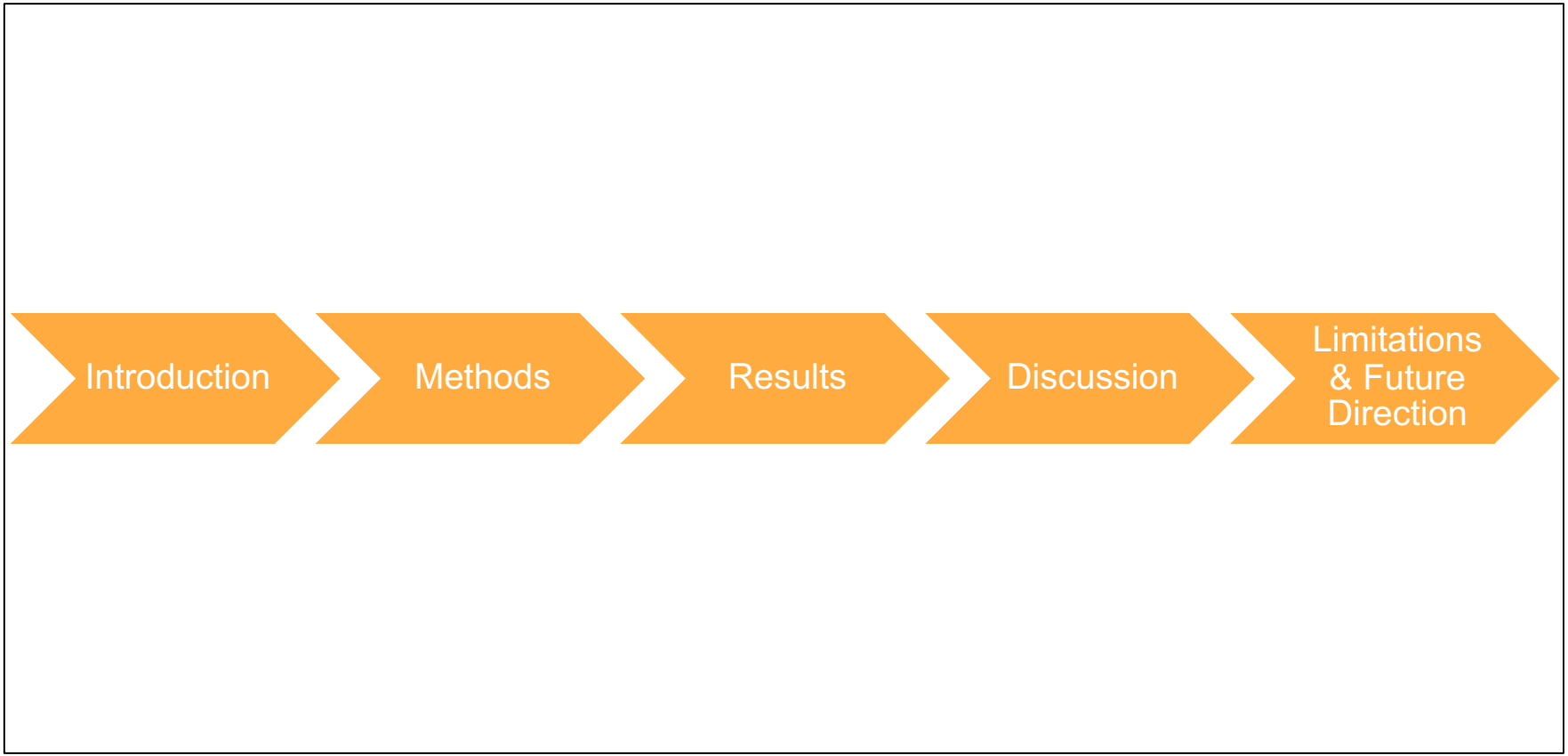
Academic Self-Efficacy Miscalibration in High School Students with ADHD

Jae Hyung Ahn, M.A. &
George J. DuPaul, Ph.D.

