INTRODUCTION

- High fidelity simulations can be stressful leading to cognitive overload
- Cognitive load theory (CLT) suggests that educators should:
  - ❖ Optimize intrinsic (IL) and germane load (GL) so that a task is appropriately challenging
  - ❖ Reduce extraneous load (EL) related to lack of familiarity with equipment, instructions, and resources
- Pre-briefing and worked-out modelling (WOM) are techniques for improving simulation design
  - ❖ Pre-briefing orients the trainee to the simulation environment and task
  - ❖ WOM orients the trainee to the necessary knowledge/skills needed to succeed in the simulation

OBJECTIVE

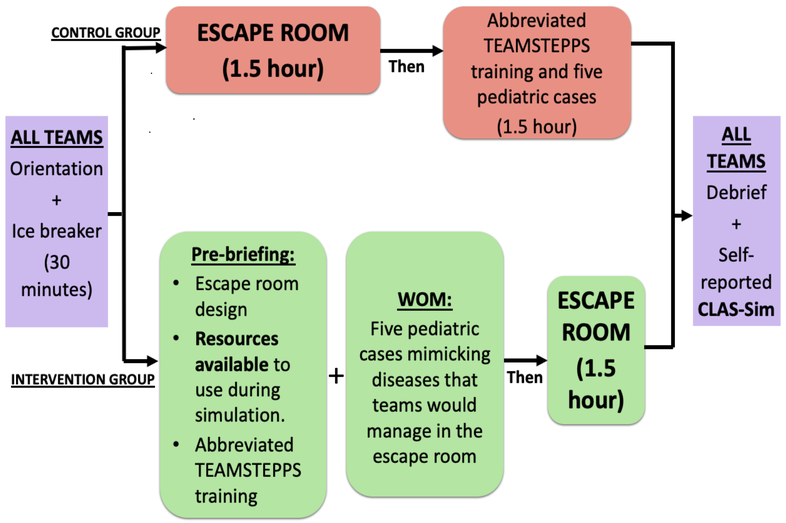
To compare self-perceived cognitive load between those who received and those who did not receive pre-briefing and WOM prior to a simulation

METHODS

- **Participants**: final year **pharmacy** and **physician assistant (PA)** students
- Students were divided into teams of 3 PA and 1 pharmacy student
- Team randomized to **control arm (26) or intervention (27) arm**
- A 5-station escape room was designed with pediatric disease states

Station	Components
1	**Pediatric dosing (crossword puzzle)**
2	**Otitis media case (invisible ink and Jigsaw puzzle)**
3	**Acute exacerbation of asthma simulation (mannequin)**
4	**Diabetes education (glucose meter and insulin)**
5	**Vaccine basics (lock box and final escape)**

DESIGN



TeamSTEPPS™: Team Strategies and Tools to Enhance Performance and Patient Safety; **WOM:** worked-out modeling; **CLAS-Sim**: cognitive load assessment scales in simulation

OUTCOME MEASURES

Immediately post-event:

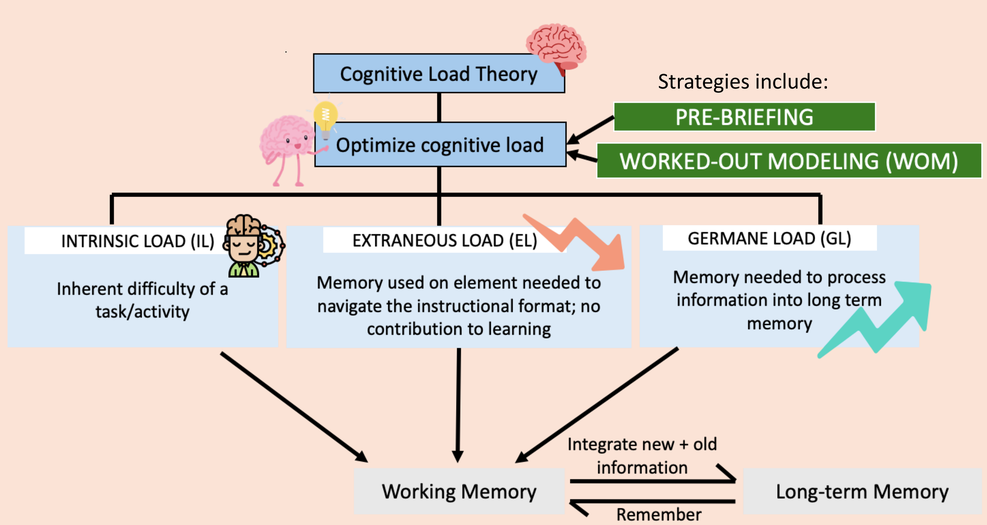
- ➢ **CLAS-Sim**: Cognitive Load Assessment Scales in Simulation
- ➢ Rate your **knowledge of pediatrics** (scale 1= "much worse" to 5= "much improved")

