PRESENTER:

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INTRO:

- Raising students' **self-efficacy** improves academic success.
- Extant **interventions** are time-intensive, discipline-specific, and hard to scale.
- **Can we develop a *practical, scalable* intervention to improve university physics students' STEM self-efficacy?**

METHODS:

- Developed a 30-minute **in-class intervention** to enhance self-efficacy by teaching growth mindset and strategies enhancing academic agency.
- **Developed and validated a questionnaire** with 34 Likert items to assess STEM self-efficacy, growth mindset, and perceived academic control.
- Conducted **a quasi-experimental study** at three universities over three semesters (total ***N* = 853**) testing whether intervention increased self-efficacy, growth mindset, and/or perceived academic control more than a control treatment.

RESULTS:

- HLM shows the intervention **increased self-reported growth mindset** more than control (0.12σ, $p = 0.005$).
- The intervention **did *not* affect self-efficacy**, perceived academic control, or course grade to a statistically significant degree ($p > 0.05$).
- **Measuring psychosocial/ affect variables is hard!**

DISCUSSION:

- We may have failed to detect an increase in self-efficacy,
- or self-reported growth mindset may not be reliable,
- or self-efficacy increase may take time (e.g., cycles of perseverance and success).

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A brief in-class intervention increased growth mindset in university physics students, but *not* their STEM self-efficacy.

Take a picture to see the full abstract and download the paper.

Improving STEM self-efficacy with a scalable classroom intervention targeting growth mindset and success attribution

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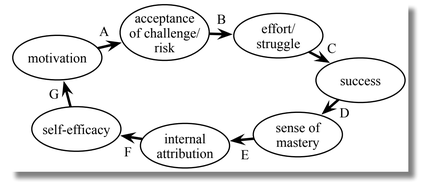
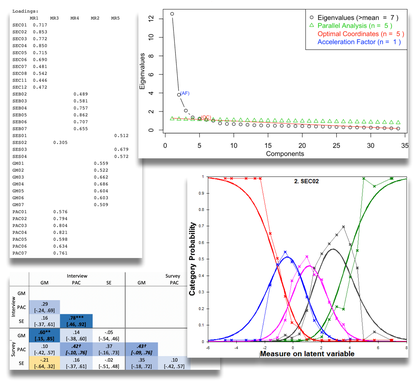


Students completing pre-test, treatment, and post-test:

	UNCG		NCA&T		NCSU	total
	Alg	*Calc*	*Alg*	*Calc*	*Calc*	
Fall 2017	83	—	83	99	—	265
Spring 2018	56	29	31	85	—	201
Fall 2018	5	—	83	93	206	387
total	144	29	197	277	206	853

Instrument validated via EFA, Rasch model & MTMM:



HLM results for pre → post change in **growth mindset**:

Predictor	Value	Std.Error	DF	t-value	p-value	sig	Beta
<fctr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<chr>	<dbl>
(Intercept)	0.169	0.060	816	2.828	0.005	*	0.116
Treat	0.311	0.079	816	3.955	0.000	*	0.213
Cour	-0.088	0.064	25	-1.379	0.180		-0.060
Ins1	-0.026	0.120	25	-0.219	0.829		-0.018
Ins2	0.172	0.125	25	1.379	0.180		0.118
Sem1	0.031	0.079	25	0.388	0.701		0.021
Sem2	-0.135	0.092	25	-1.478	0.152		-0.093
Treat:Cour	0.030	0.075	816	0.404	0.686		0.021
Treat:Ins1	0.221	0.150	816	1.477	0.140		0.152
Treat:Ins2	-0.129	0.152	816	-0.847	0.397		-0.088
Treat:Sem1	-0.203	0.097	816	-2.093	0.037	*	-0.139
Treat:Sem2	0.057	0.107	816	0.533	0.594		0.039

HLM results for pre → post change in **self-efficacy**:

Predictor	Value	Std.Error	DF	t-value	p-value	sig	Beta
<fctr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<chr>	<dbl>
(Intercept)	0.141	0.062	831	2.295	0.022	*	0.107
Treat	-0.007	0.080	831	-0.081	0.935		-0.005
Cour	0.074	0.062	25	1.192	0.244		0.056
Ins1	0.069	0.120	25	0.574	0.571		0.052
Ins2	0.046	0.124	25	0.367	0.716		0.034
Sem1	0.161	0.079	25	2.052	0.051		0.122
Sem2	-0.141	0.089	25	-1.576	0.128		-0.107
Treat:Cour	0.010	0.075	831	0.129	0.898		0.007
Treat:Ins1	0.091	0.151	831	0.601	0.548		0.069
Treat:Ins2	-0.145	0.153	831	-0.950	0.342		-0.110
Treat:Sem1	-0.084	0.097	831	-0.867	0.386		-0.063
Treat:Sem2	-0.041	0.106	831	-0.383	0.702		-0.031

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