

Electronic Supplementary Material: Extensive Tables

Table S1

The Comparison of Low- and High-Performing Students' Absolute Monitoring/Regulation Accuracy Before Self-Scoring (RQ 1A and 1B)

	Absolute monitoring accuracy before self-scoring				Absolute regulation accuracy before self-scoring			
	Multiplication, $n = 597$		Division, $n = 405$		Multiplication, $n = 590$		Division, $n = 374$	
	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	1.21 (0.05)***	1.67 (0.10)***	0.89 (0.06)***	1.04 (0.10)***	0.50 (0.03)***	0.63 (0.04)***	0.23 (0.03)***	0.30 (0.04)***
Low/high ^a		-0.84 (0.12)***		-0.30 (0.11)**		-0.26 (0.05)***		-0.03 (0.05)
Random effects								
σ^2_e (day)	1.29 (0.19)***	1.24 (0.18)***	0.59 (0.06)***	0.59 (0.06)***	0.34 (0.03)***	0.34 (0.03)***	0.13 (0.02)***	0.13 (0.02)***
σ^2_{u0} (student)	0.16 (0.09)	0.04 (0.09)	0.16 (0.08)*	0.14 (0.07)*	0.09 (0.02)***	0.07 (0.02)**	0.07 (0.02)**	0.07 (0.02)**

Note. ^a 0 = low-performing students; 1 = high-performing students

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S2

The Effect of Self-Scoring on Absolute Monitoring/Regulation Accuracy, Within the Whole Sample (RQ 2A and 2B)

	Absolute monitoring Accuracy				Absolute regulation Accuracy			
	Multiplication, $N = 1958$		Division, $N = 1389$		Multiplication, $N = 1927$		Division, $N = 1362$	
	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	0.70 (0.02)***	1.23 (0.04)***	0.54 (0.03)***	0.95 (0.05)***	0.53 (0.02)***	0.61 (0.02)***	0.40 (0.03)***	0.43 (0.03)***
Self-Scoring ^a		-1.08 (0.04)***		-0.84 (0.05)***		-0.17 (0.02)***		-0.08 (0.02)***
Random effects								
σ^2_e (self-scoring)	1.10 (0.06)***	0.73 (0.06)***	0.68 (0.05)***	0.46 (0.03)***	0.21 (0.02)***	0.20 (0.02)***	0.16 (0.01)***	0.15 (0.01)***
σ^2_{u0} (day)	0.00 (0.09) ^b	0.01 (0.03)	0.00 (0.10) ^c	0.01 (0.02)	0.15 (0.02)***	0.16 (0.02)***	0.19 (0.03)***	0.19 (0.03)***
σ^2_{v0} (student)	0.00 (0.05) ^b	0.07 (0.03)*	0.00 (0.05) ^c	0.04 (0.02)*	0.08 (0.02)***	0.08 (0.02)***	0.05 (0.02)*	0.05 (0.02)*

Note. ^a 0 = before self-scoring, 1 = after self-scoring; Unrounded values: ^b $\sigma^2_{u0} = 0.004$, $\sigma^2_{v0} = 0.004$; ^c $\sigma^2_{u0} = 0.002$, $\sigma^2_{v0} = 0.003$.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S3

The Effect of Self-Scoring on Absolute Monitoring/Regulation Accuracy, Within Low-Performing Students (RQ 2A and 2B)

	Absolute monitoring Accuracy				Absolute regulation Accuracy			
	Multiplication, $n = 535$		Division, $n = 386$		Multiplication, $n = 549$		Division, $n = 378$	
	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	0.90 (0.05)***	1.58 (0.10) ***	0.59 (0.05)***	1.04 (0.10)***	0.56 (0.03)***	0.63 (0.04)***	0.28 (0.05)***	0.31 (0.05)***
Self-Scoring ^a		-1.37 (0.08)***		-0.93 (0.12)***		-0.16 (0.04)***		-0.05 (0.03)
Random effects								
σ^2_e (self-scoring)	1.456 (0.11)***	0.86 (0.09)***	0.77 (0.10)***	0.50 (0.06)***	0.25 (0.03)***	0.24 (0.03)***	0.06 (0.01)*** ^d	0.06 (0.01)*** ^e
σ^2_{u0} (day)	0.01 (0.24)	0.08 (0.08)	0.00 (0.02) ^b	0.00 (0.04) ^c	0.15 (0.04)**	0.16 (0.04)***	0.11 (0.04)** ^d	0.11 (0.04) ** ^e
σ^2_{v0} (student)	0.01 (0.14)	0.06 (0.06)	0.01 (0.04)	0.07 (0.05)	0.05 (0.03)	0.05 (0.03)	0.10 (0.06) ^d	0.10 (0.06) ^e

