

LEARNING PROCEDURAL SKILLS

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INSIGHT U – MARCH 27, 2019

LEARNING OBJECTIVES

- Engage in discussion about study findings
- Identify relevance to health professions education
- Engage in discussion about how to integrate study findings into current curriculum
- Engage in discussion regarding theoretical foundations for study design

BACKGROUND

- Medical education covers content that is a complex mix of knowledge, attitudes and skills
- Complex content must be learned in a changing environment, with limited time and resources
- Medical education relies on self-assessment which can be problematic
- Because of these demands, medical education research is consistently looking to refine the most effective strategies
- One 'strategy' that is considered a *truism* is “See One, Do One, Teach One”

BACKGROUND

- Why is “See One” then “Do One” a sound strategy?
 - Reduces risk to patients
 - Allows trainee to first visualize an *expert’s* standard of performance
 - Allows trainees to first understand scope of the skill

BACKGROUND

- Why is "See One", then "Do One" a challenge?
 - Rarity of procedures
 - Trust/entrustment barriers
 - How many is required to be 'seen' before being allowed to 'do'?
 - Focusing on "seeing" does not facilitate self-regulation/reflection/appropriate self-assessment

BACKGROUND

- Role of self-regulation – self generated thoughts and actions that are adapted to the attainment of goals in a cyclical nature
 - Influenced by
 - Self-efficacy evaluation
 - Identification of goal
 - Access to ideal strategies
 - Ability to adapt

DO ONE THEN SEE ONE

- Benefits?
- Challenges?
- Limitations?

SELF-REGULATED LEARNING

- Which is better - Discovery or guided instruction?

Klahr D, Nigam M. The equivalence of learning paths in early science instruction: Effects of direct instruction and discovery learning. *Psychological science*. 2004 Oct;15(10):661-7.

Mayer RE. Should there be a three-strikes rule against pure discovery learning?. *American psychologist*. 2004 Jan;59(1):14.

STUDY DESIGN

- 32 medical students assigned to 2 groups
- Suturing task with silicone skin pads
 - “Do then See” group engaged in 30 min self-discovery and then instruction
 - “See then Do” group received 30 min instruction then 30 min practice
- After one week delay transfer test with same task placed in an abdominal simulator
- Also measured self-efficacy

RESULTS

- Outcomes measured –
 - 1-week delayed transfer test performance (simulated abdominal cavity)
 - Midpoint performance (performance midway between see then do or do then see)
 - Immediate post-test (performance after all training)
 - Retention test (performance on an identical post-test after 1-week delay)
 - Self-efficacy

