Appendix A: Correlations between reported experiences/beliefs (item/factor scores)

Item/factor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) Self-concept	1																
(2) Self-efficacy	.547	1															
(3) Mastery experiences (current grade)	.488	.626	1														
(4) Mastery norms (what is a good grade)	P5.065	.309	.291	1													
(5) Subject-comparison	.495	.391	.321	N.026	1												
(6) Peer-comparison	.494	.379	.314	N.039	.625	1											
(7) Anxiety (absence of)	.548	.416	.360	N.035	.666	.666	1										
(8) Praise (social persuasions)	.592	.401	.383	N.045	.343	.359	.391	1									
(9) Vicarious experiences	.354	.300	.222	P5.053	.198	.221	.235	.415	1								
(10) Interest value	.624	.471	.430	P1.086	.441	.345	.452	.569	.381	1							
(11) Utility value	.491	.398	.339	.099	.298	.230	.250	.450	.341	.717	1						
(12) Personal value	.480	.374	.343	.097	.309	.268	.285	.483	.320	.655	.717	1					
(13) Cost value (absence of)	N.012	N-.020	N-.051	N-.035	.158	.141	.211	N-.047	-.096	-.127	-.270	-.287	1				
(14) Teacher perceptions	.410	.235	.242	N.048	.246	.213	.305	.507	.293	.606	.488	.423	P1-.085	1			
(15) Gender (1=male)	.195	.289	.268	.149	.221	.171	.265	.152	.120	.205	.109	.200	N.022	P1.081	1		
(16) Task score	.341	.436	.507	.145	.265	.230	.306	.271	.169	.350	.240	.213	N.017	.237	.191	1	
(17) Task confidence	.557	.526	.524	.166	.376	.356	.457	.411	.289	.530	.410	.417	N-.023	.357	.351	.521	1
(18) Task confidence bias	.132	N-.002	P5-.063	N-.009	P5.061	P1.080	P1.085	P1.085	P1.084	.113	.120	.161	N-.039	P1.078	.102	-.634	.329

Notes: Correlations (Pearson R coefficients) were all significant at p < .001, except when highlighted with superscript indicators: P1 significance at p < .01 only; P5 significance at p < .05 only; N over p < .05 (not significant).

Appendix B: Mediators of the predictive association between students' reported grades and self-concept or self-efficacy beliefs

Conceptually, 'meditators' explain or account for the relation between a factor and an outcome: the factor predicts the mediator, which in turn predicts the outcome, thereby reducing the direct effect from the factor to the outcome (Baron & Kenny, 1986). Sobel tests (Sobel, 1982) have been established as reliably identifying when mediation occurs (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), and these confirmed that all the items/factors, with the exceptions of mastery norms and gender, individually mediated the predictive association between students' mastery experiences (current grades) and their self-concept or self-efficacy beliefs.

	Current grade → Self-concept			Current grade → Self-efficacy		
Mediator	Sobel sig. (p)	Proportion of total effect mediated	Ratio of indirect to direct effect	Sobel sig. (p)	Proportion of total effect mediated	Ratio of indirect to direct effect
Mastery norms (what is a good grade)	**.018**	-.010	-.010	.152	.022	.023
Subject-comparison	**<.001**	.229	.297	**<.001**	.149	.175
Peer-comparison	**<.001**	.221	.284	**<.001**	.142	.166
Anxiety (absence of)	**<.001**	.313	.455	**<.001**	.179	.217
Praise (social persuasions)	**<.001**	.362	.567	**<.001**	.180	.220
Vicarious experiences	**.007**	.110	.123	**<.001**	.069	.075
Interest value	**<.001**	.417	.714	**<.001**	.233	.304
Utility value	**<.001**	.239	.315	**<.001**	.167	.201
Personal value	**<.001**	.199	.249	**<.001**	.124	.142
Cost value (absence of)	**<.001**	<.001	<.001	**<.001**	<.001	<.001
Teacher perceptions	**<.001**	.149	.175	**<.001**	.058	.061
Gender (1=male)	.262	.021	.022	**.043**	.018	.019
Self-efficacy / self-concept	**<.001**	.432	.760	**<.001**	.398	.662

Notes: Sobel tests considered the various coefficients and standard errors within three predictive models in order to determine whether mediation significantly occurred: (1) grade → mediator; (2) mediator and grade → self-concept (or self-efficacy); (3) grade → self-concept (or self-efficacy).

