

# The Effects of “Ungrading” Individual Readiness

## Assurance Tests

### A 2x2 Crossover Study



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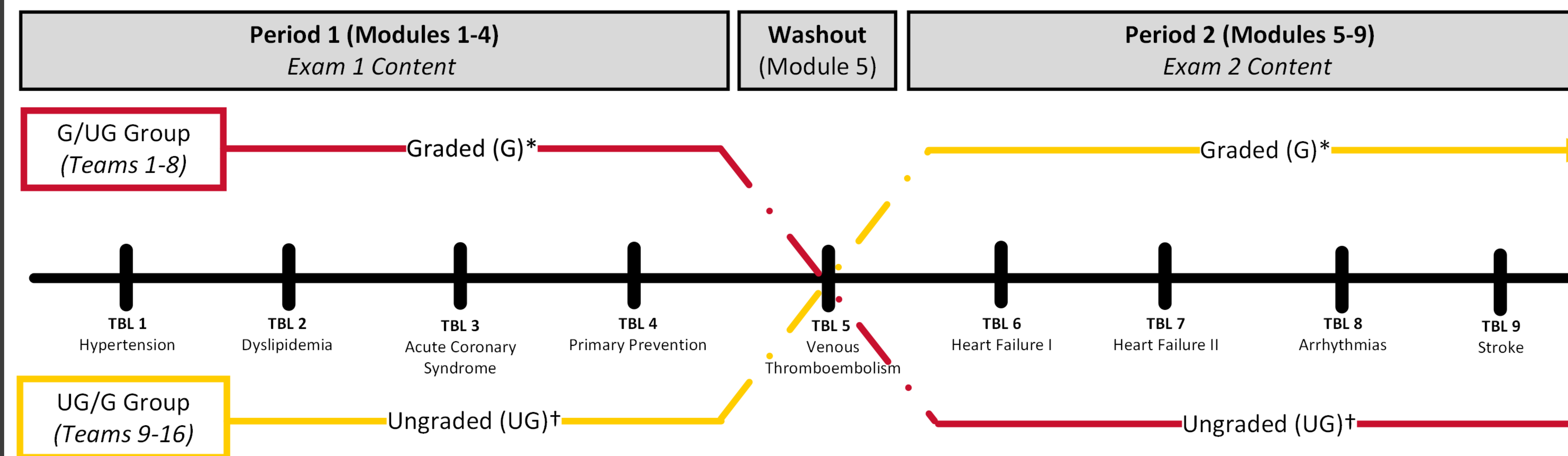
### Study Question

Is there a difference in PharmD student assessment scores in a team-based learning (TBL) course based individual readiness assurance test (iRAT) grading condition (i.e., graded versus ungraded)?

### Methods

- In a required pharmacotherapy course that uses TBL, students were evenly assigned to one of two iRAT grading conditions during period 1 and then crossed over to the other grading condition during period 2.
- Students in the **graded condition (G)** earned iRAT grades based on correctness; students in the **ungraded condition (UG)** earned iRAT grades based on completion. See **Figure 1** for an illustration of the crossover design.
- Students were aware of their iRAT grading condition throughout the study.
- Assessment performance was analyzed using multivariate analysis of variance of **within-subject differences** in iRAT and examination scores.

## 2x2 Crossover Study Design



\*Grades assigned based on correctness

†Full credit given for completing the individual and team readiness assurance process, regardless of correctness

