Table 1.

Demographic Distribution of Each Sample

Characteristic (%)	EFA1 (n=253)	EFA2 (n=280)	CFA (n=290)
Male	36.4	38.4	42.1
Race			
White	82.6	77.2	73.8
African American	7.5	6.4	4.1
Latino	4.0	3.9	5.9
Asian	3.2	8.2	11.7
Indigenous American	0.0	0.4	0.3
Other	2.0	3.6	3.8
Highest Level Math			
Basic Algebra	1.6	0.8	1.0
College Algebra	13.8	31.3	33.1
Calculus I	19.0	49.5	43.1
Calculus II	4.0	11.0	14.8
More than Calculus II	60.9	3.9	3.8
Other	0.0	3.2	3.4

Table 2.

Standardized Factor Pattern Coefficients, Structure Coefficients, and Communalities for the Four Factor Principal-axis Factor Analysis of the Mathematical Resilience scale, EFA1.

		Pattern Coefficients				Structure Coefficients				
Item No.	Item	Value	Struggle	Growth	Resilience	Value	Struggle	Growth	Resilience	h2
V1	Math is essential for my future.	**.793**				.799	.214	-.309	.100	.649
V2	Math will be useful to me in my life's work.	**.860**				.835	.245	-.188	.015	.705
V3	Math courses are very helpful no matter what I decide to study.	**.625**		.134		.681	.251	-.348	.064	.486
V4	Knowing math contributes greatly to achieving my goals.	**.905**		-.115		.874	.252	-.185	.018	.775
V5	Having a solid knowledge of math helps me understand more complex topics in my field of study.	**.855**				.867	.297	-.244	-.073	.764
V6	People who are good at math have more opportunities than those who aren't good at math.	**.398**		-.125	.220	.375	.121	.033	-.236	.213
V7	Thinking mathematically can help me with things that matter to me.	**.774**			.162	.790	.248	-.229	-.148	.650
V8	It would be difficult to succeed in life without math.	**.450**		.100		.463	.070	-.218	-.049	.229
V9	Math develops good thinking skills that are necessary to succeed in any career.	**.579**		.186	.119	.640	.188	-.347	-.074	.445
S1	Everyone struggles with math at some point.		**.685**			.103	.666	-.129	.120	.452
S3	Good mathematicians experience difficulties when solving problems.		**.654**		.162	.243	.653	-.145	-.065	.456
S4	Successful people who work in math related fields struggle when working on hard math problems.**	.103	**.626**		.218	.301	.640	-.186	-.115	.471
S5	Everyone makes mistakes at times when doing math.	.131	**.504**			.288	.562	-.209	.174	.347
S6	Struggle is a normal part of working on math.		**.494**	-.138	-.110	.027	.463	.040	.147	.249
S7	People in my peer group struggle sometimes with math.[a]		**.481**		-.144	.091	.496	-.171	.224	.276
S8	People who are good at math may fail a hard math test.	.138	**.479**		.189	.302	.510	-.193	-.102	.324
S9	Math teachers are sometimes stumped by a math problem.	.151	**.449**		.210	.254	.450	-.026	-.161	.273

Note. Pattern coefficients given in boldface have values of .40 or greater and signify items loading primarily with that factor. Pattern coefficients less than .10 were suppressed. h^2 represents the communality of the measured variables.

[a]Item was reworded in EFA2.

Table 2 Continued.
Standardized Factor Pattern Coefficients, Structure Coefficients, and Communalities for the Four Factor Principal-axis Factor Analysis of the Mathematical Resilience scale, EFA1.

