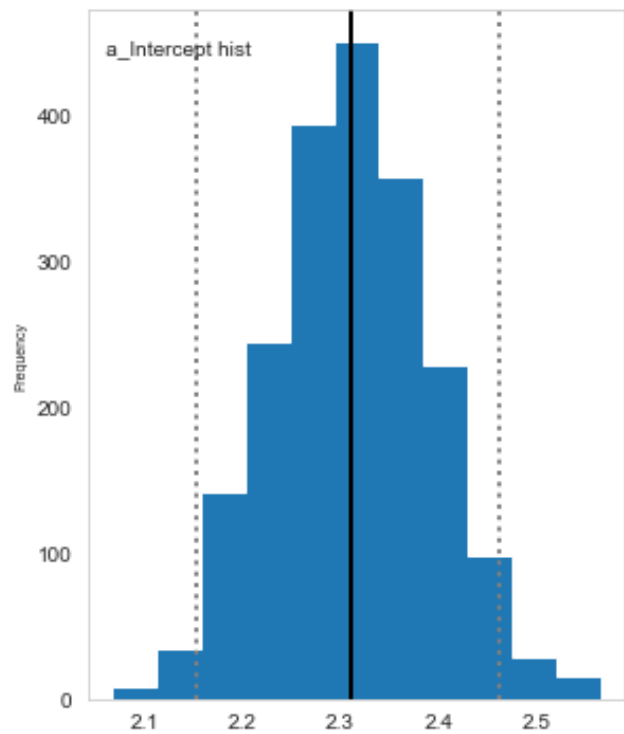
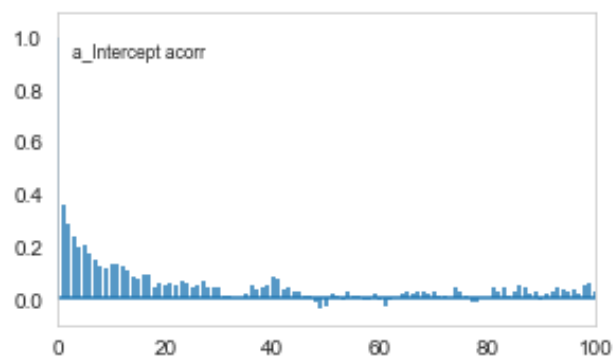
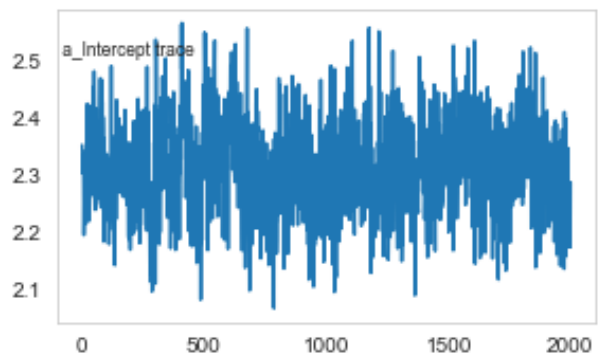
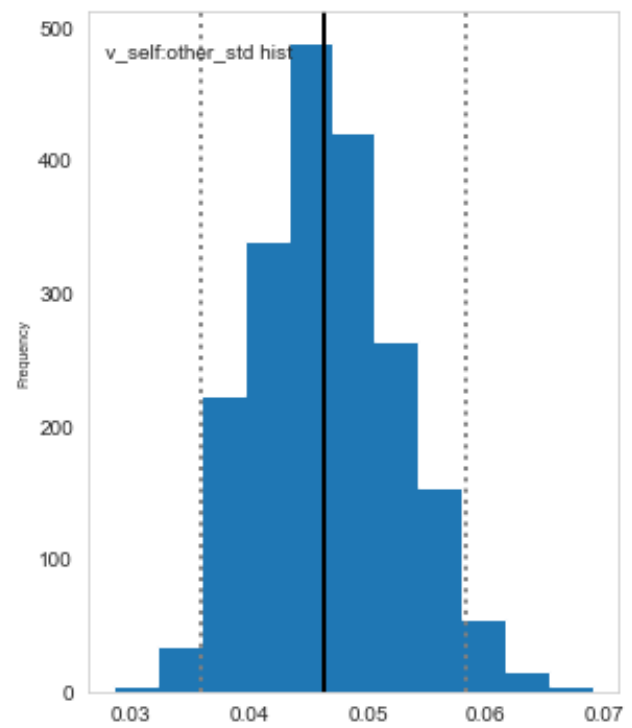
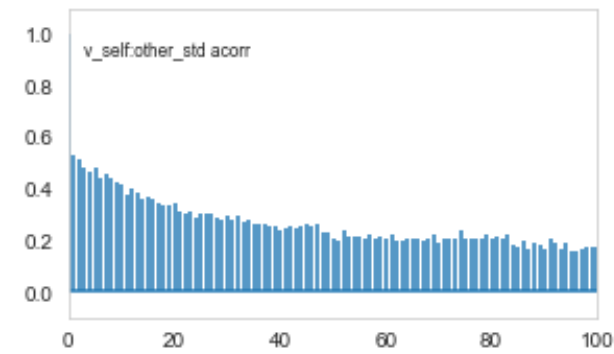