References

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Appendix C: Science items/factors predicting students' science self-concept beliefs (with self-efficacy)

	Step 1				Step 2				Step 3				Step 4			
Item/factor	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect
Constant/intercept	**1.10**	**.14**	**<.001**	**NA**	**1.53**	**.16**	**<.001**	**NA**	**.88**	**.16**	**<.001**	**NA**	**-.19**	**.18**	**.308**	**NA**
Self-efficacy	**.45**	**.03**	**<.001**	**.964**	**.47**	**.03**	**<.001**	**1.003**	**.35**	**.03**	**<.001**	**.756**	**.21**	**.03**	**<.001**	**.441**
Mastery experiences (current grade)	**.21**	**.02**	**<.001**	**.622**	**.21**	**.02**	**<.001**	**.621**	**.17**	**.02**	**<.001**	**.499**	**.12**	**.02**	**<.001**	**.355**
Mastery norms (what is a good grade)					**-.12**	**.03**	**<.001**	**-.218**	**-.07**	**.02**	**.004**	**-.134**	**-.05**	**.02**	**.024**	**-.096**
Subject-comparison									**.13**	**.02**	**<.001**	**.373**	.03	.02	.083	.099
Peer-comparison									**.14**	**.02**	**<.001**	**.350**	**.06**	**.02**	**.011**	**.142**
Anxiety (absence of)													**.10**	**.03**	**<.001**	**.232**
Praise (social persuasions)													**.20**	**.02**	**<.001**	**.432**
Vicarious experiences													.02	.02	.382	.039
Interest value													**.13**	**.03**	**<.001**	**.298**
Utility value													**.09**	**.03**	**.006**	**.188**
Personal value													.01	.02	.598	.032
Cost value (absence of)													.02	.02	.232	.052
Teacher perceptions													**.06**	**.03**	**.030**	**.112**
Gender (1=male)													.07	.05	.175	.061
Explained variance	38.4%				39.9%				49.7%				64.4%			
Unexplained variance, school level	3.1%				2.3%				1.7%				1.8%			
Unexplained variance, residual	58.5%				57.8%				48.7%				33.8%			

Notes: Estimated coefficients (Est.), standard errors (SE), significance (p-values; Sig.), and effect sizes (Effect) are shown. Items/factors used 1-6 scales unless otherwise indicated. Significant predictors (p < .05 or below) have been highlighted in bold for clarity. Unexplained variance at the residual level can be assumed to reflect the student level.

Appendix D: Science items/factors predicting students' science self-efficacy beliefs (with self-concept)

	Step 1				Step 2				Step 3				Step 4			
Item/factor	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect
Constant/intercept	**2.31**	**.13**	**<.001**	**NA**	**1.66**	**.16**	**<.001**	**NA**	**1.42**	**.18**	**<.001**	**NA**	**1.44**	**.21**	**<.001**	**NA**
Self-concept	**.38**	**.02**	**<.001**	**.713**	**.39**	**.02**	**<.001**	**.728**	**.33**	**.03**	**<.001**	**.622**	**.27**	**.04**	**<.001**	**.512**
Mastery experiences (current grade)	**.21**	**.02**	**<.001**	**.582**	**.20**	**.02**	**<.001**	**.557**	**.17**	**.02**	**<.001**	**.482**	**.15**	**.02**	**<.001**	**.420**
Mastery norms (what is a good grade)					**.15**	**.02**	**<.001**	**.258**	**.14**	**.02**	**<.001**	**.238**	**.13**	**.03**	**<.001**	**.219**
Subject-comparison													.04	.02	.106	.099
Peer-comparison													**.07**	**.03**	**.012**	**.151**
Anxiety (absence of)									**.08**	**.02**	**<.001**	**.174**	-.01	.03	.836	-.014
Praise (social persuasions)									.03	.03	.303	.054	.04	.03	.208	.074
Vicarious experiences									**.04**	**.02**	**.039**	**.091**	.01	.02	.494	.032
Interest value													.06	.04	.133	.119
Utility value													**.12**	**.04**	**.001**	**.239**
Personal value													-.02	.03	.462	-.047
Cost value (absence of)													.02	.02	.366	.042
Teacher perceptions													**-.10**	**.03**	**.002**	**-.174**
Gender (1=male)													**.12**	**.06**	**.032**	**.104**
Explained variance	45.8%				48.6%				50.2%				52.1%			
Unexplained variance, school level	5.5%				4.2%				4.4%				4.0%			
Unexplained variance, residual	48.7%				47.2%				45.4%				43.9%			

Notes: Estimated coefficients (Est.), standard errors (SE), significance (p-values; Sig.), and effect sizes (Effect) are shown. Items/factors used 1-6 scales unless otherwise indicated. Significant predictors (p < .05 or below) have been highlighted in bold for clarity. Unexplained variance at the residual level can be assumed to reflect the student level.

Appendix E: Science items/factors predicting students' science self-concept beliefs across confidence bias groups (with self-efficacy)

