



# An Evaluation of the Efficiency of Equivalence-Based Instruction

Juliana Oliveira and Anna Ingeborg Petursdottir  
Texas Christian University

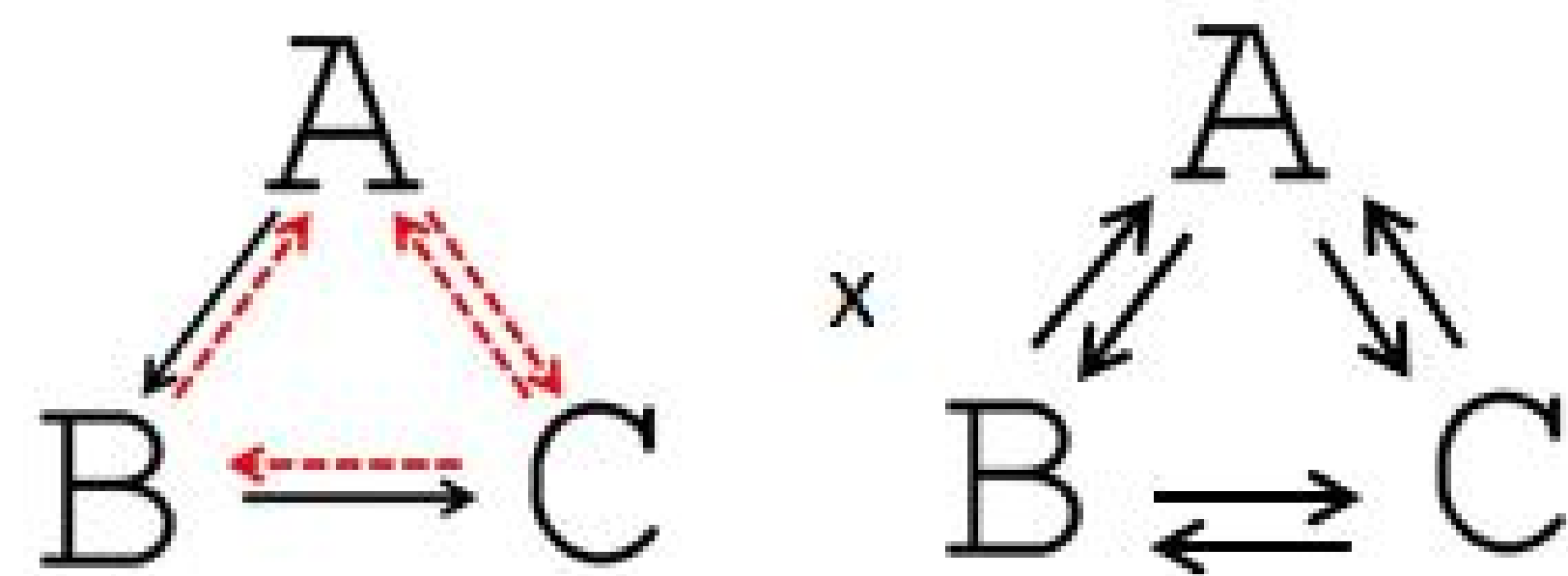
## Introduction

Equivalence based-instruction (EBI) is a teaching procedure in which teaching a small number of stimulus relations results in the emergence of a large number of untrained relations. Many studies have demonstrated successful applications of EBI with various populations and instructional objectives.

EBI is assumed to be an efficient approach to teaching due to eliminating the need for directly teaching every instructional target, but few studies have directly evaluated its efficiency compared to directly teaching all of the possible relations between stimuli in a set.

Fienup and Critchfield (2011) found that EBI produced similar test performance and took less training to complete than sequential instruction of all stimulus relations. However, it is possible that the control group received an unnecessary amount of training due to the sequential mastery criteria.

The purpose of the present study was to evaluate the efficiency of an EBI protocol compared to a simultaneous direct instruction (DI) protocol, using abstract stimuli.



## Method

**Participants:** 48 undergraduate students were recruited from a psychology department's human subjects pool.

**Setting and equipment:** The experiment was programmed in *SuperLab 5.0* and run on a laptop computer in a quiet room.

	A	B	C	D	E
1	#	♟	⚙	武	■
2	\$	♟	⚙	家	■
3	&	♟	⚙	龍	■

Figure 1. The stimulus sets used in the experiment. The three first columns are the stimuli used for Phase 1. The two others columns were stimuli used in Phase 2 of the present study.