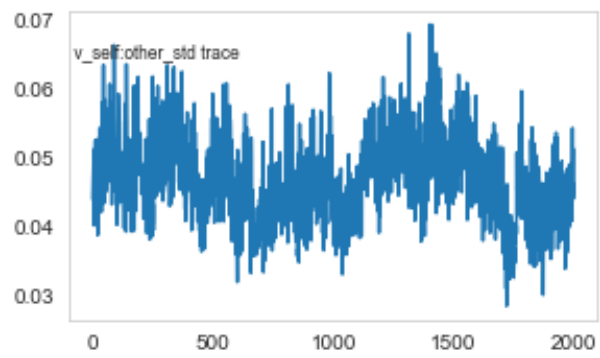


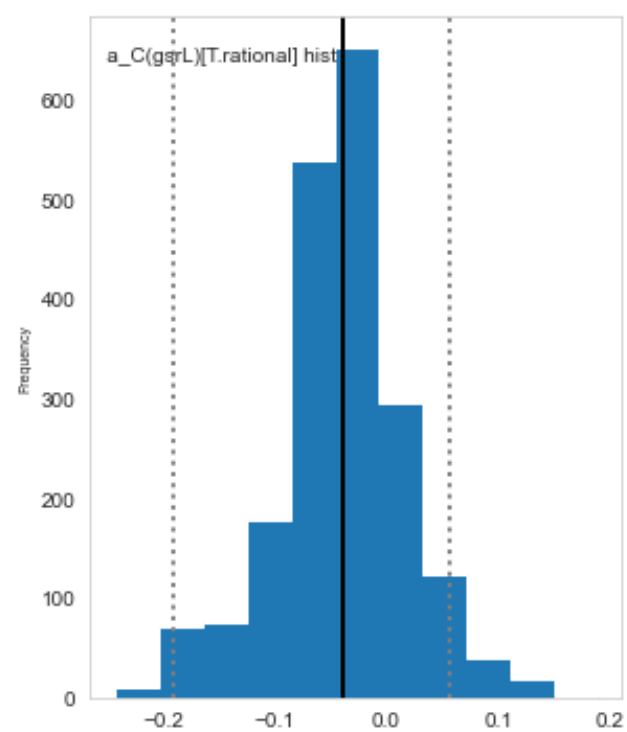
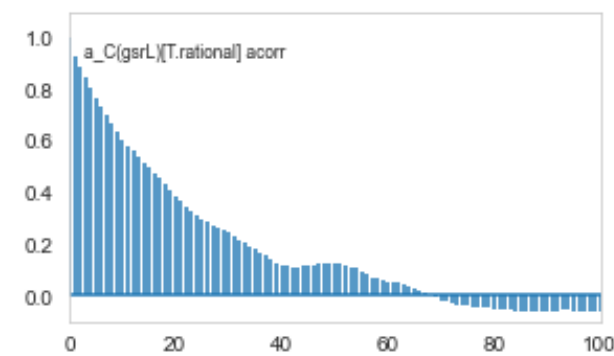
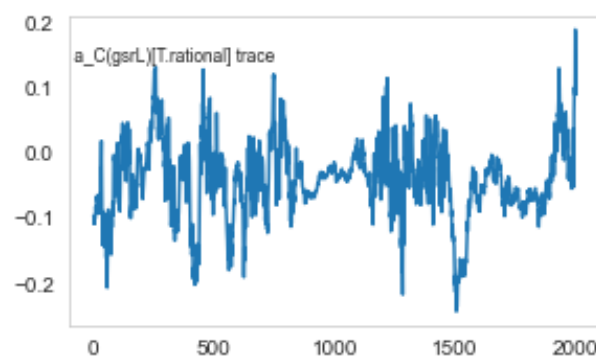
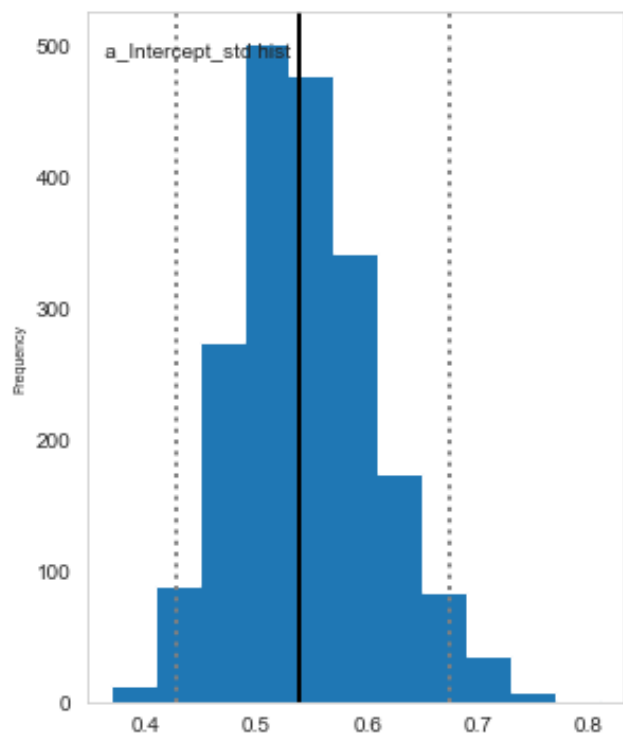