Note. ^a 0 = before self-scoring, 1 = after self-scoring; Unrounded values: ^b $\sigma^2_{u0} = 0.003$; ^c $\sigma^2_{u0} = 0.004$. Effects with outliers: ^d $\sigma^2_e = 0.13 (0.03)***$, $\sigma^2_{u0} = 0.08 (0.04)*$, $\sigma^2_{v0} = 0.10 (0.05)*$; ^e $\sigma^2_e = 0.13 (0.03)***$, $\sigma^2_{u0} = 0.09 (0.04)*$, $\sigma^2_{v0} = 0.10 (0.05)*$

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S4

The Effect of Self-Scoring on Absolute Monitoring/Regulation Accuracy, Within High-Performing Students (RQ 2A and 2B)

	Absolute monitoring Accuracy				Absolute regulation Accuracy			
	Multiplication, $n = 634$		Division, $n = 403$		Multiplication, $n = 604$		Division, $n = 370$	
	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring	M0: intercept only	M1: effect of self-scoring
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	0.43 (0.02)***	0.78 (0.04)***	0.39 (0.03)***	0.69 (0.05)***	0.29 (0.02)***	0.33 (0.03)***	0.18 (0.02)***	0.19 (0.03)***
Self-Scoring ^a		-0.71 (0.04)***		-0.59 (0.05)***		-0.09 (0.02)***		-0.02 (0.03)
Random effects								
σ^2_e (self-scoring)	0.41 (0.03)***	0.27 (0.02)***	0.35 (0.03)***	0.24 (0.02)***	0.07 (0.01)***	0.07 (0.01)***	0.07 (0.01)***	0.07 (0.01)***
σ^2_{u0} (day)	0.00 (0.04) ^b	0.01 (0.02)	0.00 (0.03) ^c	0.02 (0.02)	0.16 (0.02)***	0.16 (0.02)***	0.07 (0.02)**	0.07 (0.02)**
σ^2_{v0} (student)	0.00 (0.04) ^b	0.01 (0.02)	0.00 (0.03) ^c	0.00 (0.02) ^d	0.02 (0.02)	0.01 (0.02)	0.01 (0.01)	0.01 (0.01)

Note. ^a 0 = before self-scoring, 1 = after self-scoring; Unrounded values: ^b $\sigma^2_{u0} = 0.001$, $\sigma^2_{v0} = 0.001$; ^c $\sigma^2_{u0} = 0.002$, $\sigma^2_{v0} = 0.001$; ^d $\sigma^2_{v0} = 0.001$

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S5

The Comparison of Low- and High-Performing Students' Absolute Monitoring/Regulation Accuracy After Self-Scoring (RQ 3A and 3B)

	Absolute monitoring accuracy after self-scoring				Absolute regulation accuracy after self-scoring			
	Multiplication, $n = 581$		Division, $n = 386$		Multiplication, $n = 581$		Division, $n = 357$	
	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	0.10 (0.01)***	0.14 (0.02)***	0.07 (0.02)***	0.06 (0.02)**	0.35 (0.02)***	0.47 (0.03)***	0.18 (0.02)***	0.18 (0.03)***
Low/high ^a		-0.07 (0.03)*		0.02 (0.03)		-0.23 (0.04)***		-0.02 (0.04)
Random effects								
σ^2_e (day)	0.11 (0.02)***	0.11 (0.02)***	0.06 (0.01)***	0.06 (0.01)***	0.31 (0.03)***	0.30 (0.03)***	0.11 (0.01)*** ^d	0.11 (0.01)*** ^e
σ^2_{u0} (student)	0.00 (0.01) ^b	0.00 (0.01) ^c	0.01 (0.01)	0.01 (0.01)	0.01 (0.02)	0.01 (0.02)	0.04 (0.02)** ^d	0.04 (0.02)** ^e

Note. ^a 0 = low-performing students; 1 = high-performing students; Unrounded values: ^b $\sigma^2_{u0} = 0.003$; ^c $\sigma^2_{u0} = 0.002$; Effects with outliers: ^d $\sigma^2_e = 0.21 (0.03)***$, $\sigma^2_{u0} = 0.04 (0.02)$; ^e $\sigma^2_e = 0.21 (0.03)***$, $\sigma^2_{u0} = 0.04 (0.02)$

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S6

Effect of Monitoring Judgments on Regulation Judgments, Within the Whole Sample (RQ 4A and 4B)