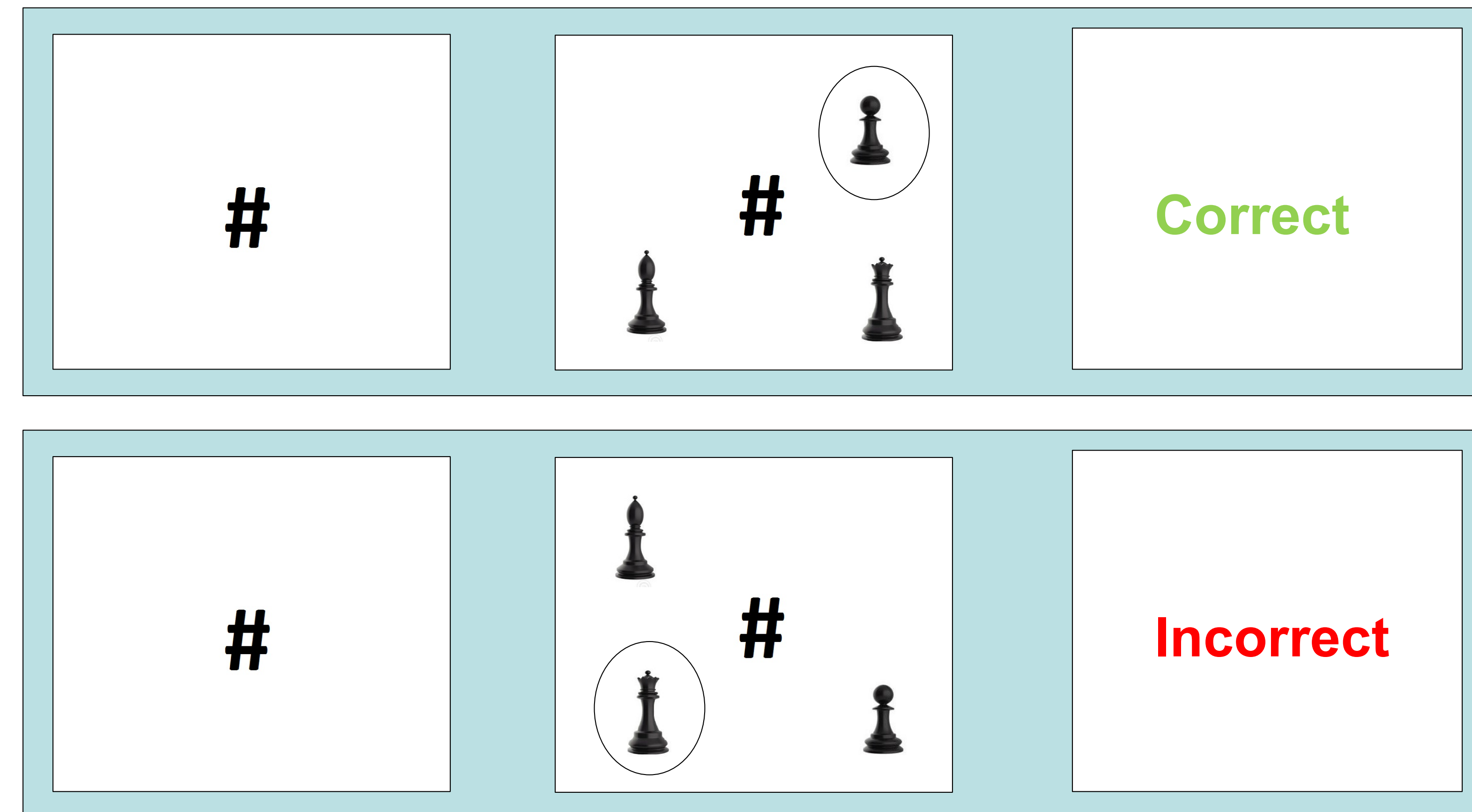


Figure 2. Stimulus presentation arrangements in two different trials during training. The visual sample stimulus is presented. After clicking in the sample stimulus, three comparison stimuli are presented. When pressing the correct or incorrect stimulus, the participant will receive the feedback "Correct" or "Incorrect", respectively.