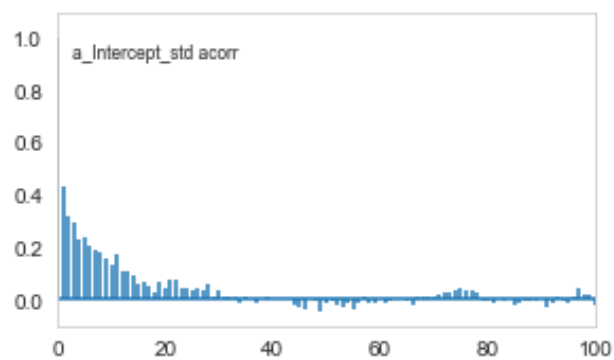
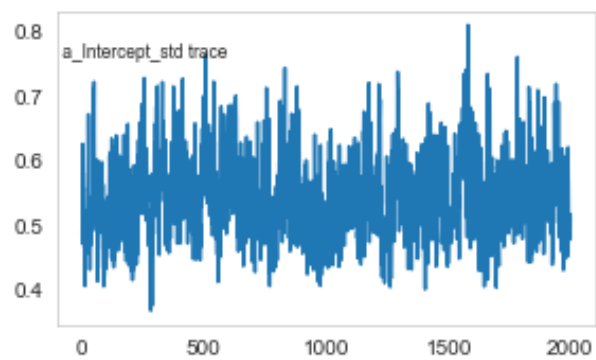


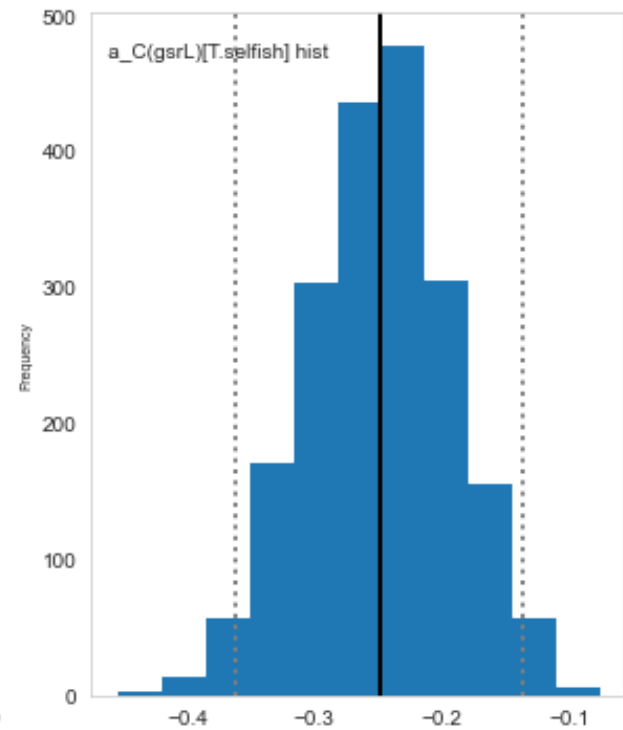
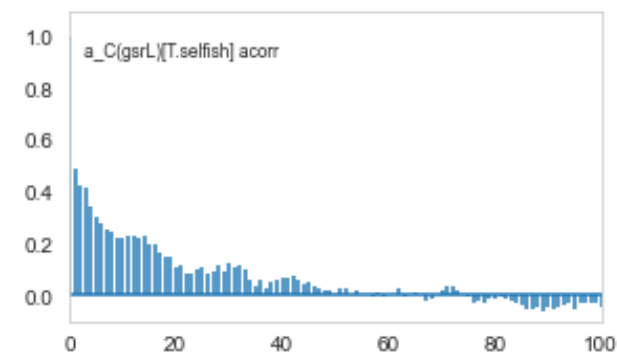
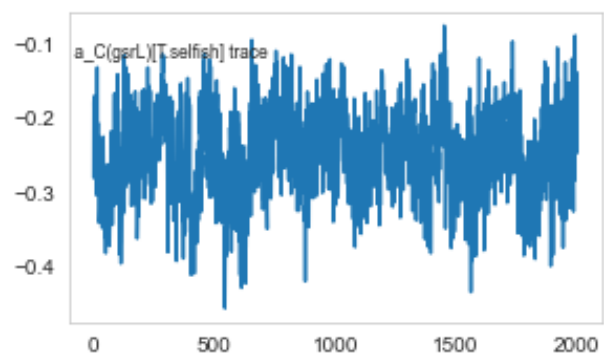
