Supplemental Material

Table S1

Academic Backgrounds of Participants

Characteristic	*n*	Total M (*SD*)	*n*	Metacognition M (*SD*)	*n*	Metacognition+TM M (*SD*)
ACT composite score[a]	233	27.3 (*SD* = 4.1)	123	27.9 (*SD* = 3.9)	110	26.6 (*SD* = 4.1)
Beginning-of-term cumulative GPA[b]	212	3.24 (*SD* = 0.46)	116	3.22 *(SD* = 0.47)	96	3.25 (*SD* = 0.44)

a. Includes students in the sample who had submitted standardized test scores during the admissions process.
b. Graded on a 4.0 scale; available for all but newly admitted or transfer students. In subsequent analyses, missing data were handled using a maximum likelihood estimation method.

Table S2

Table of Measurement Invariance Using Three Measurement Invariance Steps: (1) Configural, Equivalence of Model Form; (2) Metric, Equivalence of Factor Loadings; and (3) Scalar, Equivalence of Item Intercepts Reported as Chi-square Values (df)

	Configural	Metric	Scalar
Self-Efficacy for Self-Regulated Learning	174.05 (64)	181.30 (73)	194.15 (82)
Goal Commitment	35.37 (22)	38.99 (27)	44.85 (32)
Motivational Regulation	86.29 (40)	90.04 (47)	100.63 (54)
Procrastination	102.75 (50)	104.54 (57)	111.1 (64)
Metacognitive Strategies	80.40 (50)	87.91 (57)	91.41 (64)
Time Management Strategies	410.51 (232)	420.84 (247)	438.40 (262)

Note. Measurement invariance was tested using a multi-group CFA. Measurement invariance was tenable for nearly all constructs as all constructs displayed scalar invariance, except metacognitive strategies and time management. Self-efficacy for self-regulated learning displayed scalar invariance; there was no significant difference between the configural model and metric model ($\chi2$ (9) = 7.25, p = .61) and no significant difference between the metric model and scalar model ($\chi2$ (9) = 12.85, p = .17). Goal commitment displayed scalar invariance; there was no significant difference between the configural model and metric model ($\chi2$ (5) = 3.62, p = .61) and no significant difference between the metric model and scalar model ($\chi2$ (5) = 5.86, p = .32). Motivational regulation displayed scalar invariance; there was no significant difference between the configural model and metric model ($\chi2$ (7) = 3.75, p = .80) and no significant difference between the metric model and scalar model ($\chi2$ (7) = 10.59, p = .16). Procrastination displayed scalar invariance; there was no significant difference between the configural model and metric model ($\chi2$ (7) = 1.79, p = .97) and no significant difference between the metric model and scalar model ($\chi2$ (7) = 6.56, p = .48).

After deleting an item, metacognitive strategies displayed scalar invariance; there was no significant difference between the configural model and metric model ($\chi2$ (7) = 7.51, p = .38) and no significant difference between the metric model and scalar model ($\chi2$ (7) = 3.5, p = .84). After deleting an item, time management strategies displayed scalar invariance; there was no significant difference between the configural model and metric model ($\chi2$ (15) = 10.34, p = .80) and no significant difference between the metric model and scalar model ($\chi2$ (15) = 17.56, p = .29).

Table S3

Bivariate Correlations Between Survey Measures for Pre/Post-Intervention Assessment (on Diagonal), Pre-Intervention Assessment (Below Diagonal), and Post-Intervention Assessment (Above Diagonal)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	Exam 2	Exam 3	Booster
1. Incremental	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2. Entity	.70***	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Self-Efficacy for Self-Regulated Learning	.30***	.16*	**.60***	.35***	.34***	.63***	.47***	.50***	-.37***	-.17**	.63***	.32***	.16*	.26***	.16*
4. Institutional Commitment	.10	.16*	.25***	**.70***	.55***	.15*	.09	.11	-.14*	-.24***	.14*	.05	.13*	.18**	.07
5. Degree Commitment	.10	.12	.30***	.42***	**.33***	.26***	.18**	.21**	-.11	-.34***	.20**	.20**	.14*	.20**	.13*
6. Motivational Regulation	.26***	.03	.65***	.23***	.14*	**.67***	.52***	.71***	-.32***	-.14*	.67***	.18**	.20**	.23**	.17**
7. Planning	.18**	.08	.53***	.16**	.20**	.43***	**.46***	.58***	-.18**	-.22***	.78***	.48***	.04	.14*	.17**
8. Monitoring and Evaluating	.26***	.04	.64***	.20**	.18**	.59***	.47***	**.55***	-.22***	-.10	.68***	.30***	.17**	.27***	.17**
9. Postponement	-.05	-.26***	-.29***	-.21**	-.03	-.39***	-.23***	-.24***	**.70***	.52***	-.40***	-.02	-.13*	-.13*	-.13*
10. Missed Deadlines	.04	-.24***	-.18**	-.22**	-.20**	-.17**	-.18**	-.07	.46***	**.55***	-.26***	-.11	-.14*	-.18**	-.23***
11. Intentional Time Use	.28***	.14*	.61***	.22**	.21**	.54***	.70***	.57***	-.45***	-.25***	**.65***	.52***	.05	.14*	.16*
12. Time Management Tools	.14*	.15*	.28***	.15*	.22***	.15*	.45***	.15*	-.09	-.15*	.41***	**.64***	.07	.03	.15*
Exam 1	.13*	.12	.26***	.02	.11	.22**	.13*	.23***	-.17**	-.19**	.13*	-.01	**.78***	**.76***	--