Item No.	Item	Pattern Coefficients				Structure Coefficients				h2
		Value	Struggle	Growth	Resilience	Value	Struggle	Growth	Resilience	
G1	Everyone can get better at math if they try.**	.302		**.557**		.495	.243	-.654	.080	.523
G2	Math can be learned by anyone.			**.668**		.188	.131	-.664	.161	.442
G3	If someone is not a math person, they won't be able to learn much math.	.195		**.706**	.155	-.403	-.111	.723	.009	.584
G4	If someone is not good at math, there is nothing that can be done to change that.	.140	.115	**.511**		-.335	-.259	.587	-.169	.384
G5	People are either good at math or they aren't.	.103		**.553**		-.280	-.127	.572	-.052	.342
G6	I believe a person's math ability is determined at birth.**	-.252		**.623**		.047	-.082	.566	-.227	.387
G7	Some people cannot learn math.			**.762**		-.174	-.174	.759	-.241	.588
G8	Only smart people can do math.	*	*	*	*	*	*	*	*	*
G9	I believe I can grow in my knowledge of math	**.408**		.104	-.159	.468	.250	-.287	.197	.276
R1	When I have done poorly on something related to math, I know how to adapt.	**.551**			-.274	.600	.282	-.330	.305	.462
R2	I sometimes get discouraged by difficulties in mathematics, but I bounce back.		**.590**	.131	-.123	.242	.642	-.284	.232	.454
R3	I have strategies to use when I get stuck trying to solve math problems.	**.582**			-.148	.597	.160	-.285	.163	.387
R4	When I fail or do poorly on a math test, I know I have to work harder.	.262		.117	-.377	.319	.208	-.294	.412	.286
R5	When I struggle with math, I return to it until I get it.	.603		.082	-.427	.647	.294	-.377	.456	.630
R6	When I experience a setback in something related to math, I seek encouragement from others.			.026	**-.427**	.069	.155	-.145	.444	.208
R7	I sometimes find math confusing, but I stick with it.	-.151	**.603**		-.274	.015	.596	-.115	.352	.452
R8	When I don't do as well as I hoped on a math task or test, I keep trying until I can do it.	.496			-.454	.531	.248	-.334	.477	.512

Note. Pattern coefficients given in boldface have values of .40 or greater and signify items loading primarily with that factor. Pattern coefficients less than .10 were suppressed. h^2 represents the communality of the measured variables.

Table 3.

Standardized Factor Pattern Coefficients, Structure Coefficients, and Communalities for the Four Factor Principal-axis Factor Analysis of the Mathematical Resilience scale, EFA2.

Item No.	Item	Value	Struggle	Growth	Value	Struggle	Growth	h^2
V1	Math is essential for my future.	**0.763**		0.135	0.833	0.356	0.395	.719
V2	Math will be useful to me in my life's work.	**0.851**			0.859	0.274	0.307	.739
V3	Math courses are very helpful no matter what I decide to study.	**0.697**		0.170	0.771	0.319	0.405	.626
V4	Knowing math contributes greatly to achieving my goals.	**0.867**		0.100	0.881	0.247	0.368	.787
V5	Having a solid knowledge of math helps me understand more complex topics in my field of study.	**0.732**			0.719	0.225	0.202	.518
V6	People who are good at math have more opportunities than those who aren't good at math.	**0.421**		-0.259	0.352	0.133	-0.116	.184
V7	Thinking mathematically can help me with things that matter to me.	**0.627**		0.118	0.673	0.252	0.324	.467
V8	It would be difficult to succeed in life without math.	**0.557**		0.233	0.655	0.296	0.425	.485
V9	Math develops good thinking skills that are necessary to succeed in any career.	**0.571**	0.187	0.155	0.682	0.403	0.373	.523
S1	Everyone struggles with math at some point.	-0.113	**0.521**		0.042	0.475	0.010	.242
S3	Good mathematicians experience difficulties when solving problems.	0.135	**0.561**		0.334	0.614	0.195	.399
S4	People who work in math related fields sometimes find math challenging.[a]	0.184	**0.556**		0.358	0.612	0.137	.403
S5	Everyone makes mistakes at times when doing math.		**0.471**		0.162	0.475	0.113	.227
S6	Struggle is a normal part of working on math.		**0.575**		0.255	0.592	0.067	.358
S7	People in my peer group struggle sometimes with math.		**0.612**	-0.111	0.235	0.614	0.024	.389
S8	People who are good at math may fail a hard math test.		**0.592**		0.122	0.575	0.158	.341
S9	Math teachers are sometimes stumped by a math problem.[a]		0.395		0.153	0.404	0.094	.164
S10	When someone struggles in math, it doesn't mean they have done something wrong.[b]		0.309		0.121	0.318	0.096	.103
S11	Making mistakes is necessary to get good at math.[b]	0.103	**0.533**	0.186	0.338	0.601	0.318	.414

Note. Pattern coefficients given in boldface have values of .40 or greater and signify items loading primarily with that factor. Pattern coefficients less than .10 were suppressed. h^2 represents the communality of the measured variables.
[a]Item was reworded in EFA2.

Table 3 Continued.

Standardized Factor Pattern Coefficients, Structure Coefficients, and Communalities for the Four Factor Principal-axis Factor Analysis of the Mathematical Resilience scale, EFA2.