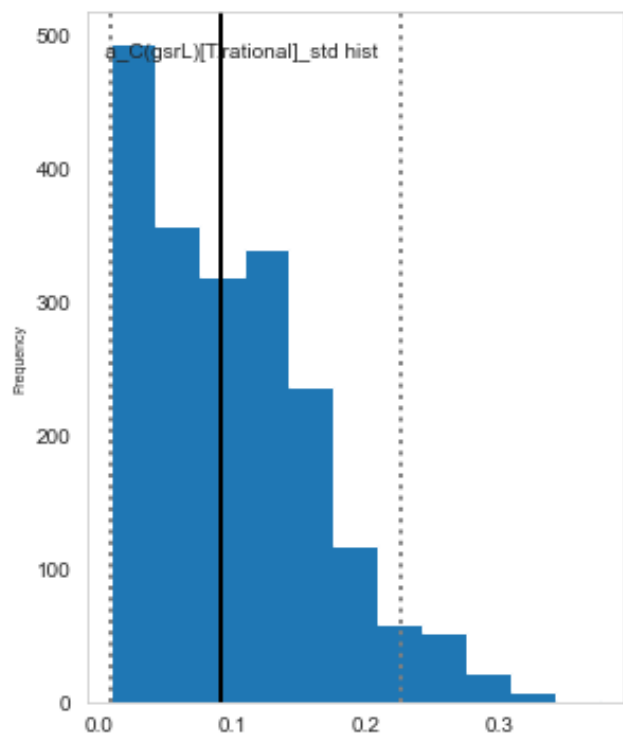
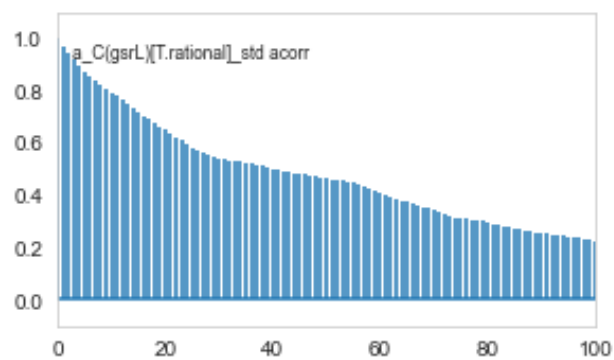
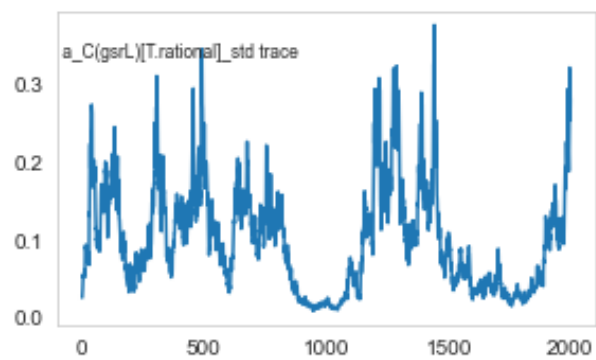


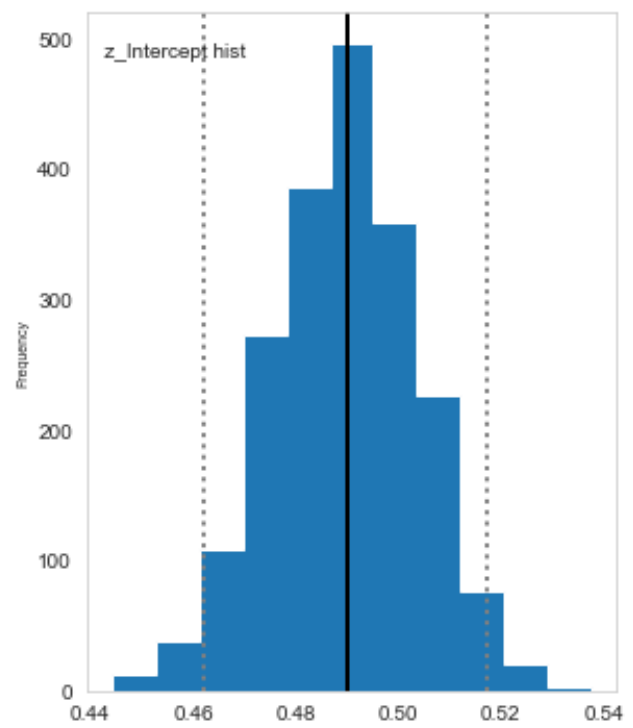
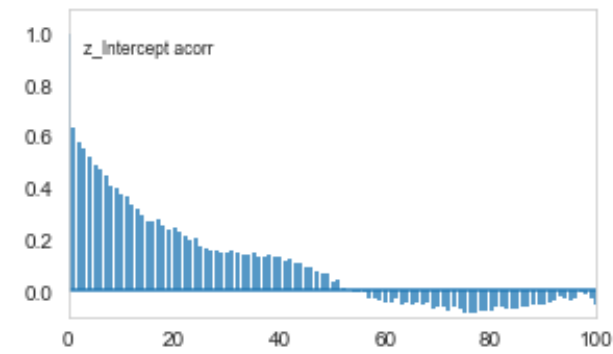