Note. The diagonal (bold) displays the correlations between the pre- and post-intervention scores. Correlations between variables assessed prior to the intervention are listed below the diagonal, whereas correlations between variables assessed after the intervention are listed above the diagonal. Incremental and entity beliefs were used as covariates, based on the pre-intervention survey. Booster assignments were a follow-up to the intervention and were optionally completed by students during the second two-thirds of the course. *** p < .001, ** p < .01, * p < .05

Table S4

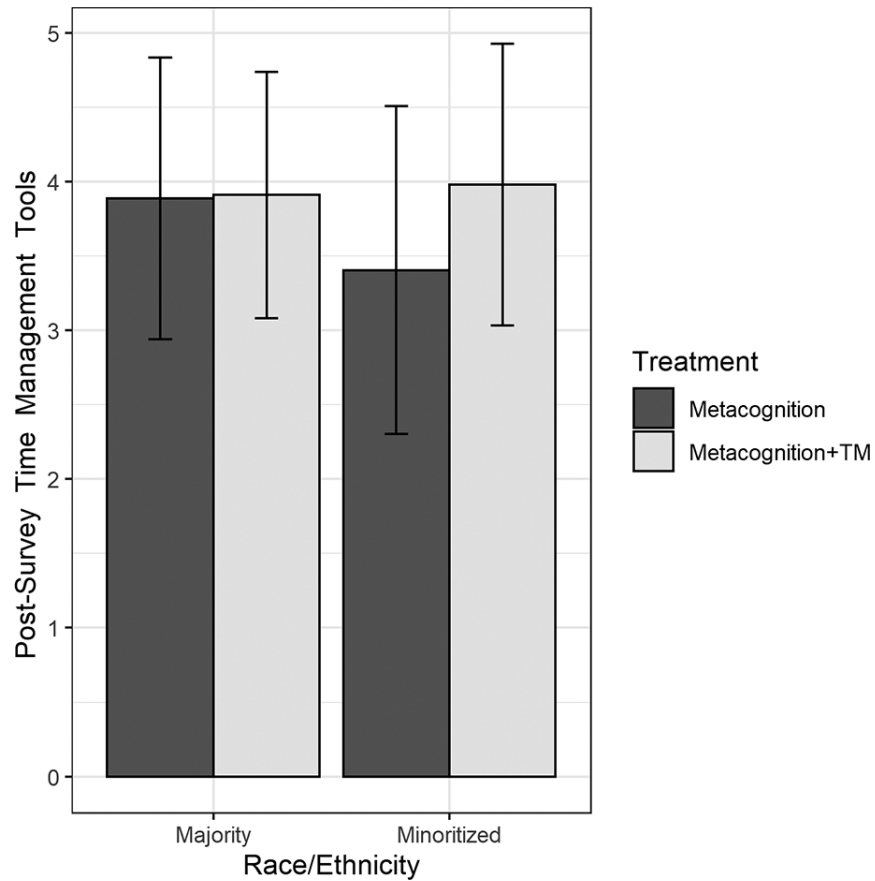*Raw Mean (SD) Pre-Intervention and Post-Intervention Scores for Each Measure, Based on Intervention Group*

Measure	Metacognition Workshop (n = 133)		Metacognition+TM Workshop (n = 116)	
	Pre-intervention M (*SD*)	Post-intervention M (*SD*)	Pre-intervention M (*SD*)	Post-intervention M (*SD*)
Incremental Beliefs[a]	3.51 (0.87)	--	3.41 (0.74)	--
Entity Beliefs[a]	2.51 (0.96)	--	2.78 (0.94)	--
Self-efficacy for Self-Regulated Learning	3.71 (0.62)	3.72 (0.69)	3.62 (0.69)	3.79 (0.68)
Institutional Commitment	4.47 (0.62)	4.44 (0.70)	4.38 (0.66)	4.42 (0.63)
Degree Commitment	4.73 (0.56)	4.70 (0.60)	4.66 (0.57)	4.75 (0.49)
Motivational Regulation	3.53 (0.58)	3.60 (0.64)	3.43 (0.57)	3.56 (0.58)
Planning	3.79 (0.70)	3.78 (0.79)	3.59 (0.71)	3.74 (0.64)
Monitoring and Evaluating	3.48 (0.65)	3.61 (0.66)	3.48 (0.61)	3.67 (0.61)
Postponement[b]	2.90 (0.92)	2.98 (0.91)	3.04 (0.80)	3.08 (0.80)
Missed Deadlines[b]	1.85 (0.88)	2.03 (1.12)	2.03 (0.87)	1.92 (0.91)
Intentional Time Use	3.62 (0.55)	3.65 (0.60)	3.51 (0.54)	3.64 (0.51)
Time Management Tools	3.78 (1.08)	3.84 (0.98)	3.79 (0.94)	3.89 (0.86)
Exam 1	72.47 (14.59)	--	69.20 (15.61)	--
Exam 2	--	79.62 (13.01)	--	79.09 (12.68)
Exam 3	--	77.24 (14.83)	--	78.10 (15.64)