Item No.	Item	Pattern Coefficients			Structure Coefficients			h^2
		Value	Struggle	Growth	Value	Struggle	Growth	
G1	Everyone can get better at math.[a]	0.195	0.228	**0.523**	0.437	0.389	0.627	.502
G2	Math can be learned by anyone.	0.171	0.207	**0.469**	0.390	0.350	0.562	.403
G3	If someone is not a math person, they won't be able to learn much math.			**0.618**	0.222	0.131	0.627	.393
G4	If someone is not good at math, there is nothing that can be done to change that.	0.121		**0.681**	0.368	0.254	0.736	.568
G5	People are either good at math or they aren't.	0.134	-0.232	**0.563**	0.239	-0.084	0.563	.369
G6	Everyone's math ability is determined at birth.[a]			**0.561**	0.159	0.185	0.562	.325
G7	Some people cannot learn math.	0.126	-0.176	**0.538**	0.241	-0.035	0.546	.331
G8	Only smart people can do math.		0.163	**0.604**	0.151	0.243	0.603	.390

Note. Pattern coefficients given in boldface have values of .40 or greater and signify items loading primarily with that factor. Pattern coefficients less than .10 were suppressed. h^2 represents the communality of the measured variables.

[a]Item was reworded in EFA2.

[b]Item is new in EFA2.

Table 4.

Pattern matrix for the three factor confirmatory factor analysis of the mathematical resilience scale.

Item No.	Item	Value	Struggle	Growth
		Pattern Matrix		
V1	Math is essential for my future.	0.914	0	0
V2	Math will be useful to me in my life's work.	0.933	0	0
V3	Math courses are very helpful no matter what I decide to study.	0.807	0	0
V4	Knowing math contributes greatly to achieving my goals.	0.914	0	0
V5	Having a solid knowledge of math helps me understand more complex topics in my field of study.	0.811	0	0
V7	Thinking mathematically can help me with things that matter to me.	0.764	0	0
V8	It would be difficult to succeed in life without math.	0.685	0	0
V9	Math develops good thinking skills that are necessary to succeed in any career.	0.697	0	0
S1	Everyone struggles with math at some point.	0	0.511	0
S3	Good mathematicians experience difficulties when solving problems.	0	0.517	0
S4	People who work in math related fields sometimes find math challenging.**	0	0.452	0
S5	Everyone makes mistakes at times when doing math.	0	0.418	0
S6	Struggle is a normal part of working on math.	0	0.663	0
S7	People in my peer group struggle sometimes with math.	0	0.389	0
S10	When someone struggles in math, it doesn't mean they have done something wrong.	0	0.356	0
S11	Making mistakes is necessary to get good at math.	0	0.632	0
G2	Math can be learned by anyone.	0	0	0.586
G3	If someone is not a math person, they won't be able to learn much math.	0	0	0.747
G4	If someone is not good at math, there is nothing that can be done to change that.	0	0	0.721
G5	People are either good at math or they aren't.	0	0	0.608
G6	Everyone's math ability is determined at birth.**	0	0	0.554
G7	Some people cannot learn math.	0	0	0.667
G8	Only smart people can do math.	0	0	0.612

Note. Pattern coefficients given in boldface have values of .40 or greater and signify items loading primarily with that factor. Pattern coefficients less than .10 were suppressed. h^2 represents the communality of the measured variables.
[a]Item was reworded in EFA2.
[b]Item is new in EFA2.

Table 5

Scale Means and Standard Deviations

Demographic Group	N	Value M (SD)	Struggle M (SD)	Growth M (SD)
Gender				
Male	231	4.90 (1.28)	5.44 (.76)	4.79 (1.02)
Female	339	4.86 (1.36)	5.44 (.73)	4.74 (1.09)
Major				
STEM majors	159	5.39 (1.16)	5.56 (.75)	4.82 (1.09)
Non-STEM majors	420	4.67 (1.34)	5.39 (.73)	4.73 (1.05)
Highest Math Course				
Calculus or higher	371	5.08 (1.26)	5.46 (.74)	4.84 (1.04)
Lower than Calculus	208	4.48 (1.37)	5.40 (.74)	4.61 (1.07)
Self Reported Knowledge of Math				
High	348	5.28 (1.10)	5.46 (.72)	4.96 (.98)
Low	231	4.25 (1.41)	5.40 (.77)	4.45 (1.10)
Race				
White	434	4.81 (1.36)	5.42 (.72)	4.79 (1.05)
All other	145	5.03 (1.22)	5.49 (.80)	4.65 (1.07)