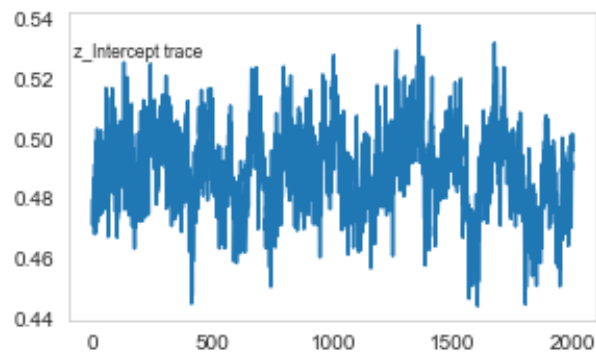
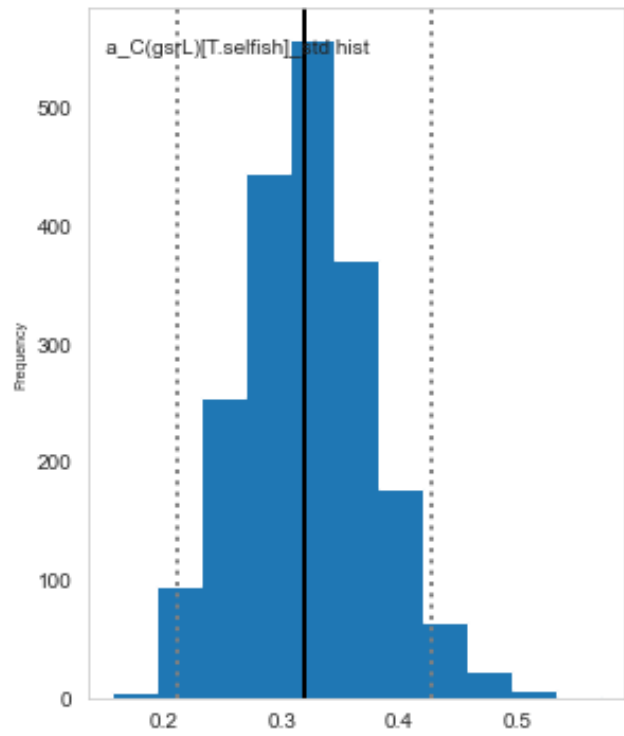
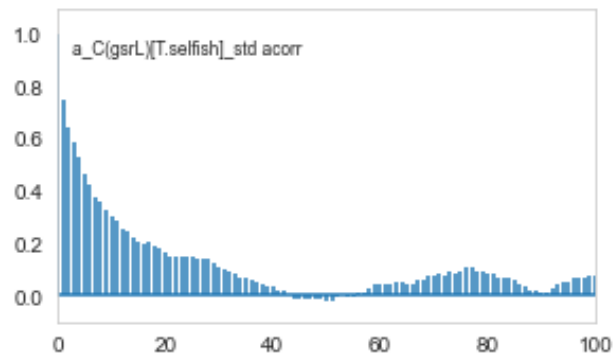
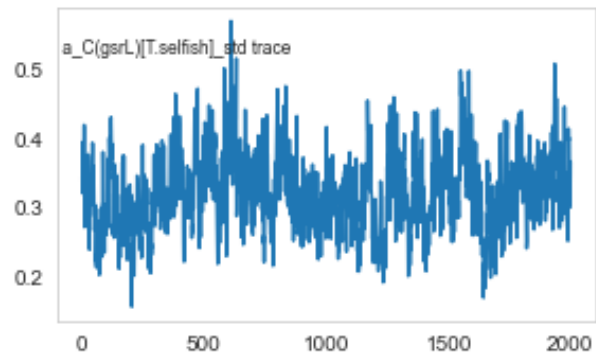


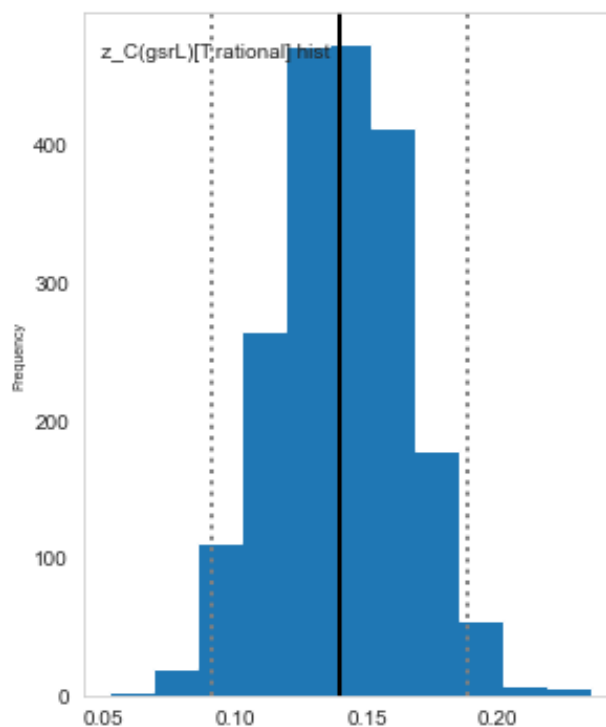
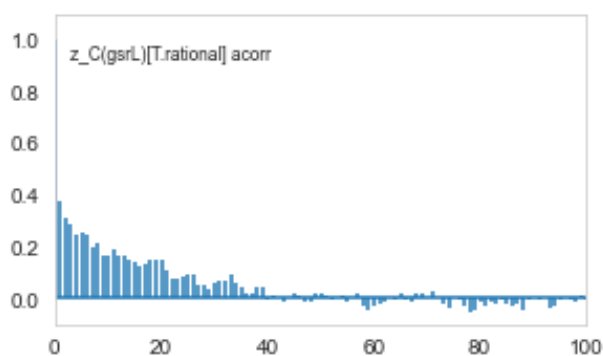