			95% CI for Odds Ratio			95% CI for Odds Ratio			
<i>B</i> (<i>SE</i>)			Lower	Odds ratio	Upper	<i>B</i> (<i>SE</i>)	Lower	Odds ratio	Upper
Before self-scoring			Multiplication (<i>n</i> = 976)			Division (<i>n</i> = 709)			
Practice vs. Nothing	Intercept	3.95 (0.39)***				4.79 (0.59)***			
	Monitoring judgment	-0.99 (0.08)***	0.32	0.37	0.44	-1.18 (0.12)***	0.25	0.31	0.39
Instruction vs. Nothing	Intercept	4.65 (0.39)***				6.39 (0.65)***			
	Monitoring judgment	-1.40 (0.10)***	0.21	0.25	0.30	-1.67 (0.14)***	0.14	0.19	0.25
After self-scoring			Multiplication (<i>n</i> = 947)			Division (<i>n</i> = 668)			
Practice vs. Nothing	Intercept	4.56 (0.45)***				4.54 (0.45)***			
	Monitoring judgment	-1.19 (0.11)***	0.25	0.30	0.37	-1.20 (0.09)***	0.25	0.30	0.36
Instruction vs. Nothing	Intercept	5.38 (0.45)***				6.07 (0.56)***			
	Monitoring judgment	-1.66 (0.11)***	0.15	0.19	0.24	-1.70 (0.13)***	0.14	0.18	0.24

Note. "Practice" refers to regulation judgment = additional practice needed. "Instruction" refers to regulation judgment = additional instruction (and practice) needed. "Nothing" refers to regulation judgment = no intervention needed.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S7

Effect of Monitoring Judgments on Regulation Judgments, Within the Low-Performing Students (RQ 4A and 4B)

			95% CI for Odds Ratio			95% CI for Odds Ratio			
<i>B (SE)</i>			Lower	Odds ratio	Upper	<i>B (SE)</i>	Lower	Odds ratio	Upper
Before self-scoring			Multiplication (<i>n</i> = 272)			Division (<i>n</i> = 198)			
Practice vs. Nothing	Intercept	4.00 (0.60)***				3.19 (0.89)***			
	Monitoring judgment	-0.90 (0.15)***	0.31	0.41	0.52	-0.76 (0.24)***	0.29	0.47	0.75
Instruction vs. Nothing	Intercept	4.79 (0.63)***				4.77 (0.94)***			
	Monitoring judgment	-1.29 (0.17)***	0.20	0.28	0.36	-1.07 (0.26)***	0.21	0.34	0.57
After self-scoring			Multiplication (<i>n</i> = 261)			Division (<i>n</i> = 178)			
Practice vs. Nothing	Intercept	3.39 (0.52)***				5.82 (1.41)***			
	Monitoring judgment	-0.79 (0.16)***	0.33	0.45	0.62	-1.97 (0.54)***	0.05	0.14	0.40
Instruction vs. Nothing	Intercept	4.39 (0.51)***				7.34 (1.44)***			
	Monitoring judgment	-1.43 (0.20)***	0.16	0.24	0.36	-2.23 (0.55)***	0.04	0.11	0.32

Note. "Practice" refers to regulation judgment = additional practice needed. "Instruction" refers to regulation judgment = additional instruction (and practice) needed. "Nothing" refers to regulation judgment = no intervention needed.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S8

Effect of Monitoring Judgments on Regulation Judgments, Within the High-Performing Students (RQ 4A and 4B)

		<i>B (SE)</i>	95% CI for Odds Ratio			<i>B (SE)</i>	95% CI for Odds Ratio		
			Lower	Odds ratio	Upper		Lower	Odds ratio	Upper
Before self-scoring		Multiplication (<i>n</i> = 313)				Division (<i>n</i> = 200)			
Practice vs. Nothing	Intercept	3.75 (0.86)***				8.98 (1.48)***			
	Monitoring judgment	-1.01 (0.17)***	0.26	0.36	0.51	-1.99 (0.29)***	0.08	0.14	0.24
Instruction vs. Nothing	Intercept	3.84 (0.92)**				- ^a			
	Monitoring judgment	-1.36 (0.19)***	0.18	0.26	0.37	-	-	-	-
After self-scoring		Multiplication (<i>n</i> = 308)				Division (<i>n</i> = 191)			
Practice vs. Nothing	Intercept	5.94 (1.48)***				9.108 (1.60)***			
	Monitoring judgment	-1.49 (0.31)***	0.12	0.23	0.42	-2.18 (0.32) ***	0.06	0.11	0.21
Instruction vs. Nothing	Intercept	1.31 (0.76)				- ^a			
	Monitoring judgment	-1.05 (0.11)***	0.29	0.35	0.43	-	-	-	-

Note. "Practice" refers to regulation judgment = additional practice needed. "Instruction" refers to regulation judgment = additional instruction (and practice) needed. "Nothing" refers to regulation judgment = no intervention needed. ^a When outliers are excluded, no students within this sample made the "Instruction" judgment, thus this model could not be analyzed. Effects with outliers, division before self-scoring: $B_{Intercept} = 7.58 (1.89)***$, $B_{Monitoring\ judgment} = -2.25 (0.45)***$, $Odds\ Ratio = 0.11$, 95% CI [0.04, 0.25]. Effects with outliers, division after self-scoring: $B_{Intercept} = -1.74 (3.72)$, $B_{Monitoring\ judgment} = -0.42 (0.69)$, $Odds\ Ratio = 0.66$, 95% CI [0.17, 2.53].

