Supplementary Materials 2

Results from exploratory analysis on gender

Title: Math self-concept decreases while math anxiety increases over the lifespan
Authors: Xinru Yao, Mine Avcil, Paul Meuer, Hans-Christoph Nuerk, Christina Artemenko

Exploratory analyses on gender differences

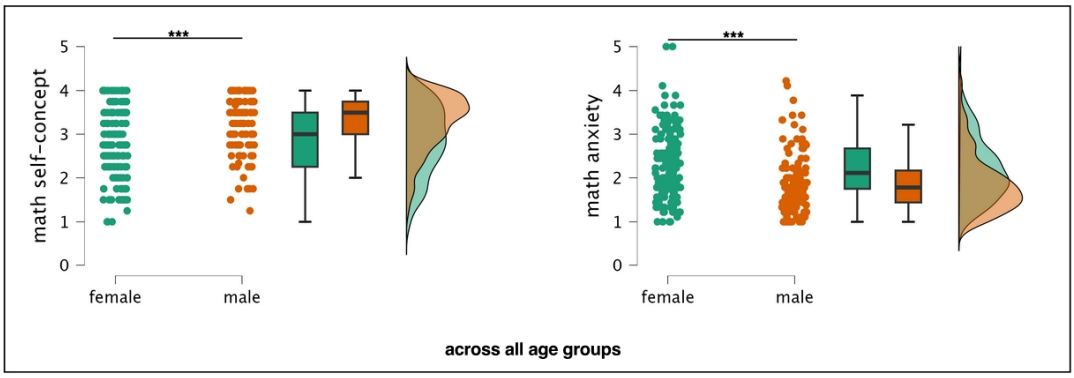
Bayesian independent samples *t*-test revealed that females reported a lower math self-concept (BF_{10} > 100) but higher math anxiety (BF_{10} > 100) than males across all age groups (see Figure S3). However, Bayesian independent samples *t*-test for each age group were not consistent with evidence for a lower math self-concept in females than in males (see Figure S4) only in children (BF_{10} = 9.81) and older adults (BF_{10} = 35.65), and evidence for higher math anxiety in females than in males (see Figure S5) only in children (BF_{10} = 26.89), older adolescents (BF_{10} = 15.90), and older adults (BF_{10} = 7.68).

Table S13. Bayesian *t*-tests for gender differences in math self-concept and math anxiety

	children		younger adolescents		older adolescents		younger adults		middle-aged adults		older adults	
	BF_{10}	BF_{01}	BF_{10}	BF_{01}	BF_{10}	BF_{01}	BF_{10}	BF_{01}	BF_{10}	BF_{01}	BF_{10}	BF_{01}
math self-concept	**9.81**	0.10	0.63	1.59	1.17	0.85	0.345	2.90	0.47	2.11	**35.65**	0.03
math anxiety	**26.89**	0.04	0.53	1.89	**15.90**	0.06	0.33	3.06	0.31	3.23	**7.68**	0.13

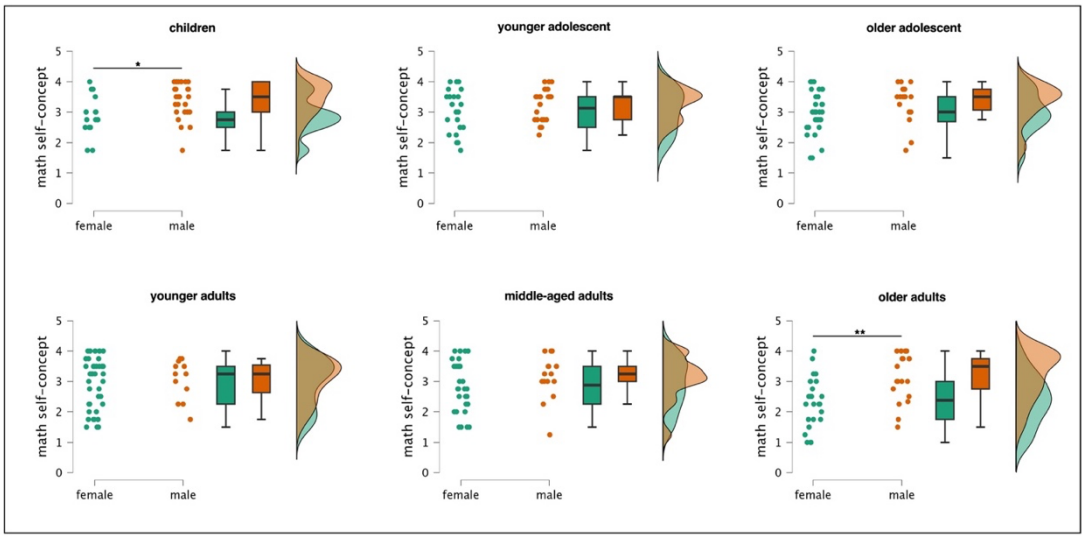
Due to the observed gender differences, the confirmatory analyses were repeated as exploratory analyses including gender. The results on math self-concept only changed in the regard that there was conclusive (instead of inconclusive) evidence for the linear predictor of age group after controlling for gender (see Table S14) and no changes in the ANOVA (see Table S15). The results on math anxiety only changed in the regard that there was conclusive (instead of inconclusive) evidence for the linear predictor of age group after controlling for gender in the regression (see Table S16) and vice versa in the ANOVA (see Table S17). The results for the analyses on math performance and the complexity effect did not change.