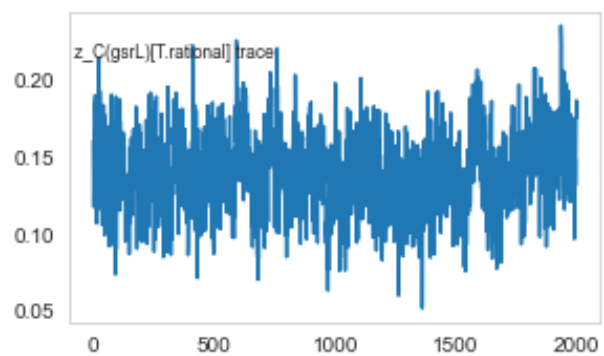
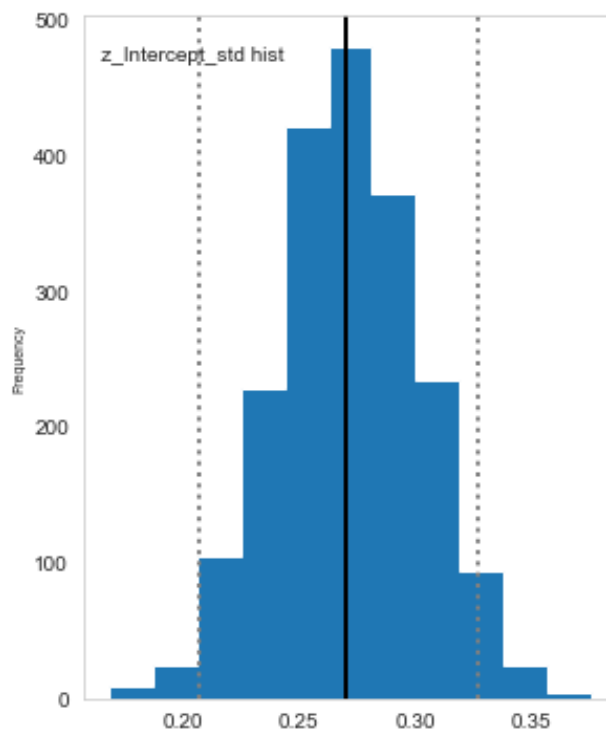
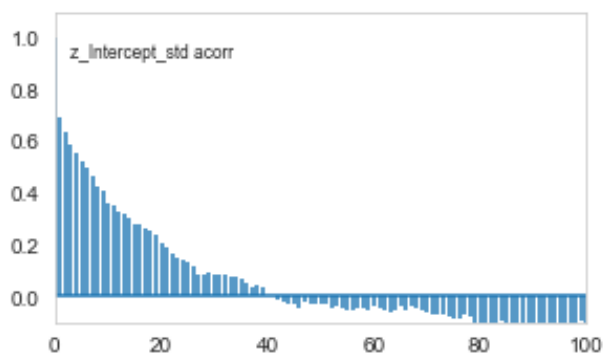
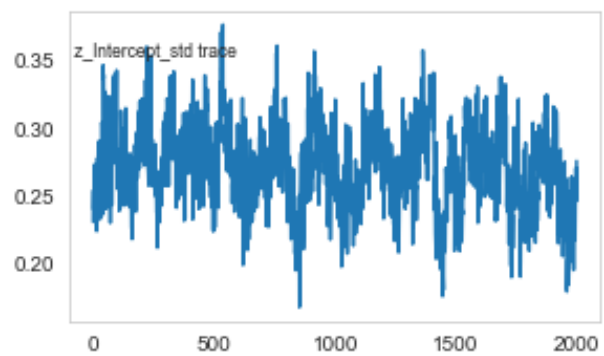


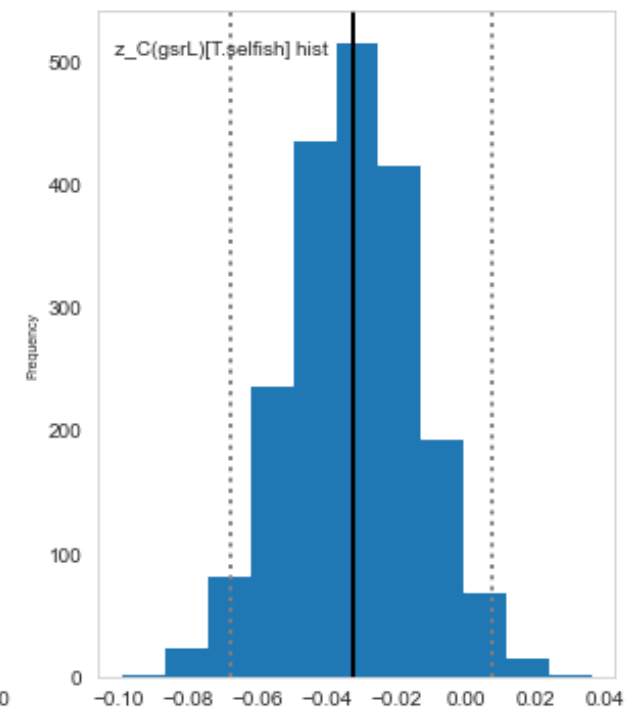