a. Incremental and entity beliefs were covariates used to control for students' beliefs about their capacity to change.
b. For the procrastination factors—postponement and missed deadlines—a decrease reflects improvement
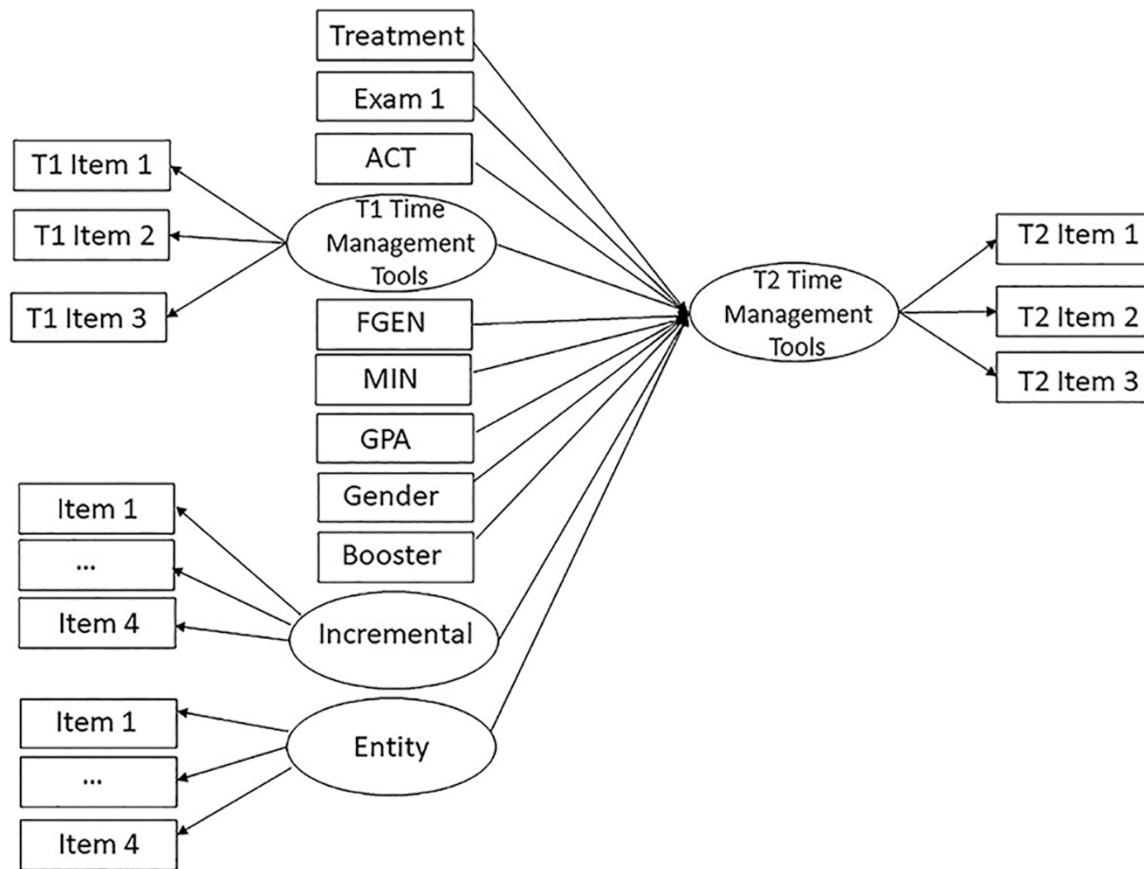
Supplemental Figure 1. Example of SEM model for the use of time management tools. Given the limited sample size, each distinct factor was modeled in its own separate SEM model. In this example of the model used for time management tools, T1 refers to the pre-intervention survey and T2 to the post-intervention survey. Latent factors are drawn as ovals, and the three items for time management tools are rectangles labeled T1 Item 1, T1 Item 2, and T1 item 3 for the pre-survey, and similarly for the post-survey. Covariates included Exam 1 score, ACT score, first-generation status (FGEN), status as a student from minoritized group (MIN), GPA, and gender. The analyses also controlled for incremental and entity beliefs about intelligence measured on the pre-intervention survey, to account for the degree to which students might expect their intelligence to be able to change, as well as booster assignment completion, to account for students' level of ongoing engagement with intervention content.

Supplemental Figure 2. Mean (+/- 1SD) post-intervention survey time management tools scale raw scores for students from majority and minoritized groups in the Metacognition and Metacognition+TM treatment groups, indicating higher average post-intervention scores for students from minoritized groups in the Metacognition+TM treatment than those in the Metacognition treatment. While this plot visualizes the interaction of treatment and race/ethnicity, it does not account for any of the covariates in our SEM model. This is a simplified breakdown of time management tools scores by treatment and race/ethnicity.