Can Undergraduate Participant Data Represent a Larger Population?
Evaluating the Differences between Undergraduate Populations and Working Populations

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Introduction

Background Information:

- Many occupations require vigilance, such as air traffic control, nurses, surgeons, commercial drivers, etc.
- Vigilance refers to sustaining attention over a prolonged period of time. However, vigilance declines over time, resulting in decreased task performance and higher levels of mental workload; this is known as the vigilance decrement (Warm, Parasuraman & Matthews, 2008).

Problem to address:

- Importantly, majority of psychological research relies on undergraduate participants, in hopes that their results can be generalized to working populations.
- Further, many studies focus on cohort effects in social psychology (Hanel & Vione, 2016) or business psychology (Peterson, 2001) and have found college students to not be generalizable to a larger population.
- To our knowledge, studies focusing on cohort effects among college students and a working population has not been conducted with regards to vigilance.

Goal of present study:

- Our goal is to further investigate how college undergraduate participants compare to other populations, specifically working populations on a vigilance task.

Method

Participants:

- Two cohorts were used:
  1. 23 undergraduate participants (12.5% male; 86.95% female; age *M*=19.39 years; age *SD*=2.62 years)
  2. 5 working population participants (40% male; 60% female; age *M*=31.6 years; *SD*=10.83 years).

Procedure:

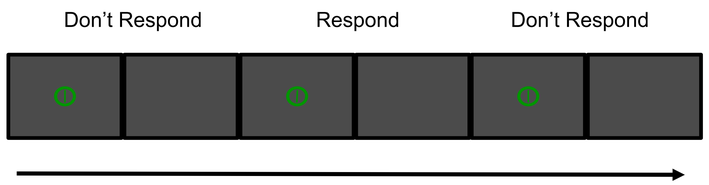
- Participants were asked to perform a 40-minute vigilance task (four 10-minute blocks). Afterwards, participants filled out a mental workload questionnaire and were debriefed.

Vigilance Task:

- Participants were instructed to indicate when a critical gauge was presented by pressing the spacebar.
- Gauges were presented for a short period of time followed by a mask (a grey screen).
- The gauges would change infrequently, and participants were asked to press the spacebar when they changed (See gauge examples and task procedure figures).

Gauge Examples:

Task Procedure:



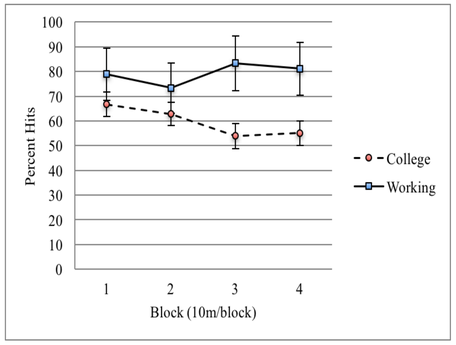
Experimental Design:

- Between-subjects IV: Group – working population and undergraduate population
- Within-subjects IV: Vigilance Block (four 10-minute blocks)
- DVs: Performance as measured by percent hits, average response time, and false alarm percent, and perceived mental workload

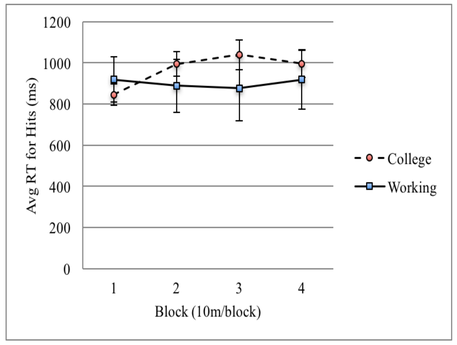
Results

Analysis:

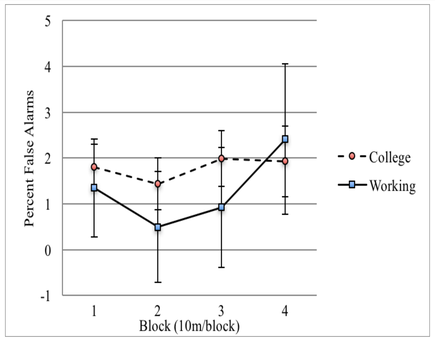
- 2 X 4 mixed design ANOVA tests were conducted for percent hits, average response time, and false alarm percent.
- An Univariate ANOVA was conducted on perceived mental workload.
- No significant differences were found between cohorts across the four blocks for each DV (see charts below).



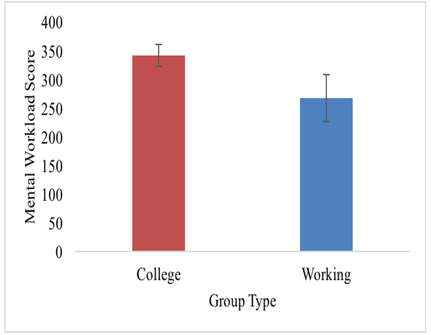
$F(3,78)=1.19$, $p=.319$, $\eta_p^2=.044$



$F(3,78)=1.935$, $p=.131$, $\eta_p^2=.069$



$F(3,78)=1.381$, $p=.255$, $\eta_p^2=.050$



$F(1,26)=2.713$, $p=.112$, $\eta_p^2=.094$

Discussion

Summary of findings:

- No significant differences between cohorts suggest that undergraduate research participants could potentially represent a wider population for vigilance tasks.
- However, factors other than cohort effects, such as motivation and exposure to vigilance-like tasks, may also have an impact on the results.
- In fact, Deaton and Parasuraman (1993) found that age differences in a vigilance task had conflicting results among different age groups. This could be another potential factor to look into further.

Limitations:

- Due to limited access to working populations, future studies should gather more participants from this population.
- In addition, these results only provide evidence for psychological studies that involve vigilance processes and not for other branches of psychological research.

Practical Implications:

- Due to finding no significant differences between the two cohorts, the use of undergraduate participants may continue to be both a convenient and generalizable sample.
- Undergraduate college students could provide information on how to implement certain techniques or solutions to prevent or improve the vigilance decrement from occurring in jobs that require high levels of sustained attention.

Acknowledgements

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References.

Deaton, J., Parasuraman, R., & Deaton, JE. (1993). Sensory and cognitive vigilance: Effects of age on performance and subjective workload. *Human Performance*, *6*(1), 71-97.

Hanel, P. H. P., & Vione, K. C. (2016). Do student samples provide an accurate estimate of the general public? *PLoS ONE*, *11*(12).

Peterson, R. A. (2001). On the use of college students in social science research: Insights from a second-order meta-anaylsis. *Journal of Consumer Research*, *28*(3), 450–461. https://doi-org.libe2.lib.ttu.edu/10.1086/323732

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