

Supplemental Online Content

Aliaga L, Bavolek RA, Cooper B, et al. Error management training and adaptive expertise in learning computed tomography interpretation: a randomized clinical trial. *JAMA Netw Open*. 2024;7(9):e2431600. doi:10.1001/jamanetworkopen.2024.31600

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This supplemental material has been provided by the authors to give readers additional information about their work.

eMethods.

Training modules were delivered on websites, one for each cohort:

Difficult-EMT: <https://www.failct-1.org>

Easy-EMT: <https://www.tnecemt.org>

EAT control: <https://www.aectcea-1.org>

Link to head CT interpretation post-test: [FAIL CT Study Post-test](#)

eTable 1. Participant Baseline Characteristics and Proportion Within Cohorts by Posttest Completion

	Participants, No. (%)			
Characteristic	Overall (n=212)	Completed the post-test (n=150)	Did NOT complete the post-test (n=62)	<i>P</i> value ^a
Age, mean (SD), y	28.8 (2.0)	28.9 (2.1)	28.4 (1.7)	.08
Gender				
Women	105 (49.5)	74 (49.3)	31 (50.0)	.93
Men	107 (50.5)	76 (50.7)	31 (50.0)	
Post-graduate year				
1	68 (32.1)	45 (30.0)	23 (37.1)	.74
2	65 (30.7)	48 (32.0)	17 (27.4)	
3	62 (29.2)	44 (29.3)	18 (29.0)	
4	17 (8.0)	13 (8.7)	4 (6.5)	
Institution				
University of California Los Angeles	40 (18.9)	28 (18.7)	12 (19.4)	.69
Highland Hospital	23 (10.8)	16 (10.7)	7 (11.3)	
Brown University	30 (14.2)	19 (12.7)	11 (17.7)	
University of Chicago	25 (11.8)	15 (10.0)	10 (16.1)	
University of Wisconsin	24 (11.3)	18 (12.0)	6 (9.7)	
UT Health Houston	46 (21.7)	36 (24.0)	10 (16.1)	
Vanderbilt University	24 (11.3)	18 (12.0)	6 (9.7)	
Program length				
4-year programs	93 (43.9)	63 (42.0)	30 (48.4)	.39
3-year programs	119 (56.1)	87 (58.0)	32 (51.6)	
Cohort				
Difficult-EMT	70 (33.0)	45 (30.0)	25 (40.3)	.09
Easy-EMT	71 (33.5)	48 (32.0)	23 (37.1)	
EAT Control	71 (33.5)	57 (38.0)	14 (22.6)	

^a Mann-Whitney U test; Pearson's Chi-squared test

eTable 2. Baseline Characteristics for All Participants Initially Enrolled

	Participants, No. (%)				
Characteristic	Overall (n=212)	Difficult-EMT (n=70)	Easy-EMT (n=71)	EAT Control (n=71)	<i>P</i> value ^a
Age, mean (SD), y	28.8 (2.0)	28.6 (2.1)	28.9 (2.3)	28.8 (1.6)	.22
Gender					
Women	105 (49.5)	32 (45.7)	36 (50.7)	37 (52.1)	.73
Men	107 (50.5)	38 (54.3)	35 (49.3)	34 (47.9)	
Post-graduate year					
1	68 (32.1)	24 (34.3)	22 (31.0)	22 (31.0)	.72
2	65 (30.7)	22 (31.4)	22 (31.0)	21 (29.6)	
3	62 (29.2)	21 (30.0)	22 (31.0)	19 (26.8)	
4	17 (8.0)	3 (4.3)	5 (7.0)	9 (12.7)	
Institution					
University of California Los Angeles	40 (18.9)	13 (18.6)	13 (18.3)	14 (19.7)	1.0
Highland Hospital	23 (10.8)	8 (11.4)	8 (11.3)	7 (9.9)	
Brown University	30 (14.2)	10 (14.3)	10 (14.1)	10 (14.1)	
University of Chicago	25 (11.8)	8 (11.4)	9 (12.7)	8 (11.3)	
University of Wisconsin	24 (11.3)	8 (11.4)	8 (11.3)	8 (11.3)	
UT Health Houston	46 (21.7)	15 (21.4)	15 (21.1)	16 (22.5)	
Vanderbilt University	24 (11.3)	8 (11.4)	8 (11.3)	8 (11.3)	
Program length					
4-year programs	93 (43.9)	31 (44.3)	31 (43.7)	31 (43.7)	.99
3-year programs	119 (56.1)	39 (55.7)	40 (56.3)	40 (56.3)	

^a Kruskal-Wallis test; Pearson's Chi-squared test

Abbreviations: EMT, Error Management Training; EAT, Error Avoidance Training.

eTable 3. Adaptive Expertise Posttest Scores Stratified by PGY Level

	Adaptive expertise post-test score: Mean (95% CI)			ANOVA	
	Difficult-EMT	Easy-EMT	EAT Control	<i>P</i> value	η^2
PGY 1	70.5 (64.1 to 76.8)	40.2 (32.7 to 47.7)	35.7 (26.2 to 45.3)	<.001	0.56
PGY 2	59.2 (52.0 to 66.3)	44.8 (31.5 to 58.1)	37.6 (29.6 to 45.6)	.006	0.20
PGY 3&4	52.7 (44.5 to 60.9)	50.4 (42.2 to 58.7)	46.4 (38.0 to 54.8)	.53	NA