REACH
Lehigh

LEHIGH UNIVERSITY

Agenda


Introduction
Methods
Results
Discussion
Limitations & Future Direction

Main Points

- High school students with ADHD had lower GPAs & higher levels of miscalibration in both math and science
- Also, high level of miscalibration occurred in students with ADHD regardless of their current medication status.
- Inaccurate appraisal of one's own competence may hinder realistic goal setting and reduce the motivation to use effective study strategies.
- Providing behavioral interventions and academic coaching may be beneficial in decreasing PIB

Introduction

Self-Efficacy

- Self-efficacy: People's beliefs in their ability to perform tasks to achieve goals
    - Self-efficacy beliefs influence:
        - Choice of tasks
        - Degree of effort expenditure
        - Level of performance
        - Perseverance in the task in the academic domain

- Subject-specific self-efficacy has been a strong predictor of cognitive engagement and performance.

(Bandura, 1993; Pintrich& De Groot, 1990)

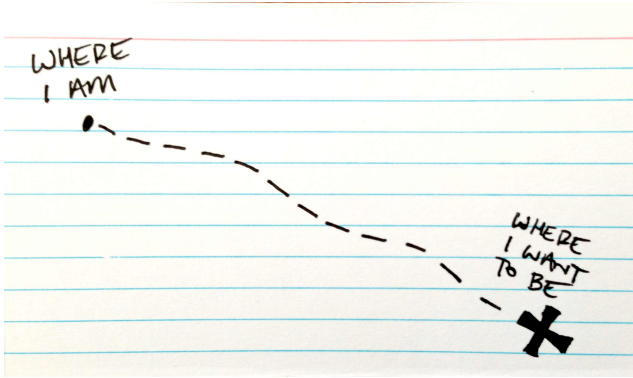
Self-Efficacy & ADHD

- Self-efficacy may not be facilitative in all students.

- Children with learning disabilities tend to optimistically miscalibrate their self-efficacy (Klassen, 2002)
    - Calibration: accuracy of one's beliefs about potential functioning

- Children with ADHD report substantially higher self-reported competence than their actual competence

    - “Positive illusory bias (PIB)” (Hoza et al., 2002)

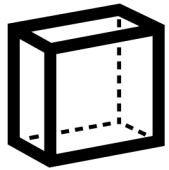


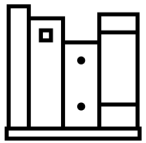
Self-Efficacy & ADHD

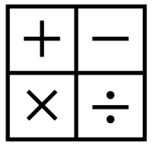
- Moderate overconfidence can promote achievement (Bandura, 1997; 1989)
- However, significant discrepancy between efficacy beliefs and performance can be problematic (Bandura, 1989).
    - “Accurate self-assessments allow students to become more autonomous agents in their education, taking responsibility for gaining and improving on their knowledge and skill.” (Dunning et al., 2004)

Self-Efficacy & ADHD

- In the ADHD literature, PIB has been calculated as the discrepancy between student self-report and teacher/ parent report of broad functioning (Owens et al., 2007)
    - E.g. scholastic competence, social acceptance, behavioral conduct
- Using more objective & domain-specific indices of performance, such as report card grades, could provide a more accurate picture of academic PIB
- Also, past PIB studies have focused on younger children with ADHD, calling for further research in the adolescent population.







Research Questions

- Do high school students with ADHD show higher levels of subject-specific miscalibration compared to their peers without ADHD in math & science?

- Does the ADHD medication status create a group difference in miscalibration among students with ADHD?

Hypothesis

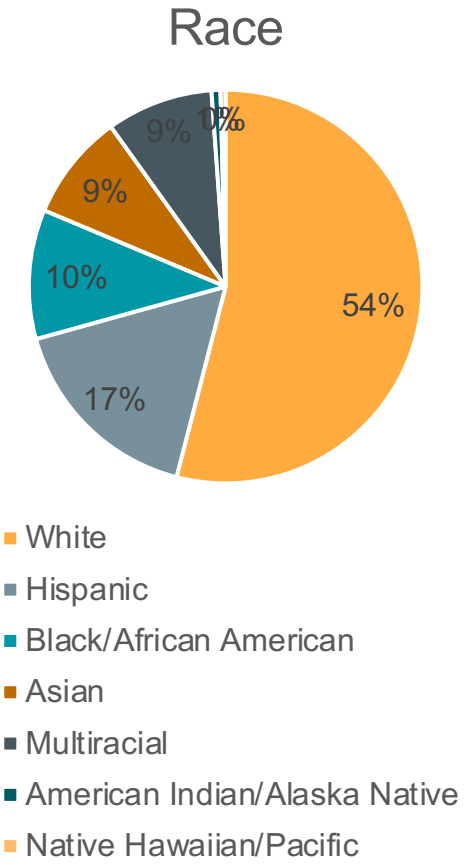
- We hypothesized that high school students with ADHD will show higher levels of subject-specific miscalibration compared to their peers without ADHD in both math and science.