		EBI-EBI	EBI-DI	DI-EBI	DI-DI
Phase 1	ABC Training	AB BC	AB BC	AB, BA, AC, CA, BC, CB	AB, BA, AC, CA, BC, CB
	ABC Test	AB, BA, AC, CA, BC, CB			
Phase 2	ABCD Training	AD DA	AD, DA, BD, DB, CD, DC	AD DA	AD, DA, BD, DB, CD, DC
	ABCD Test	AB, BA, AC, CA, BC, CB + AD, DA, BD, DB, CD, DC			
	ABCDE Training	DE ED	AE, EA, BE, EB, CE, EC, DE, ED	DE ED	AE, EA, BE, EB, CE, EC, DE, ED
	ABCDE Test	AB, BA, AC, CA, BC, CB + AD, DA, BD, DB, CD, DC AE, EA, BE, EB, CE, EC, DE, and ED			

Figure 3. Trained and tested relations presented in each phase, according to the participant group assignment.

## Results and Discussion

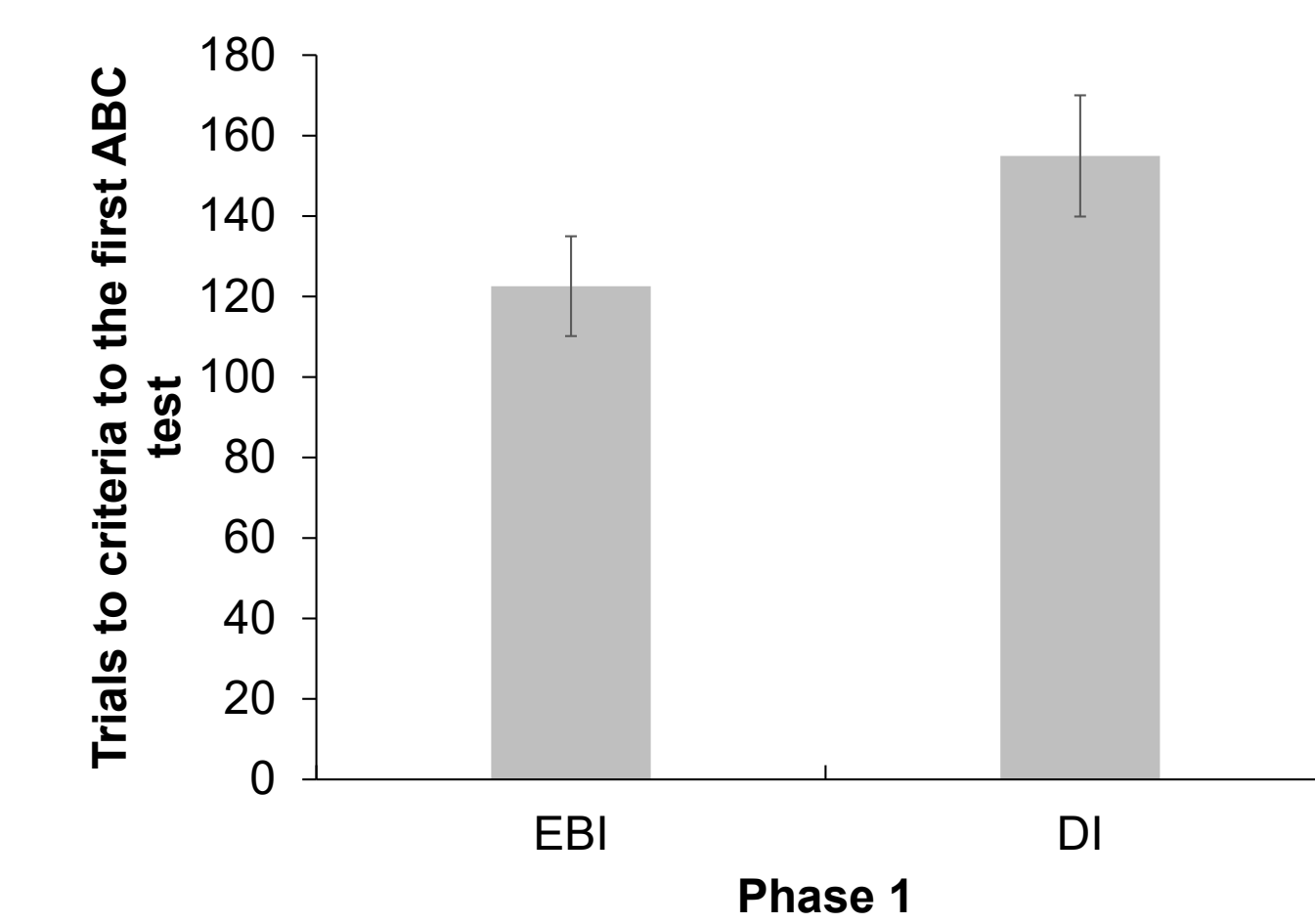


Figure 1. Trials to criterion in Phase 1 for EBI and DI groups

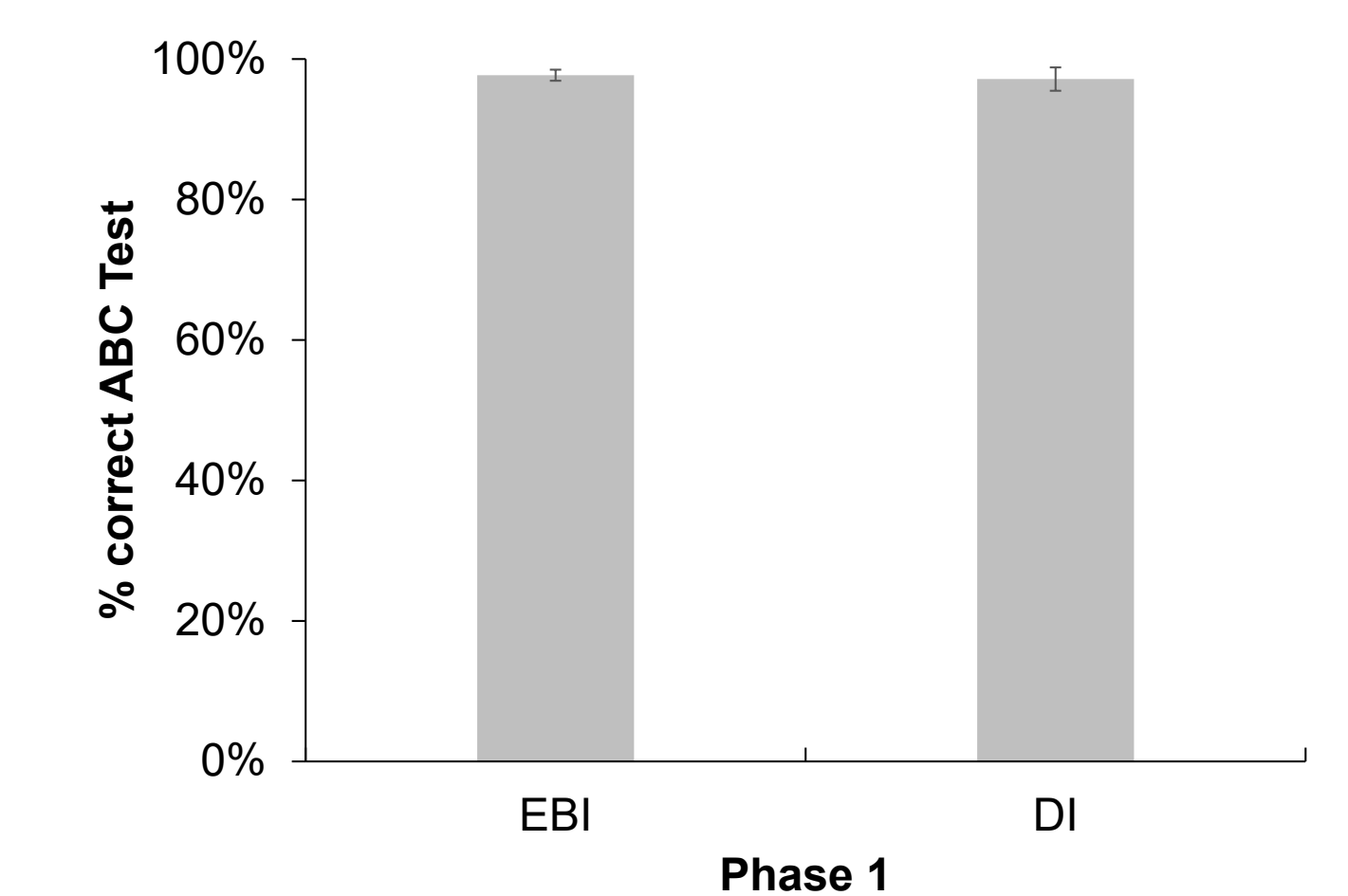


Figure 2. Percentage of correct responses in the first ABC test for EBI and DI groups