Figure S3. Gender differences across all age groups



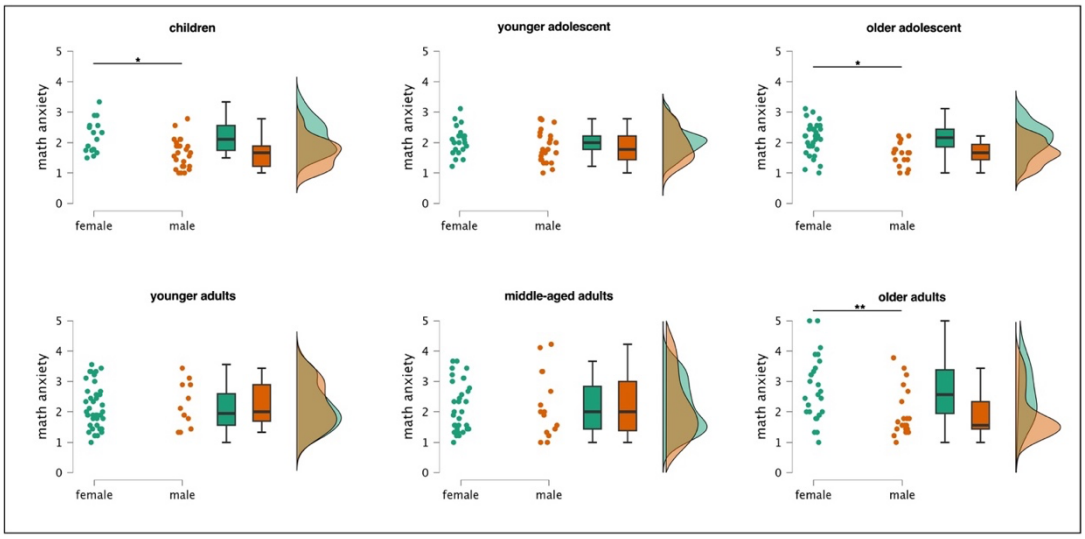
Notes. *BF_{10} > 3, **BF_{10} > 30, ***BF_{10} > 100

Figure S4. Gender comparison for math self-concept in each age group



Notes. *BF_{10} > 3, **BF_{10} > 30, ***BF_{10} > 100

Figure S5. Gender comparison for math anxiety in each age group



Notes. *BF_{10} > 3, **BF_{10} > 30, ***BF_{10} > 100

Table S14. Bayesian regression on math self-concept (controlling for gender)

(1) Model comparison for math self-concept

Models	*P(M)*	*P(M|data)*	BF_M	BF_{10}	R^2
Null model	0.252	0.000	0.000	1.000	0.000
age group (linear) + gender	0.012	0.134	12.783	> 100	0.111
age group (logarithmic) + age group (quadratic) + gender + age group (quadratic) × gender	0.007	0.111	17.216	> 100	0.135
age group (linear) + age group (quadratic) + gender + age group (quadratic) × gender	0.007	0.110	17.138	> 100	0.135
age group (linear) + age group (logarithmic) + age group (quadratic) + gender + age group (linear) × gender + age group (logarithmic) × gender + age group (quadratic) × gender	0.252	0.106	0.352	> 100	0.138
age group (logarithmic) + gender	0.012	0.051	4.447	> 100	0.105
age group (logarithmic) + age group (quadratic) + gender + age group (logarithmic) × gender + age group (quadratic) × gender	0.012	0.051	4.419	> 100	0.136
age group (linear)+ age group (quadratic) + gender + age group (linear) × gender + age group (quadratic) × gender	0.012	0.048	4.117	> 100	0.136
age group (linear) + age group (logarithmic) + age group (quadratic) + gender + age group (quadratic) × gender	0.012	0.044	3.795	> 100	0.135
age group (linear) + age group (logarithmic) + age group (quadratic) + gender + age group (logarithmic) × gender + age group (quadratic) × gender	0.036	0.040	1.106	> 100	0.136

