Using psychophysiology labs in introductory psychology to teach neuroscientific concepts

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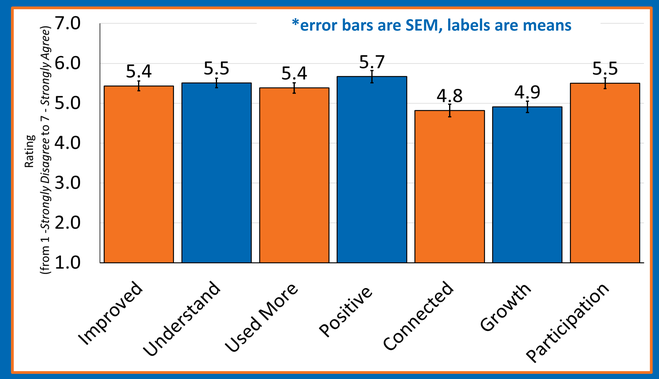
BACKGROUND

- Understanding the biological basis of human behavior is central to psychology
- Students often find biological psychology (e.g., neuroscience) concepts both intimidating & challenging
- Laboratory technology can enhance psychology program quality by engaging students in **collaborative & scientific inquiry** (Dunn et al., 2007), yet it is often expensive and difficult to use in a classroom setting
- Neulog plug-and-play technology offers relatively inexpensive, portable learning modules for recording psychophysiological data

QUESTIONS

1. **What are students' perceptions of learning related to neuroscience concepts after using psychophys tech to engage in inquiry based learning in gen psych?**
2. **Does using technology for inquiry based learning increase student understanding of neuroscientific concepts in gen psych?**

STUDY 1: STUDENT PERCEPTIONS



Compared to a neutral baseline (i.e., neither agree nor disagree [4]), students tended to agree that the GSR activity improved the quality of the course, helped them understand concepts, should be used more, helped them connect to others, promoted professional growth, and enhanced their experience of participation, *ts*(98)>5.2, *ps*<.001, Cohen's *ds* 0.53 to 1.26.

METHODS

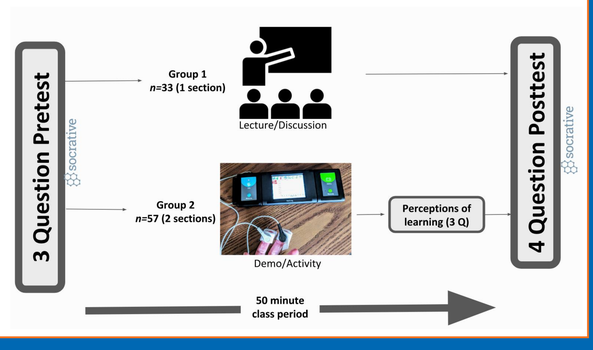
Study 1

- Three sections of KH's General Psychology courses (*N*=98) in Spring 2018
- All sections viewed a demo using GSR, then worked in groups on an activity designed to help students understand why polygraphs are not valid/reliable lie detectors using GSR
- Students completed a questionnaire about their perceptions of learning

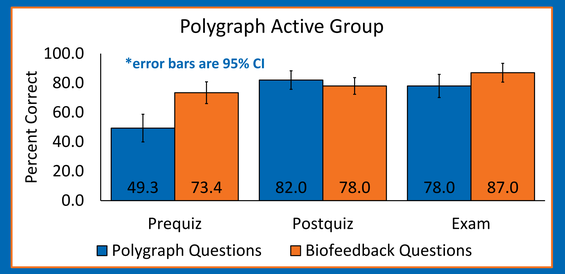
Study 2

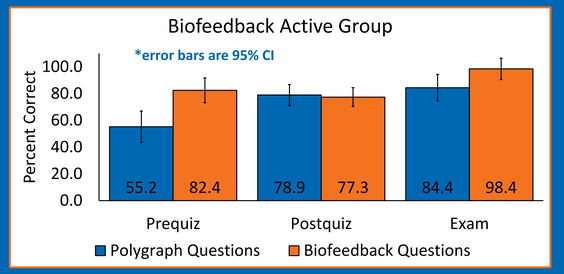
- *N*=82 who completed all measures
  - 3 sections of Gen Psych (F2018)
- 2nd class period, active groups switched
  - polygraph & biofeedback activities
- Four relevant exam questions were also measured two weeks following the activity

All procedures approved by UWP IRB

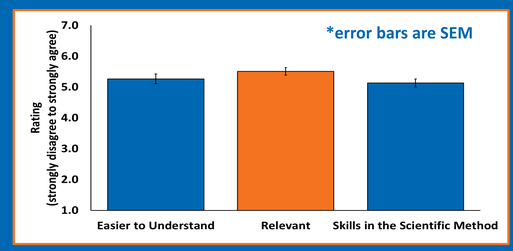


STUDY 2: STUDENT PERCEPTIONS & UNDERSTANDING





- Main effect of **activity group**, $F(1,80)=3.8$, $p=.05$ (biofeedback active group showed better performance)
- Effect of **time**, $F(1, 160)=29.4$, $p<.001$, $\eta_p^2=0.27$ (students performed better on the postquiz and exam)
- Effect of **question content**, $F(1, 80)=22.8$, $p<.001$, $\eta_p^2=0.22$ (students performed better on the biofeedback questions)
- Interaction between **time and question content**, $F(2, 160)=11.8$, $p<.001$, $\eta_p^2=0.13$ (students showed a boost in performance from prequiz to postquiz for polygraph questions, whereas the boost in performance was greater from postquiz to exam for the biofeedback questions)
- No other interactions (*ps*>.10)



Compared to a neutral baseline [4], students tended to agree that these activities (all *ps*<.001)

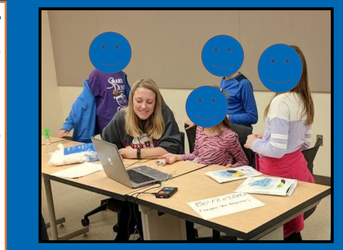
- made content easier to understand, $t(90)=8.1$, $d=0.85$
- made the content more relevant, $t(90)=12.2$, $d=1.3$
- helped develop scientific method skills, $t(90)=8.6$, $d=0.9$

CONCLUSIONS & IMPLICATIONS

Students tended to think these activities helped their learning or increased the relevance of the course content. Students' positive perceptions may motivate increased engagement in the long run.

These activities neither helped nor hurt student learning. This is important because instructors often feel they do not have time to engage in inquiry based learning activities.

Future plans include measuring student performance on future exam questions relevant to these activities to examine whether either activity leads to longer-term retention of content (via enhanced understanding or motivation to study) & more data collection in the spring.



*Data from the polygraph activity were also presented at the Society for the Teaching of Psychology Annual Conference on Teaching

*References available upon Request

2018 Annual Meeting for the *Society for Neuroscience* – Theme J ■ @kamekomae ■ Thank you to Dana Mueller, William Houghton, Bailey Kerkel, and Dominique Kornely for assistance testing Neulog and preparing activities ■ Funding from the UW-Platteville Teaching & Technology Center Digital Innovations in Teaching Technology Grant