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S9

Effect of Performance (Continuous Variable) on Absolute Monitoring/Regulation Accuracy Before Self-Scoring

	Absolute monitoring accuracy before self-scoring				Absolute regulation accuracy before self-scoring			
	Multiplication, $n = 985$		Division, $n = 705$		Multiplication, $n = 973$		Division, $n = 692$	
	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	1.22 (0.04)***	2.07 (0.14)***	0.96 (0.05)***	1.20 (0.11)***	0.61 (0.02)***	0.83 (0.06)***	0.43 (0.03)***	0.46 (0.06)***
Performance		-0.23 (0.03)***		-0.08 (0.03)**		-0.06 (0.02)***		-0.01 (0.02)
Random effects								
σ^2_e (day)	1.25 (0.11)***	1.20 (0.11)***	0.75 (0.07)***	0.75 (0.07)***	0.36 (0.02)***	0.36 (0.02)***	0.36 (0.04)***	0.36 (0.04)***
σ^2_{u0} (student)	0.10 (0.06)	0.03 (0.06)	0.14 (0.05)**	0.12 (0.05)**	0.13 (0.02)***	0.12 (0.02)***	0.08 (0.03)*	0.08 (0.03)*

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S10

Effect of Performance (Continuous Variable) on Absolute Monitoring/Regulation Accuracy After Self-Scoring

	Absolute monitoring accuracy after self-scoring				Absolute regulation accuracy after self-scoring			
	Multiplication, $n = 954$		Division, $n = 676$		Multiplication, $n = 954$		Division, $n = 670$	
	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance	M0: intercept only	M1: effect of performance
Fixed effects	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$	$B (SE)$
Intercept	0.12 (0.01)***	0.18 (0.03)***	0.09 (0.01)***	0.07 (0.02)**	0.44 (0.02)***	0.60 (0.05)***	0.36 (0.03)***	0.38 (0.05)***
Performance		-0.02 (0.01) ^b		0.01 (0.01)		-0.04 (0.01)**		-0.01 (0.01)
Random effects								
σ^2_e (day)	0.13 (0.02)***	0.13 (0.02)***	0.06 (0.01)*** ^d	0.06 (0.01)*** ^d	0.34 (0.02)***	0.34 (0.02)***	0.32 (0.03)***	0.32 (0.03)***
σ^2_{u0} (student)	0.00 (0.01) ^a	0.00 (0.01) ^c	0.02 (0.01)* ^d	0.02 (0.01)* ^d	0.04 (0.03)	0.04 (0.03)	0.04 (0.02)	0.04 (0.02)

Note. Unrounded values: ^a $\sigma^2_{u0} = 0.004$, ^c $\sigma^2_{u0} = 0.003$; Effects with outliers: ^b $B = -0.04 (0.01)***$; ^d $\sigma^2_e = 0.15 (0.05)**$, $\sigma^2_{u0} = 0.08 (0.05)$;*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table S11
*Mean Number of Omission and Commission Errors per Task, Including
 Standard Deviations Within Brackets*

	Omission errors	Commission errors
Multiplication		
Whole sample	0.62 (1.24)	1.72 (1.49)
Low-performing students	1.68 (1.71)	2.72 (1.73)
High-performing students	0.05 (0.26)	0.69 (0.64)
Division		
Whole sample	1.29 (1.69)	1.51 (1.55)
Low-performing students	2.69 (1.84)	2.39 (1.83)
High-performing students	0.06 (0.27)	0.64 (0.63)

Table S12
Types of needs in percentages

	Additional instruction (and practice afterwards)	Additional practice		Additional instruction (and practice afterwards) or additional practice	No need for additional instruction or practice
		Because this student works too slowly	Because this student makes computational errors		
Multiplication					
Whole sample	32.2	5.2	9.7	17.9	35.0
Low-performing students	66.9	0.7	4.3	27.0	1.1 ^a
High-performing students	2.2 ^b	8.5	6.3	3.5	79.4
Division					
Whole sample	49.7	2.6	5.5	11.5	30.7
Low-performing students	88.6	-	-	11.4	-
High-performing students	2.6 ^b	6.6	6.1	4.1	80.6

^a Sometimes, students who performed on average low, did not need additional practice or instruction on *one* of both days.

^b Sometimes, student who performed on average high needed additional instruction on *one* of both days.