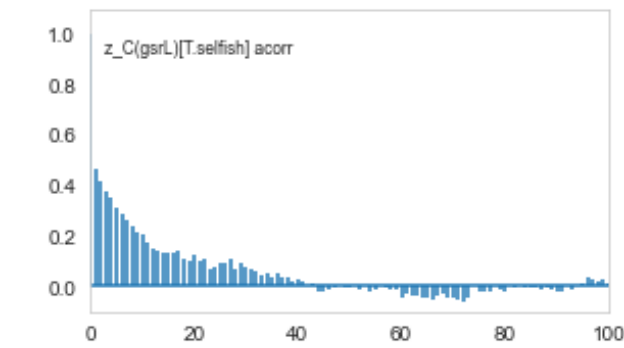
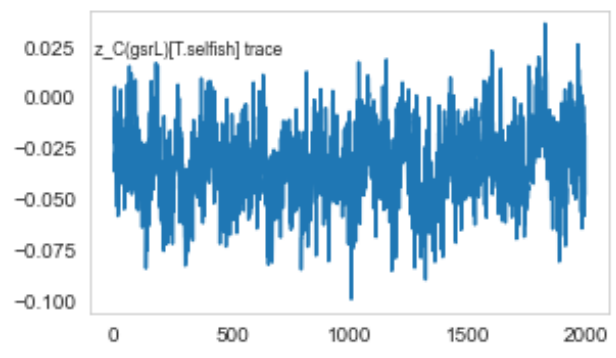
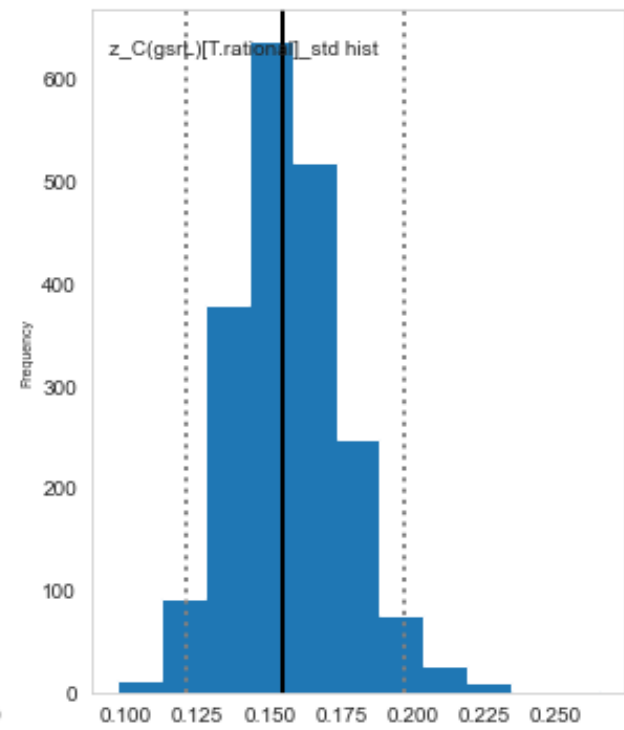
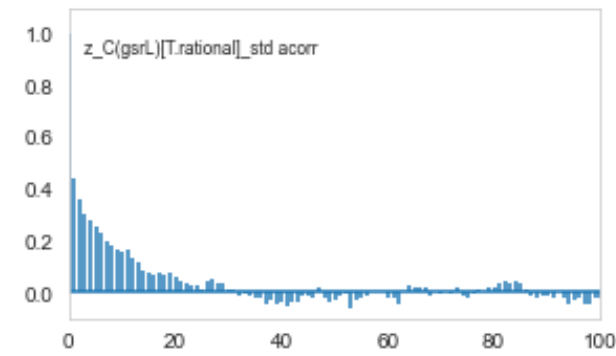
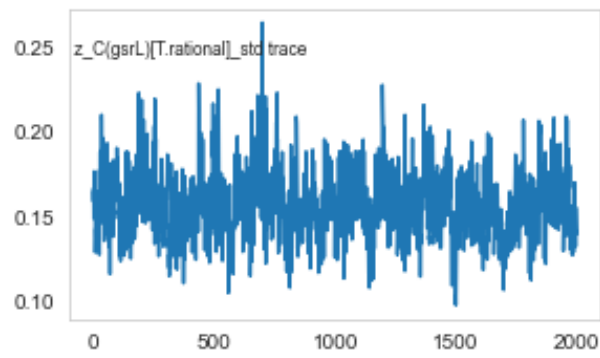