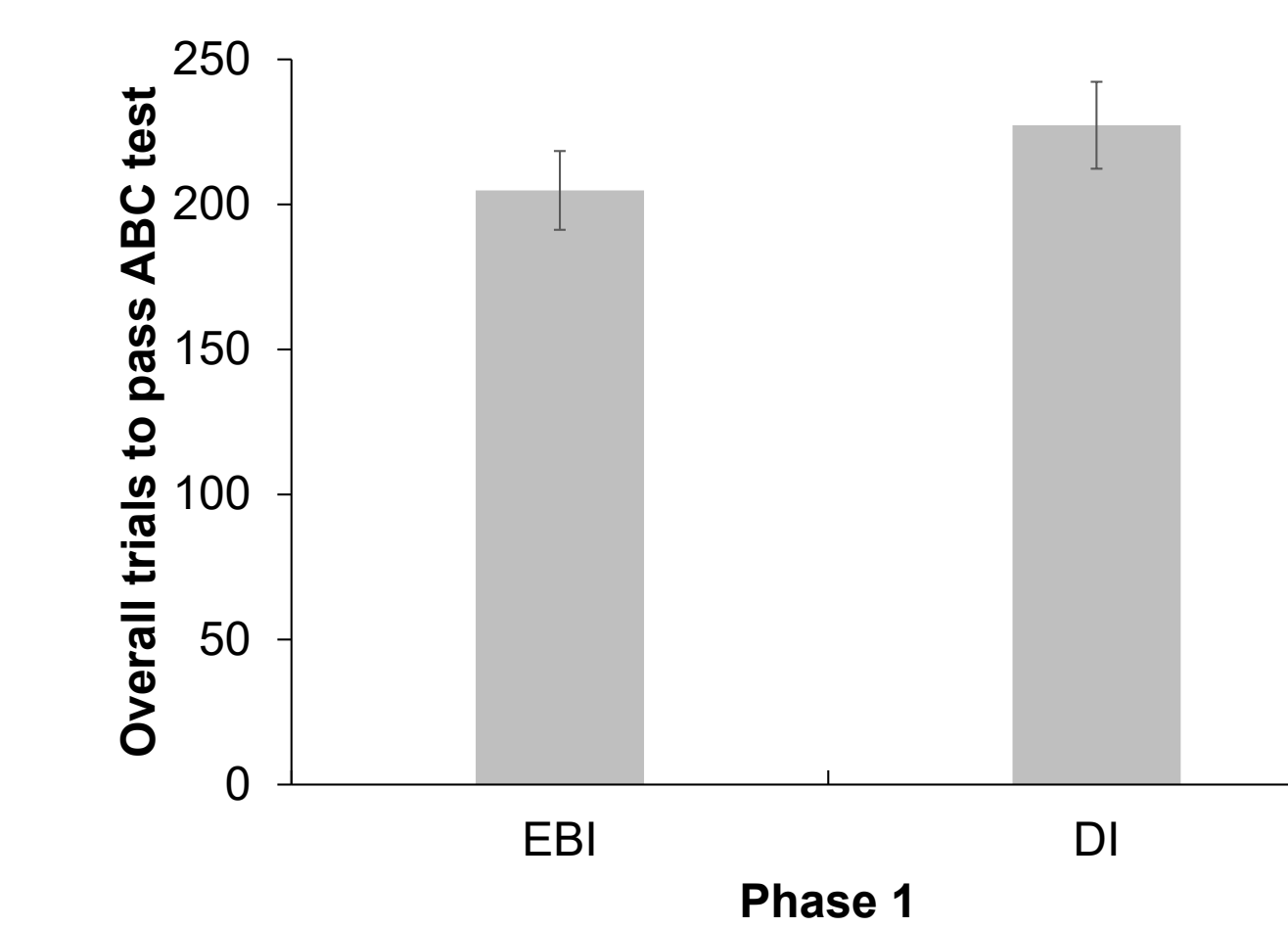


Figure 3. Overall trials to pass ABC Test for EBI and DI groups

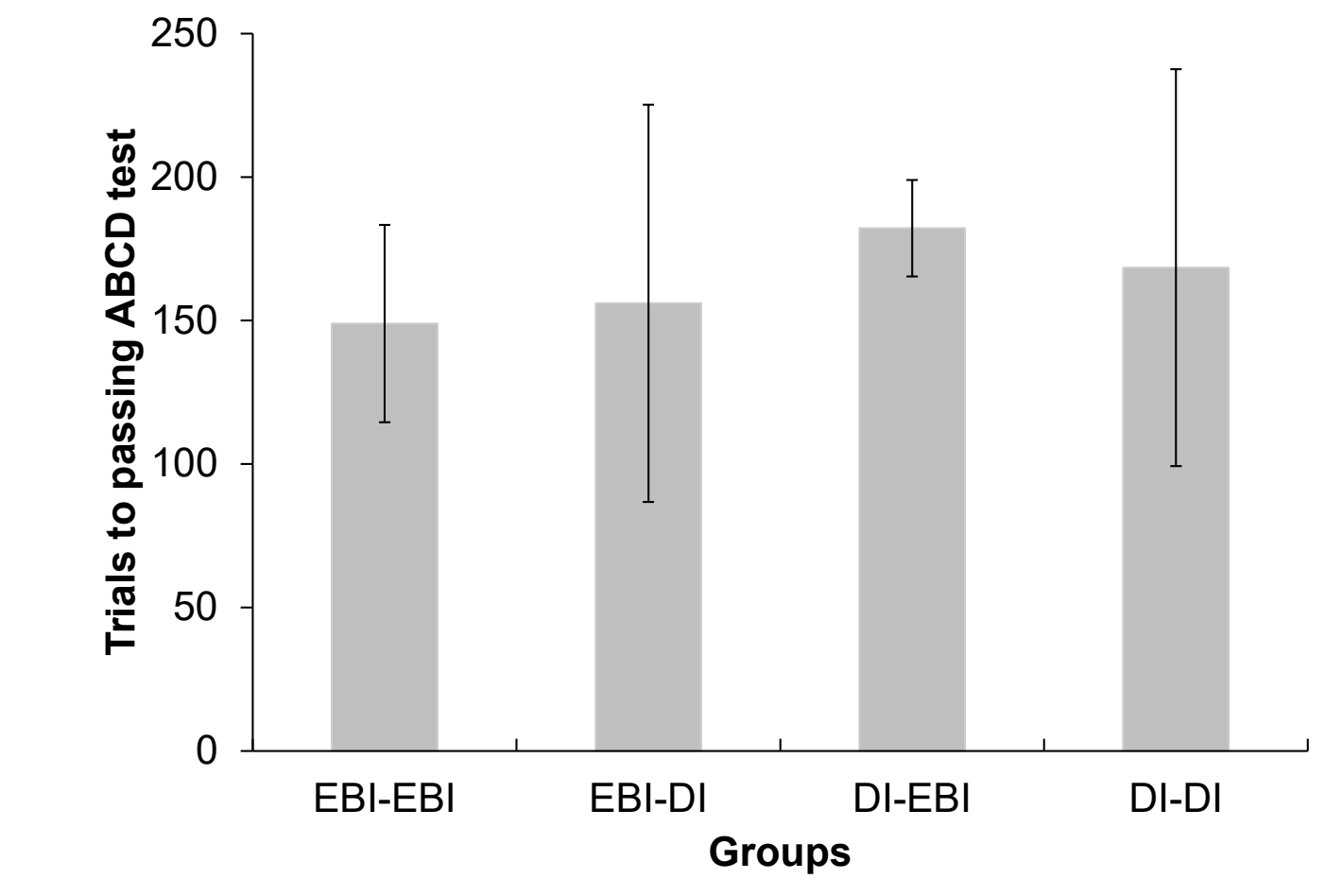


Figure 4. Trials to passing ABCD test for all groups

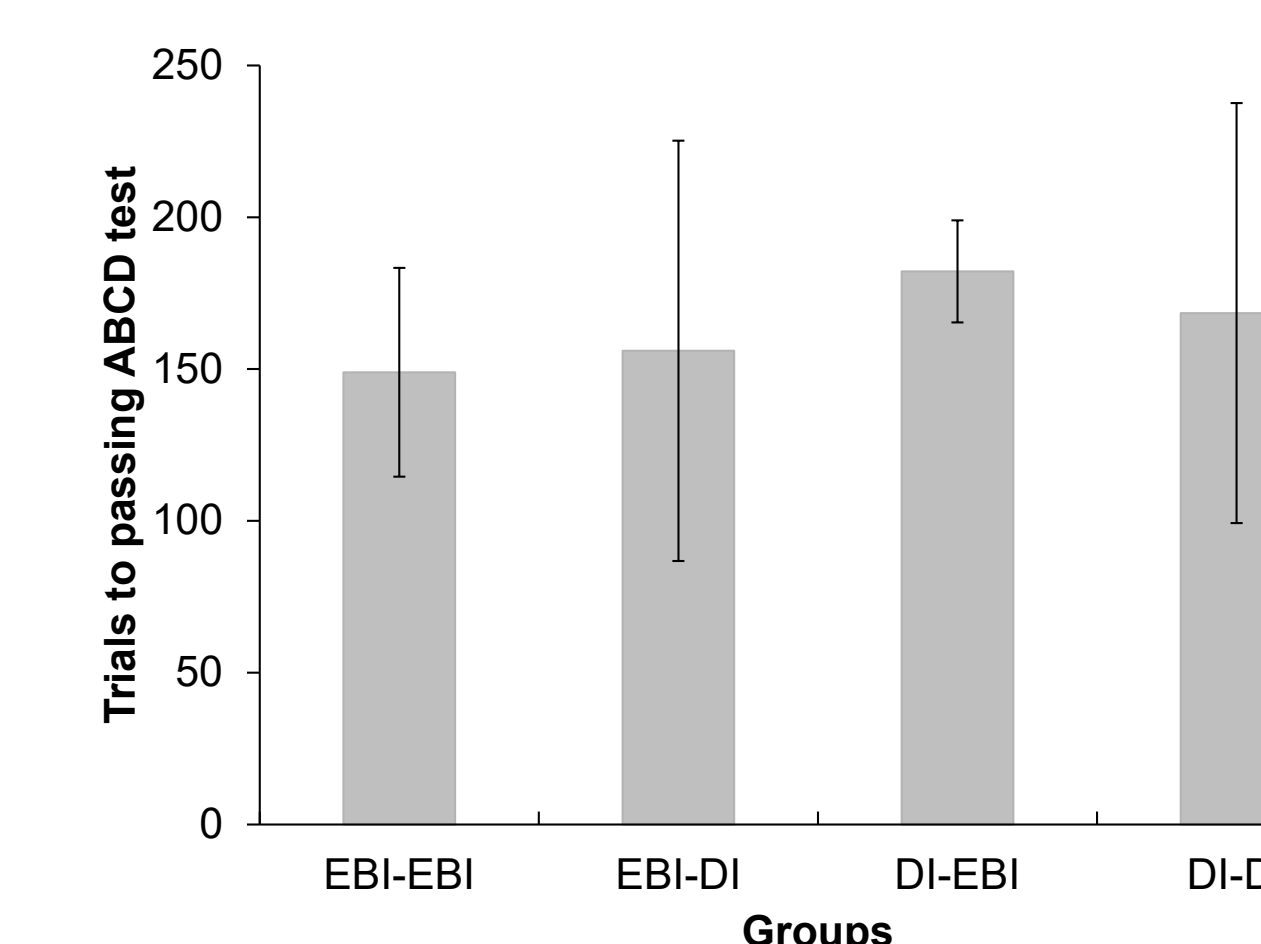


Figure 5. Trials to passing ABCDE test for all groups

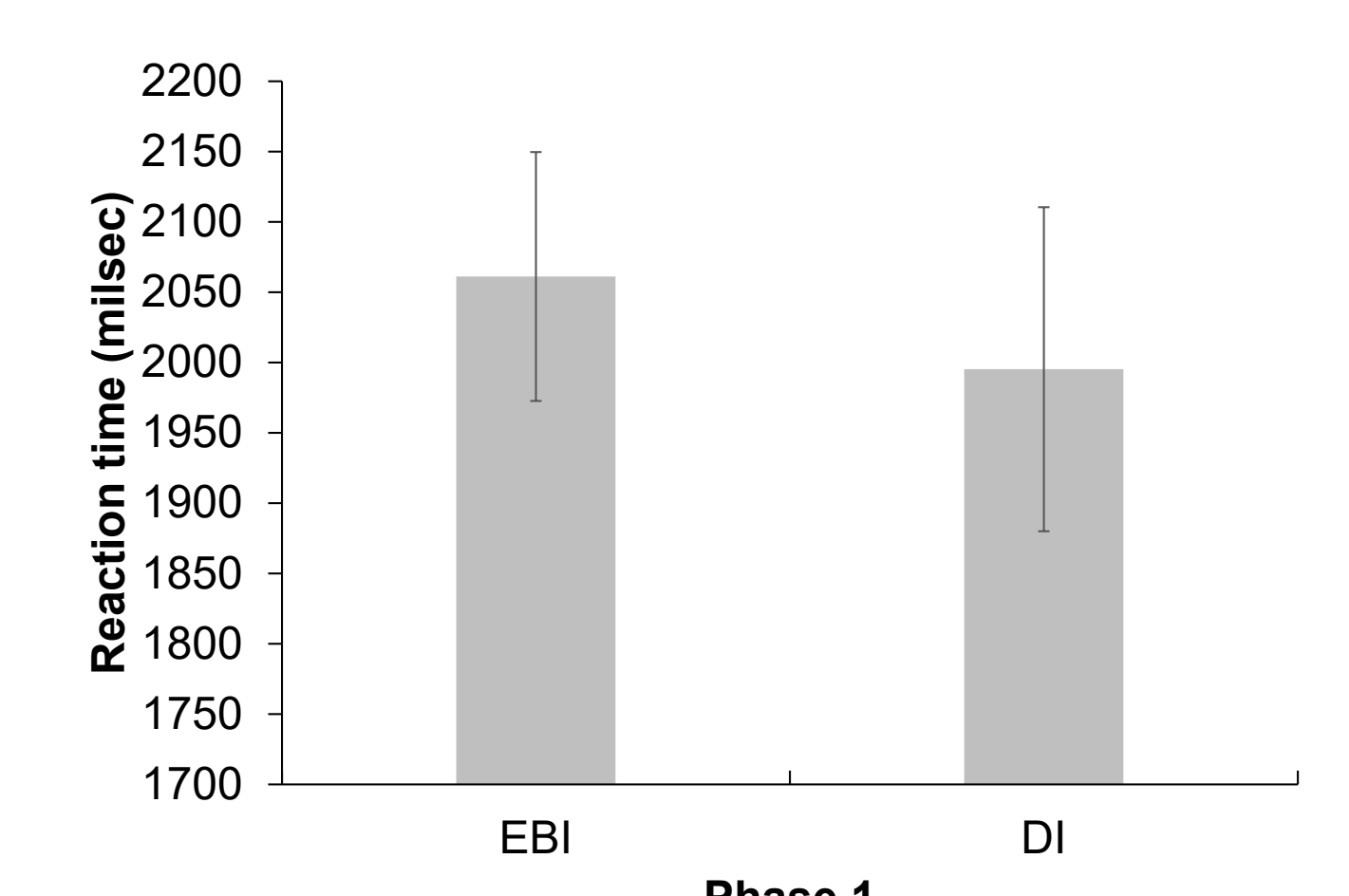


Figure 6. Trials to passing ABCD test for all groups

In Phase 1, there was not a statistically significant difference between EBI and DI groups in trials to criterion, accuracy on the first ABC test, or overall trials (including test and re-training following a failed test) to pass the ABC test.

In Phase 2, there was no difference between groups in the total number of trials to pass the ABCD and ABCDE tests or the total number of trials completed in the entire experiment before passing the ABCDE test. Initial differences in test accuracy, when present (not shown in figures), favored DI.

In summary, there was no evidence that EBI was more efficient than DI, nor that a prior history of EBI facilitated completion of subsequent EBI or DI instruction. Simultaneous instruction may have allowed whichever processes produce stimulus equivalence to exert their effects during training, accelerating the acquisition of each individual relation.

One caveat is that the EBI group in the present study may have been overtrained. Although they did not show any evidence of overtraining, such as faster reaction times or greater test accuracy, this possibility will be addressed in a second experiment.

## References

Fienup, D. M., Covey, D. P., & Critchfield, T. S. (2010). Teaching brain-behavior relations economically with stimulus equivalence technology. *Journal of Applied Behavior Analysis, 43*, 19–33.



reSEaRCh  
Science and Engineering Research Center