Abbreviations: EMT, Error Management Training; EAT, Error Avoidance Training; PGY, post-graduate year

eTable 4. Routine Expertise Posttest Scores Stratified by PGY Level

	Routine expertise post-test score: Mean (95% CI)			ANOVA	
	Difficult-EMT	Easy-EMT	EAT Control	<i>P</i> value	η^2
PGY 1	74.9 (70.9 to 78.9)	66.4 (58.0 to 74.8)	69.7 (62.7 to 76.7)	.17	NA
PGY 2	73.3 (65.7 to 80.1)	72.6 (63.9 to 81.2)	71.7 (65.7 to 77.7)	.94	NA
PGY 3&4	76.8 (71.3 to 82.2)	81.2 (76.5 to 86.0)	79.2 (75.7 to 82.6)	.38	NA

Abbreviations: EMT, Error Management Training; EAT, Error Avoidance Training; PGY, post-graduate year

eTable 5. Two-way ANOVA Assessing the Interaction Effect Between PGY Level and Learning Strategy

	Adaptive expertise cases		Routine expertise cases	
Factor	<i>P</i> value	η^2	<i>P</i> value	η^2
Cohort	<.001	0.22	.77	NA
PGY level	.73	NA	<.001	0.10
Cohort-PGY interaction	.006	0.10	.29	NA

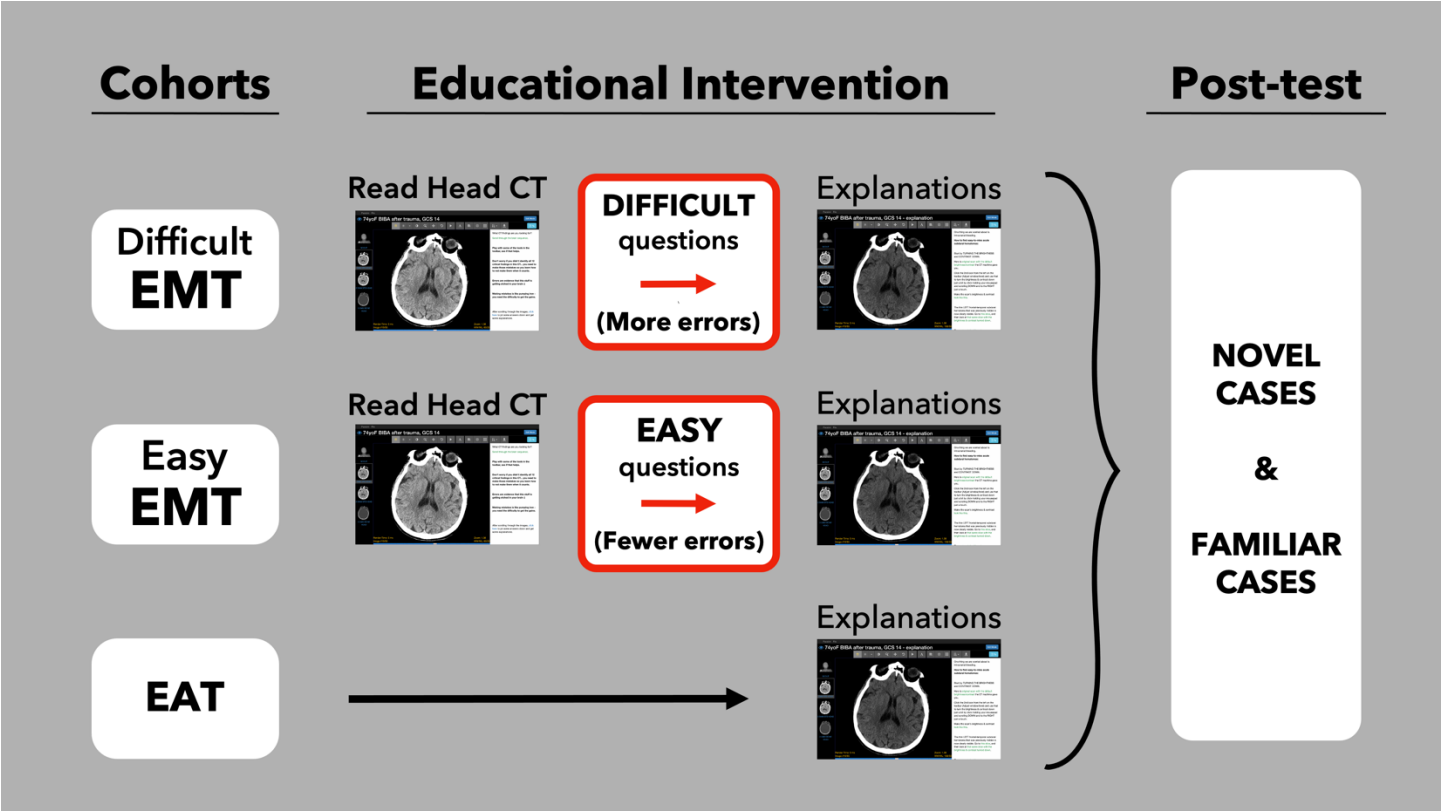
Abbreviations: PGY, post-graduate year

eTable 6. Sensitivity Analyses for Two-Way ANOVAs of Adaptive Expertise and Routine Expertise Cases, With PGY 4 Residents Removed from the Senior Resident Factor

	Adaptive expertise cases		Routine expertise cases	
Factor	<i>P</i> value	η^2	<i>P</i> value	η^2
Cohort	<.001	0.24	.81	NA
PGY level	.77	NA	.008	0.07
Cohort-PGY interaction	.01	0.10	.34	NA

Abbreviations: PGY, post-graduate year

eFigure. Experimental Design for the Educational Intervention



Abbreviations: EMT, Error Management Training; EAT, Error Avoidance Training; CT, computed tomography