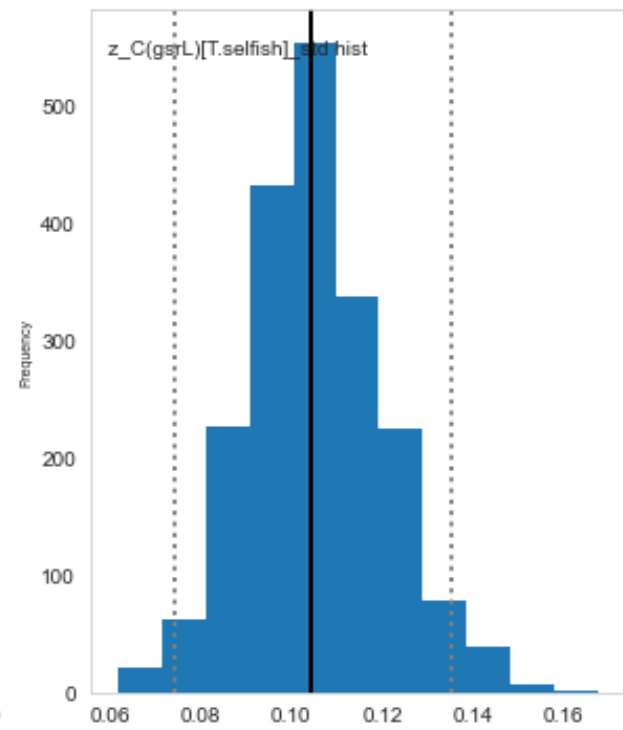
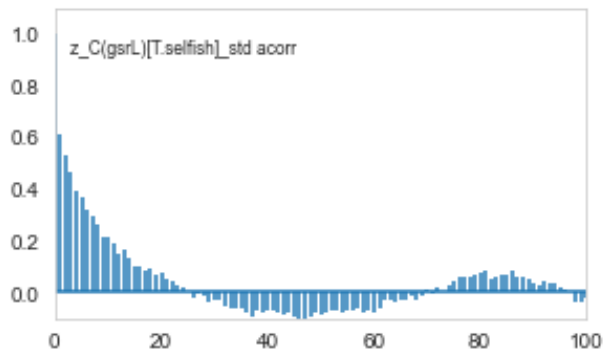
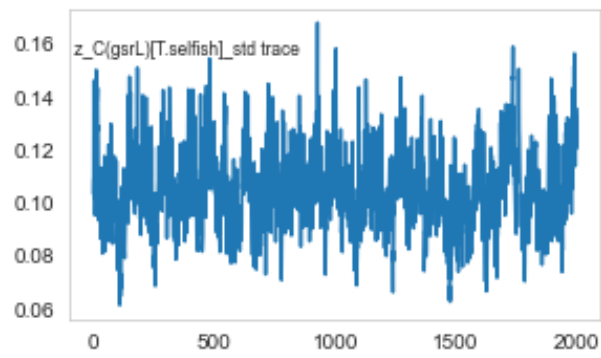












Figures S6.

Posterior predictive plots final model older adults