- We also hypothesized that high school students currently being medicated for ADHD will show lower levels of miscalibration compared to those who are not being medicated.

Method

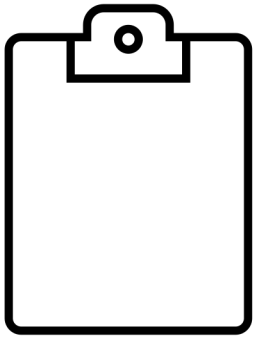
Participants

- Data from the publicly available version of the 2016 second follow-up data of High School Longitudinal Study of 2009 (HSLS:09)
  - Cases with a final GPA of 0.00 or above in math and science
    - Reduced from 23,503 to 21,620
- Demographics:
  - 50.7% male, 49.2 % female



Measures

- **ADHD Diagnosis**
  - Parents reported whether a doctor, health care provider, teacher, or school official ever told them that their 9th-grader has ADHD
  - Parents also reported whether their child received medication to treat ADHD
- **Math and Science Self-Efficacy**
  - Measured at the 2009 baseline with four items assessing a 9th grade student's confidence in each subject. Higher value represented higher self-efficacy
  - Standardized to *z*-scores
- **Math and Science GPAs**
  - From high school transcripts in 2016 (3 years post-graduation)
  - Standardized to *z*-scores
- **Math and Science Miscalibration**
  - Subtracted the math/science GPA from math/science self-efficacy

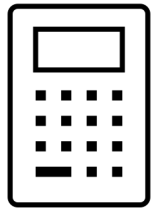


Results

LEHIGH UNIVERSITY

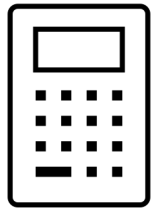
1. Math & Science GPAs

- First, independent t-tests were conducted to compare GPA *z*-scores between students with & without ADHD.
  - **Math**
    - Students with ADHD (n = 1,537, M = -.40) demonstrated significantly lower GPA than those without ADHD (n = 12,945, M = .18), t (1987.83) = 23.90, p < .001.
  - **Science**
    - Students with ADHD (n = 1,537, M = - .43) demonstrated significantly lower GPA than those without ADHD, (n = 12,945, M = .20), t (1955.60) = 25.56, p < .001.



2. Self-efficacy Ratings

- Second, independent t-tests were conducted to compare levels of self-efficacy *z*-scores between students with & without ADHD.
  - **Math**
    - Students with ADHD (*n* = 1,278, *M* = -.12) demonstrated **significantly lower self-efficacy** than those without ADHD (n = 11,308, *M*=.07), *t* (1532.27) = 6.10, *p* < .001



  - **Science**
    - Students with ADHD (*n*= 1,149, *M* = -.05) demonstrated **significantly lower self-efficacy** than those without ADHD, (*n*= 11,550, *M* = .05), *t* (1384.28) = 3.20, *p* = .001.