(2) Posterior summaries of coefficients

Coefficient	*P(incl)*	*P(excl)*	*P(incl|data)*	*P(excl|data)*	$BF_{inclusion}$	*Mean*	*SD*	95% Credible Interval	
								Lower	*Upper*
Intercept	1.000	0.000	1.000	0.000	1.000	3.032	0.043	2.944	3.123
age group (linear)	0.175	0.444	0.404	0.334	3.064	-0.052	0.189	-0.406	0.452
age group (logarithmic)	0.175	0.444	0.326	0.425	1.944	-0.045	1.231	-2.974	2.683
age group (quadratic)	0.175	0.444	0.128	0.297	1.093	0.009	0.042	-0.067	0.102
gender	0.101	0.403	0.329	0.000	> 100	-0.108	0.867	-1.769	1.794
age group (linear) × gender	0.381	0.108	0.262	0.403	0.184	0.029	0.225	-0.454	0.504
age group (logarithmic) × gender	0.381	0.108	0.248	0.326	0.216	-0.260	1.502	-3.792	2.373
age group (quadratic) × gender	0.381	0.108	0.575	0.128	1.271	-0.054	0.063	-0.165	0.011

Table S15. Bayesian ANOVA on math self-concept (controlling for gender)

(1) Model comparison

Models	*P(M)*	*P(M|data)*	BF_M	BF_{10}	BF_{01}
Null model (incl. gender)	0.333	0.630	3.407	1.000	1.000
age group	0.333	0.286	0.800	0.453	1.228
age group + age group × gender	0.333	0.084	0.184	0.134	1.233

(2) Analysis of effects

Effects	*P(incl)*	*P(excl)*	*P(incl|data)*	*P(excl|data)*	BF_{incl}	BF_{excl}
age group	0.333	0.333	0.286	0.630	0.453	2.216
age group × gender	0.333	0.333	0.084	0.286	0.295	3.438

Table S16. Bayesian regression on math anxiety (controlling for gender)

(1) Model comparison for math anxiety

Models	*P(M)*	*P(M|data)*	BF_M	BF_{10}	R^2
Null model	0.252	0.000	0.000	1.000	0.000
age group (linear) + age group (logarithmic) + age group (quadratic) + gender + age group (linear) × gender + age group (logarithmic) × gender + age group (quadratic) × gender	0.252	0.233	0.902	> 100	0.127
age group (linear) + gender	0.012	0.201	20.717	> 100	0.098
age group (logarithmic) + gender	0.012	0.063	5.529	> 100	0.090
age group (linear) + age group (quadratic) + gender + age group (quadratic) × gender	0.007	0.059	8.667	> 100	0.115
age group (logarithmic) + age group (quadratic) + gender + age group (quadratic) × gender	0.007	0.054	7.872	> 100	0.114
age group (logarithmic) + age group (quadratic) + gender	0.007	0.038	5.525	> 100	0.101
age group (linear) + age group (quadratic) + gender	0.007	0.038	5.396	> 100	0.101
age group (linear)	0.036	0.034	0.930	> 100	0.065
age group (linear) + age group (logarithmic) + gender	0.007	0.032	4.605	> 100	0.100

(2) Posterior summaries of coefficients

								95% Credible Interval	
Coefficient	*P(incl)*	*P(excl)*	*P(incl|data)*	*P(excl|data)*	$BF_{inclusion}$	*Mean*	*SD*	*Lower*	*Upper*
Intercept	1.000	0.000	1.000	0.000	1.000	2.079	0.043	1.983	2.150
age group (linear)	0.175	0.444	0.434	0.223	4.928	0.204	0.329	-0.211	1.106
age group (logarithmic)	0.175	0.444	0.273	0.405	1.709	-0.783	2.176	-6.851	1.395
age group (quadratic)	0.175	0.444	0.123	0.412	0.755	-0.029	0.066	-0.194	0.054
gender	0.101	0.403	0.387	0.055	28.215	-0.647	1.808	-5.277	0.484

Coefficient	*P(incl)*	*P(excl)*	*P(incl|data)*	*P(excl|data)*	$BF_{inclusion}$	*Mean*	*SD*	95% Credible Interval	
								Lower	*Upper*
age group (linear) × gender	0.381	0.108	0.342	0.397	0.244	-0.214	0.473	-1.451	0.103
age group (logarithmic) × gender	0.381	0.108	0.321	0.254	0.357	1.468	3.159	-0.430	9.071
age group (quadratic) × gender	0.381	0.108	0.465	0.119	1.109	0.068	0.101	0.000	0.292

Table S17. Bayesian ANOVA on math anxiety (controlling for gender)

(1) Model comparison

Models	*P(M)*	*P(M|data)*	BF_M	BF_{10}	BF_{01}
Null model	0.200	0.001	0.005	1.000	
age group + gender	0.200	0.456	3.350	> 100	
age group + gender + age group × gender	0.200	0.349	2.143	> 100	
gender	0.200	0.180	0.880	> 100	
age group	0.200	0.014	0.056	10.650	0.394

(2) Analysis of effects

Effects	*P(incl)*	*P(excl)*	*P(incl|data)*	*P(excl|data)*	BF_{incl}	BF_{excl}
age group	0.400	0.400	0.469	0.182	2.584	0.394
gender	0.400	0.400	0.636	0.015	42.478	
age group × gender	0.200	0.200	0.349	0.456	0.765	1.253