STATISTICAL ANALYSIS

Independent t-test

In this randomized control study:

Incorporating pre-briefing and worked-out modeling before a simulation ***reduced cognitive overload*** and ***increased self-reported knowledge of pediatrics***



Pre-briefing and WOM would reduce EL while optimizing GL and IL

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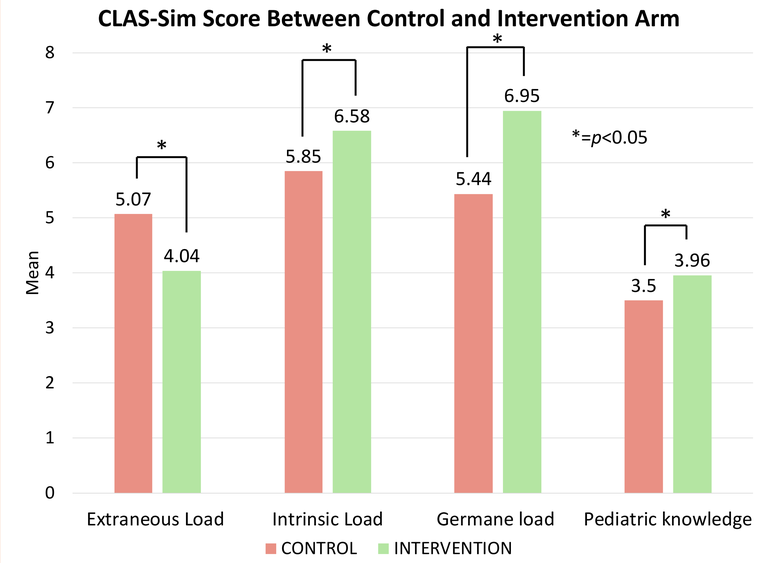
RESULTS

- Twelve pharmacy and forty-one PA students completed the study
- On the CLAS-Sim, the intervention arm had:
  - ❖ Significantly **lower EL** (5.07 vs 4.04; p=0.025)
  - ❖ Slightly **higher IL** (5.85 vs 6.58; p=0.046)
  - ❖ Significantly **better GL** (5.44 vs 6.95; p=0.002)
- On the question about "self-perceived knowledge of pediatrics" the intervention arm had higher average scores (3.5 vs 3.96; p=0.012)



CONCLUSION

STRENGTHS

- ➢ The CLAS-Sim survey isolated the elements of cognitive load that were affected by the intervention.
- ➢ Randomized control design was useful in determining any differences in cognitive load
- ➢ CLAS-Sim was administered immediately after the escape room for immediate reporting of cognitive load

LIMITATIONS

- ➢ The study did not measure actual knowledge improvement or the impact of increased germane load on long-term knowledge
- ➢ No evaluation of physiological responses such as heart rate during the simulation, which would provide information about actual stress
- ➢ Lack of pre-intervention data on knowledge regarding pediatric diseases, which could have influenced the intrinsic load

Summary

- ➢ To improve learning efficiency, instructors should consider cognitive load while designing a high-fidelity simulation

References

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Impact of Pre-Briefing and Worked-out Modeling to Reduce Cognitive Overload During an Interprofessional Simulation

Jahnavi Yalamanchili, PharmD[1]
Advisor: Deepti Vyas, PharmD[1]
Team: Tracey DelNero, DMSc, PA-C[2]; Veronica Bandy, PharmD[1]; Sara F. Mahmoud, PharmD, BCCCP[1]
[1]Thomas J. Long School of Pharmacy, University of the Pacific, Stockton, California, USA [2]School of Health Sciences, University of the Pacific, Sacramento, California, USA