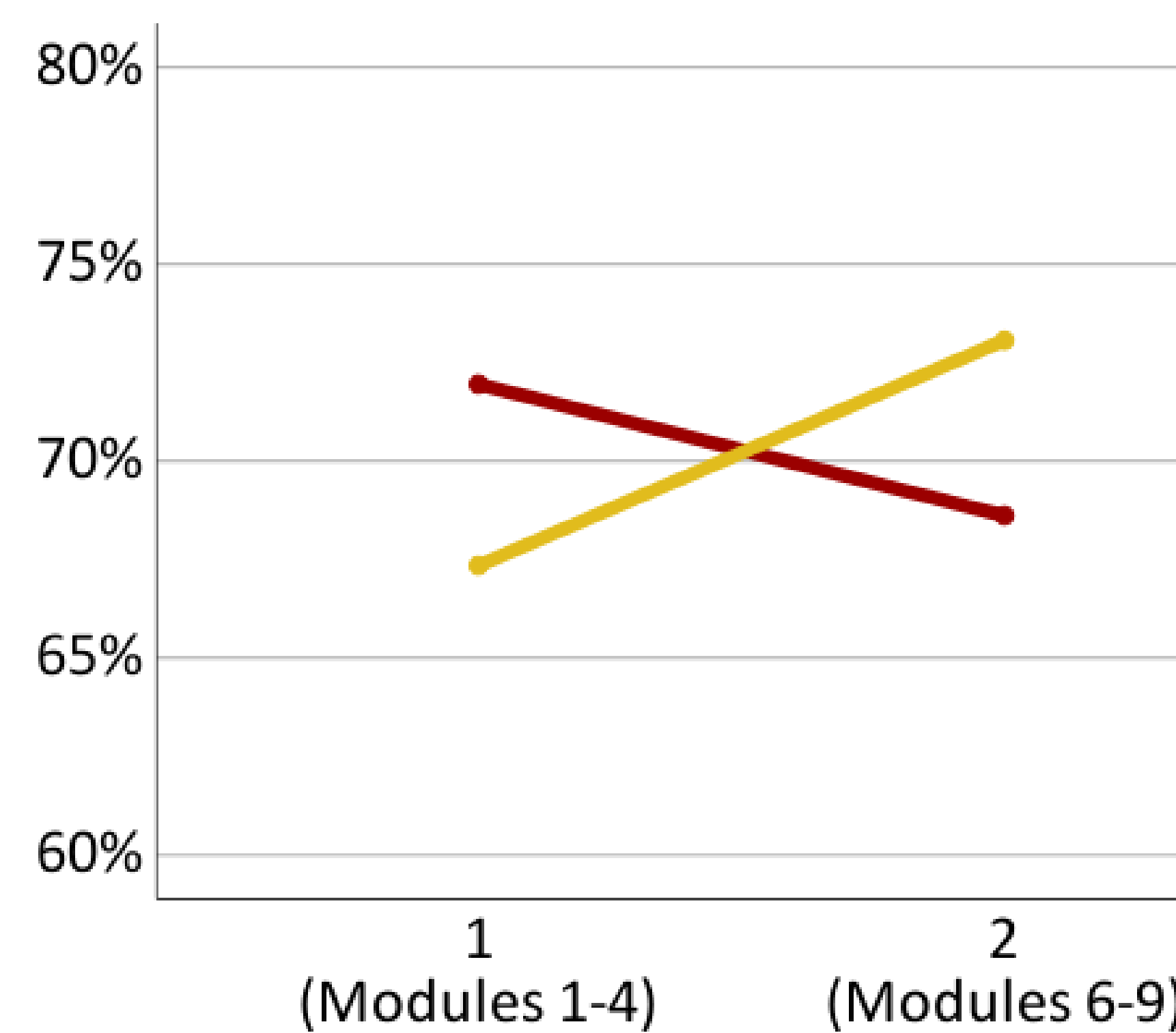
**PharmD student assessment scores were statistically significantly different when iRATs were ungraded...**