3. Levels of Miscalibration

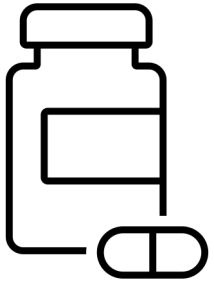
LEHIGH UNIVERSITY

- Next, independent t-tests were conducted to **compare levels of miscalibration** in math and science between students with and without ADHD.
  - **Math**
    - Students with ADHD (n = 1,278, M = .26) demonstrated **significantly higher miscalibration** than those without ADHD (n = 11,308, M= -.15), t (1548.66) = -11.94, p < .001.
    - **Cohen's *d* = .367**
  - **Science**
    - Students with ADHD (n = 1,149, M =.33) demonstrated **significantly higher miscalibration** than those without ADHD (n = 10,550, M = -.19), t (1387.37) = -14.07, p < .001.
    - **Cohen's *d* = .452**

4. Medication Status

LEHIGH UNIVERSITY

- Finally, independent t-tests were conducted to compare levels of miscalibration between students with ADHD taking medication and not taking medication.
  - **Math**
    - No significant difference between students taking medication (n = 642, *M* = .27) and not taking medication (n = 636, *M*= .26).
  - **Science**
    - No significant difference between students taking the medication (n= 581, *M* = .35) and not taking medication (n = 568, *M*= .32).



Discussion

Discussion

- As hypothesized, high school students with ADHD showed **lower GPAs and higher levels of miscalibration** in both math & science domains.
    - Students with ADHD showed lower self-efficacy than students without ADHD, but the difference in miscalibration was still significant
- Contrary to our second hypothesis, there was no significant difference in the levels of miscalibration between students taking medication and not taking medication.

Discussion

- Inaccurate appraisal of one's own competence may hinder realistic goal setting and reduce the motivation to use effective study strategies.

- Providing behavioral interventions and academic coaching maybe more beneficial in decreasing PIB in the academic domain than providing psychostimulant treatment.

- Miscalibration effect was stronger for science than math for students with ADHD.

Limitations & Future Directions

- The HSLS data does not contain information on ADHD subtypes
  - Predominantly Inattentive Type (IA)
  - Predominantly Hyperactive/Impulsive (HI)
  - Combined
- Although the HSLS is a longitudinal data, self-efficacy was measured only at two time points (2009 & 2011).
  - Investigation of time-dependent changes , as in Hoza et al.'s study (2010) that followed children (ages. 8-13) over a 6-year period, would have been interesting.
- Future analyses will investigate the relationship between self-efficacy miscalibration, GPAs, and effort expenditure.

Main Points

- High school students with ADHD had lower GPAs & higher levels of miscalibration in both math and science
- Also, high level of miscalibration occurred in students with ADHD regardless of their current medication status.
- Inaccurate appraisal of one's own competence may hinder realistic goal setting and reduce the motivation to use effective study strategies.
- Providing behavioral interventions and academic coaching may be beneficial in decreasing PIB

References

Bandura, A. (1989). Human agency in social cognitive theory. *American psychologist*, *44*(9), 1175.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational psychologist*, *28*, 117-148.

Bandura, A.(1997). *Self-efficacy: The exercise of control.* W H Freeman.

Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment: Implications for health, education, and the workplace. *Psychological Science in the Public Interest, 5*(3), 69-106.

Duprey, M.A., Pratt, D.J., Jewell, D.M., Cominole, M.B., Fritch, L.B., Ritchie, E.A., Rogers, J.E., Wescott, J.D., Wilson, D.H. (2018). *High School Longitudinal Study of 2009 (HSLS:09) Base-Year to Second Follow-Up Data File Documentation* (NCES 2018-140). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Retrieved from https://nces.ed.gov/pubsearch.

Hoza, B., Murray-Close, D., Arnold, L. E., Hinshaw, S. P., Hechtman, L., & MTA Cooperative Group. (2010). Time-dependent changes in positively biased self-perceptions of children with attention-deficit/hyperactivity disorder: A developmental psychopathology perspective. *Development and Psychopathology*, *22*(2), 375-390.

Hoza, B., Pelham Jr, W. E., Dobbs, J., Owens, J. S., & Pillow, D. R. (2002). Do boys with attention-deficit/hyperactivity disorder have positive illusory self-concepts? *Journal of Abnormal Psychology, 111*, 268-278.

Owens, J. S., Goldfine, M. E., Evangelista, N. M., Hoza, B., & Kaiser, N. M. (2007). A critical review of self-perceptions and the positive illusory bias in children with ADHD. *Clinical Child and Family Psychology Review*, *10*(4), 335-351.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*, 33-40.

Thank you