	Under-confident (U)				Accurate (A)				Over-confident (O)			
Item/factor	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect
Constant/intercept	.24	.31	.446	NA	.14	.27	.600	NA	-.09	.31	.775	NA
Self-efficacy	[UO] **.10**	**.05**	**.042**	**.217**	**.19**	**.04**	**<.001**	**.408**	[UO] **.26**	**.05**	**<.001**	**.550**
Mastery experiences (current grade)	**.13**	**.04**	**<.001**	**.363**	**.13**	**.03**	**<.001**	**.404**	**.10**	**.03**	**.002**	**.306**
Mastery norms (what is a good grade)	**-.08**	**.04**	**.050**	**-.151**	**-.10**	**.04**	**.006**	**-.175**	-.04	.04	.331	-.077
Subject-comparison	[UA] **.13**	**.04**	**.001**	**.369**	[UA] -.01	.03	.620	-.041	.04	.04	.345	.101
Peer-comparison	**.09**	**.04**	**.015**	**.243**	**.07**	**.03**	**.038**	**.174**	-.02	.05	.720	-.039
Anxiety (absence of)	**.14**	**.05**	**.006**	**.312**	**.13**	**.04**	**.001**	**.303**	.02	.05	.756	.036
Social persuasions	**.18**	**.05**	**<.001**	**.386**	**.20**	**.03**	**<.001**	**.433**	**.16**	**.05**	**.001**	**.342**
Vicarious experiences	.02	.04	.609	.044	.01	.03	.682	.025	.04	.04	.267	.100
Interest value	.12	.07	.089	.277	**.14**	**.05**	**.002**	**.327**	**.16**	**.06**	**.005**	**.366**
Utility value	.02	.06	.712	.050	.04	.04	.327	.095	**.20**	**.06**	**.002**	**.406**
Personal value	.05	.04	.214	.144	-.01	.03	.865	-.014	-.03	.04	.561	-.067
Cost value (absence of)	.00	.03	.963	.004	.05	.03	.056	.122	.02	.04	.618	.044
Teacher perceptions	.01	.05	.790	.026	.06	.04	.139	.111	.08	.05	.127	.154
Gender (1=male)	[UA] -.14	.09	.149	-.128	[UA] .09	.07	.205	.084	.03	.09	.763	.023
Explained variance	62.7%				61.9%				71.3%			
Unexplained variance, school level	1.2%				3.7%				.5%			
Unexplained variance, residual	36.1%				34.4%				28.3%			

Notes: Estimated coefficients (Est.), standard errors (SE), significance (p-values; Sig.), and effect sizes (Effect) are shown. Items/factors used 1-6 scales unless otherwise indicated. Significant predictors (p < .05 or below) have been highlighted in bold for clarity. Unexplained variance at the residual level can be assumed to reflect the student level. Significant differences (p < .05 or below) in coefficient magnitudes across groups (from separate interaction/moderation models for the various pairs of groups) have been highlighted in superscript.

Appendix F: Science items/factors predicting students' science self-efficacy beliefs across confidence bias groups (with self-concept)

	Under-confident (U)				Accurate (A)				Over-confident (O)			
Item/factor	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect	Est.	SE	Sig.	Effect
Constant/intercept	**1.24**	**.38**	**.001**	**NA**	**1.70**	**.30**	**<.001**	**NA**	**.89**	**.39**	**.025**	**NA**
Self-concept	UO **.16**	**.07**	**.029**	**.286**	**.25**	**.05**	**<.001**	**.468**	UO **.41**	**.07**	**<.001**	**.773**
Mastery experiences (current grade)	**.20**	**.04**	**<.001**	**.522**	**.19**	**.03**	**<.001**	**.557**	**.10**	**.04**	**.016**	**.285**
Mastery norms (what is a good grade)	.09	.05	.083	.148	**.10**	**.04**	**.016**	**.166**	**.19**	**.05**	**<.001**	**.360**
Subject-comparison	UA **.14**	**.05**	**.003**	**.360**	UA .02	.03	.612	.045	.01	.05	.895	.016
Peer-comparison	.08	.05	.073	.198	.05	.04	.167	.125	.06	.06	.277	.136
Anxiety (absence of)	-.07	.06	.250	-.146	.00	.05	.996	<.001	.05	.06	.409	.108
Social persuasions	.00	.06	.951	-.007	.07	.04	.095	.141	.05	.06	.397	.104
Vicarious experiences	.06	.04	.184	.127	.04	.03	.233	.080	-.05	.05	.263	-.115
Interest value	.04	.08	.657	.080	.00	.05	.949	-.007	.09	.07	.217	.183
Utility value	.11	.07	.121	.231	**.11**	**.05**	**.027**	**.230**	.10	.08	.193	.193
Personal value	UA UO .10	.05	.058	.242	UA -.02	.04	.485	-.064	UO -.07	.05	.178	-.180
Cost value (absence of)	.02	.04	.648	.039	.01	.03	.732	.023	.05	.04	.283	.107
Teacher perceptions	-.06	.07	.379	-.097	**-.09**	**.05**	**.043**	**-.162**	-.12	.06	.064	-.213
Gender (1=male)	.09	.12	.448	.076	**.19**	**.08**	**.020**	**.166**	.14	.11	.214	.110
Explained variance	50.8%				49.7%				59.2%			
Unexplained variance, school level	3.3%				3.6%				3.8%			
Unexplained variance, residual	45.9%				46.7%				37.0%			

Notes: Estimated coefficients (Est.), standard errors (SE), significance (p-values; Sig.), and effect sizes (Effect) are shown. Items/factors used 1-6 scales unless otherwise indicated. Significant predictors (p < .05 or below) have been highlighted in bold for clarity. Unexplained variance at the residual level can be assumed to reflect the student level. Significant differences (p < .05 or below) in coefficient magnitudes across groups (from separate interaction/moderation models for the various pairs of groups) have been highlighted in superscript.