Average Transfer Performance by Group

I-week delayed transfer test

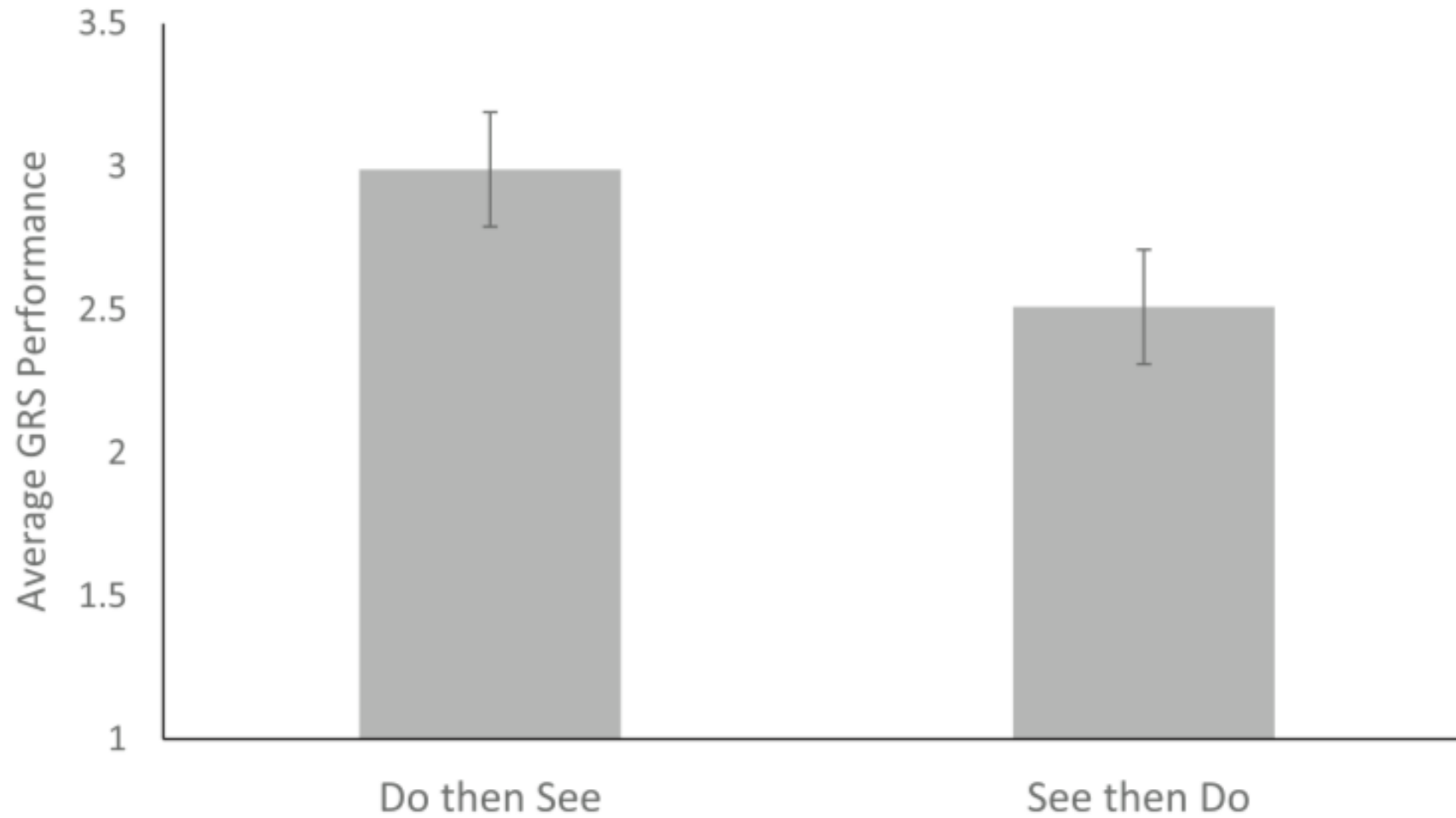
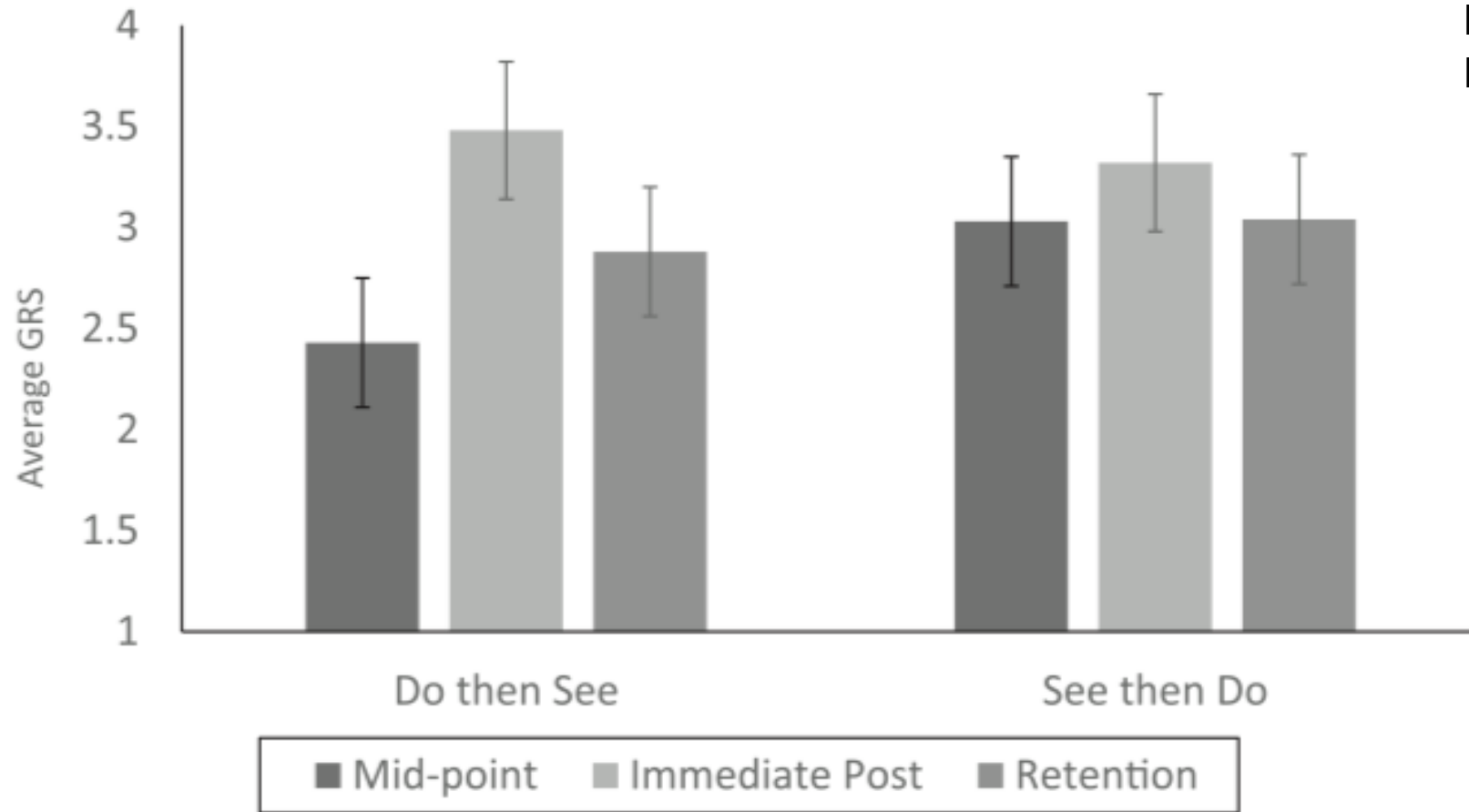