$$F(2,88) = 3.851, \text{ Wilks' } \Lambda = .992, p = .025$$

**...but the effects were driven by a modest reduction in iRAT scores (not examination scores)**

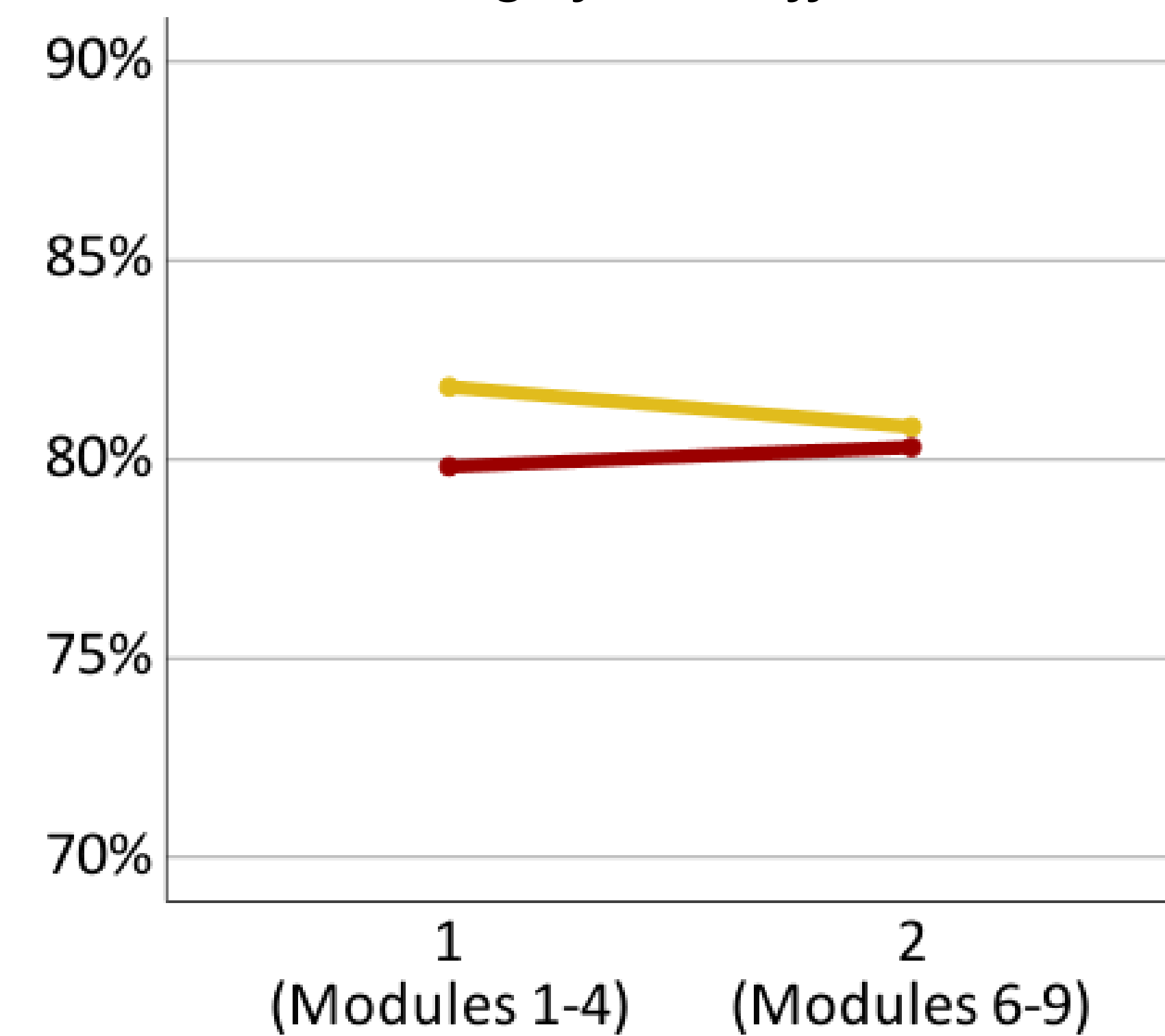
### Mean iRAT Scores (%)

$$F(1,89) = 6.813, \eta^2 = 0.71, p = .011$$



### Mean Examination Scores (%)

No significant difference



## Results

### Baseline Characteristics

	Overall	Group 1 (G/UG) n = 47	Group 2 (UG/G) n = 44	p
Age, years, M (SD)	25.42 (3.98)	25.43 (4.00)	25.41 (3.99)	.764
GPA, M (SD)	2.89 (.47)	2.84 (.43)	2.95 (.51)	.373
Gender				.655
Female, n (%)	60 (65.9)	32 (68.1)	28 (63.6)	
Male, n (%)	31 (34.1)	15 (31.9)	16 (36.4)	
English as a second language, n (%)	26 (28.6)	11 (23.4)	15 (34.1)	.259

### iRAT Scores

Sequence	Period 1		Period 2		Within-Subject Differences (G - UG)		F (1,89)	$\eta^2$	p
	M	SD	M	SD	M	SD			
G/UG	71.95	10.89	68.62	13.95	3.33	15.12	6.813	.071	.011
UG/G	67.35	12.87	73.07	16.92	5.72	17.92			

### Examination Scores

Sequence	Period 1		Period 2		Within-Subject Differences (G - UG)		F (1,89)	$\eta^2$	p
	M	SD	M	SD	M	SD			
G/UG	79.82	9.24	80.31	9.01	.49	9.21	.723	.008	.397
UG/G	81.82	8.70	80.82	8.45	1.00	7.29			

## Conclusions

- When iRATs were ungraded, **mean iRAT scores were 4.53% lower** when compared to graded iRATs; however, **examination scores were similar**.
- In this study, the effect of ungraded iRATs on pre-class knowledge acquisition appeared to be minimal, and with no repercussions on summative examination performance.
- Shifting from graded to ungraded iRATs had **no effect** on students' achievement goals (results not reported here).
- Courses using TBL should carefully consider how iRAT grading structure influences students' motivation, and how changes may influence pre-class preparation and long-term learning.