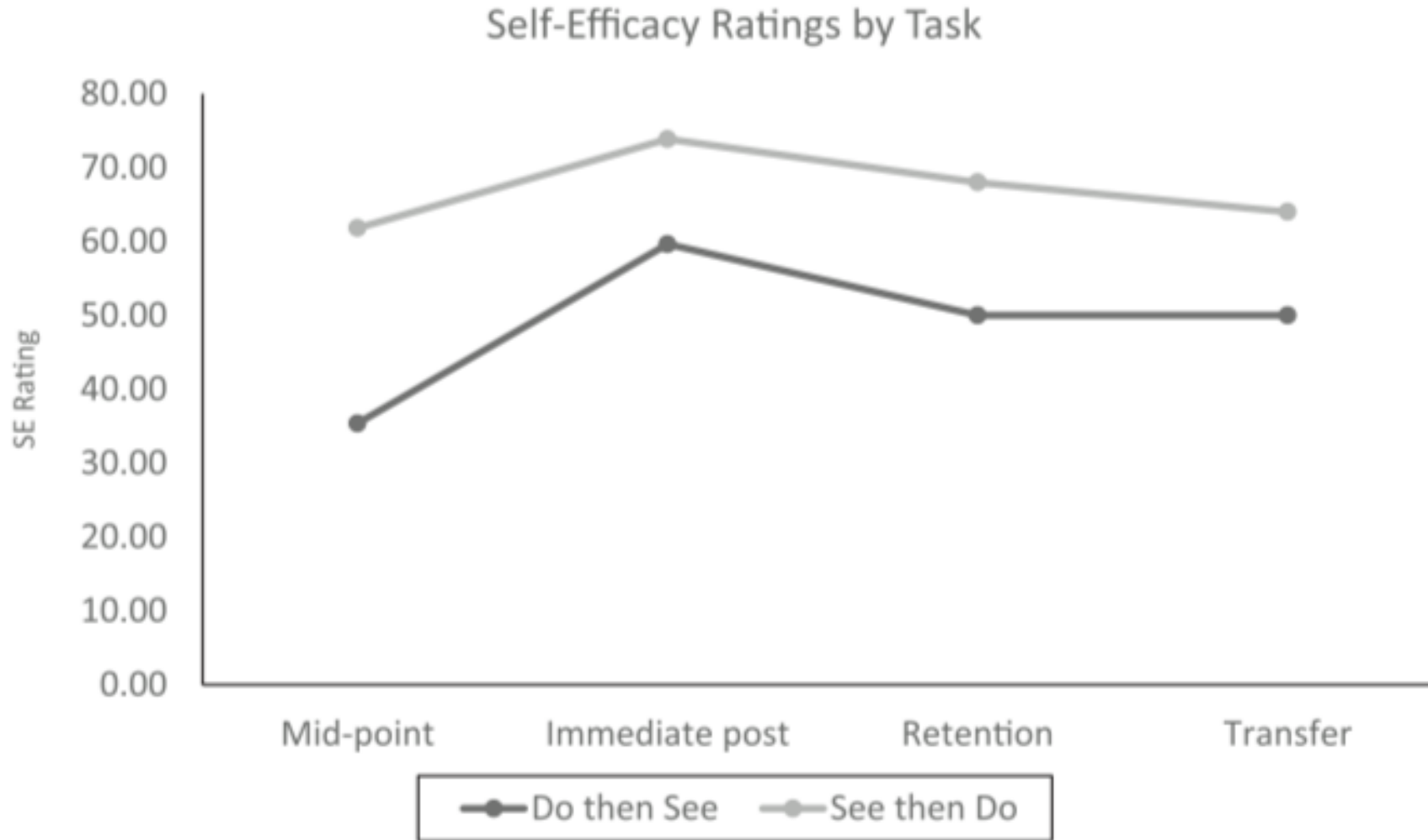
Figure 1 Performance on transfer suturing task by group; a significant effect for the Do then See group ($F[1,28] = 10.14, P < .004, \eta^2 = 0.27$).

Average Performance on Suturing



Midpoint performance
Immediate post-test
Retention test

Figure 2 Performance on midpoint, immediate post, and retention tests. A significant effect of test ($F[2,60] = 18.01, P < .001, \eta^2 = 0.38$) and significant interaction between group and time ($F[2,60] = 5.23, P < .008, \eta^2 = 0.15$) but not of group ($F[1,30] = 0.96, P < .33$).



Self-efficacy

Figure 3 Self-efficacy across the four performance tests. We found a main effect of test ($F[3,81] = 9.52, P < .0001, \eta^2 = 0.26$), and the See then Do group had significantly higher self-efficacy than the Do then See group for all tests ($F[1,27] = 8.5, P = .007, \eta^2 = 0.24$).

CHALLENGES OF DISCOVERY LEARNING

- Focus on 'seeing' only may increase familiarity and comfort (but not competence)
- Initial 'doing' may decrease comfort and self-efficacy but increase competence
 - Low self-efficacy ratings can reduce motivation and engagement
- Extreme self-discovery learning is not ideal – trainees cannot define goal

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