Achievement in the Classroom: Towards a Better Understanding of Academically 'Typical' and 'At-risk' (ADHD; Hyperactive-Inattentive) Students

Never Stand Still | Faculty of Arts and Social Sciences

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Study 1: ADHD, Motivation, and Achievement (a Study of Students)

Study 2: Hyperactivity-Inattention, Medication, and Achievement (a Study of Students and Classrooms)

Study 1

ADHD, Motivation, and Achievement

Martin, A.J., Burns, E.C., & Collie, R.J. (2017). ADHD, personal and interpersonal agency, and achievement: Exploring links from a social cognitive theory perspective. *Contemporary Educational Psychology*, *50*, 13-22.

ADHD

- Students with attention-deficit/hyperactivity disorder (ADHD) face numerous academic challenges, often leading to problematic academic outcomes (Barkley, 2006).

- As an executive function disorder, students with ADHD have difficulties with many of the core cognitive and behavioral skills essential to accomplishing academic tasks and meeting academic demands (Pennington & Ozonoff, 1996).

- Thus, students with ADHD are more likely to experience low academic achievement, reduced engagement, and decreased motivation as compared to their typical peers (Barkley, 2006).

- Much research on executive function issues, relatively little work has examined psycho-educational factors and processes that promote and sustain positive academic outcomes for students with ADHD.

SCT

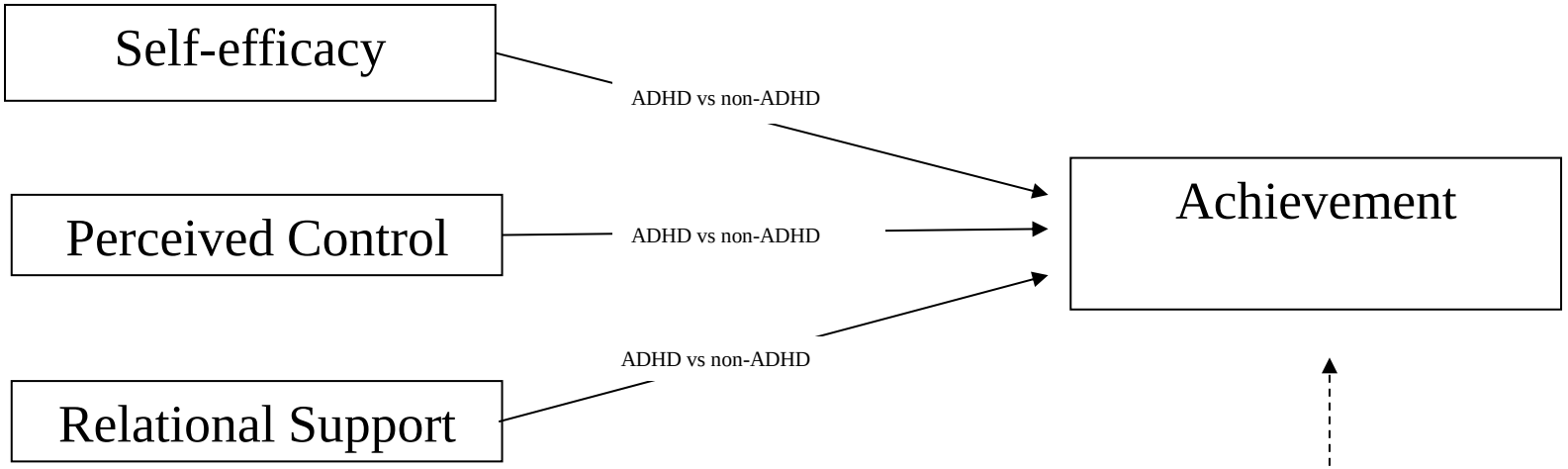
- Social cognitive theory (SCT) posits that personal and interpersonal agency have significant implications for individuals' motivation, engagement, and achievement (Bandura, 2001).

- In this study, we investigate SCT as a means to better understand factors and processes relevant to the academic success of students with ADHD.

- We examine the extent to which personal agency (self-efficacy and perceived control) and interpersonal agency (relational support by teacher) are associated with the academic achievement of students with ADHD.

Study 1 – Operational Details

The Present Study



Controlling for Covariates:

- Age
- Gender
- SES
- Disability
- Prior Achievement

Method

Participants - Schools

- 20 mainstream schools in urban areas on the east and west coast of Australia.
- Schools either systemic Catholic or private/independent.
- Seven schools co-educational, seven all female, and six all male.

Participants – ADHD Students

- *N*=164 in Year 7 (34%), Year 8 (33%), Year 9 (33%).
- 52% predominantly inattentive presentation, 15% predominantly hyperactive-impulsive presentation, and 33% combined presentation.
- 57% on medication to help manage the condition.
- Average age = 13.58 years (*SD*=.94).
- Males (77%) and females (33%).
- 29% diagnosed academic comorbidity (difficulty in reading, writing, and/or mathematics).
- 11% from a non-English speaking background (NESB).

Participants – non-ADHD Students

- *N*=4,658 in Year 7 (34%), Year 8 (33%), Year 9 (33%).
- Average age = 13.57 years (*SD*=.94).
- Males (52%) and females (48%).
- 3% diagnosed academic comorbidity (difficulty in reading, writing, and/or mathematics).
- 18% from a non-English speaking background (NESB).

Measures

- *Self-efficacy* from the Motivation and Engagement Scale – High School (Martin, 2010).
  - 4 items, e.g., “If I try hard, I believe I can do my schoolwork well”.
  - 1 (*strongly disagree*) to 7 (*strongly agree*).

- *Perceived control* from the MES-HS (Martin, 2010).
  - 4 items, e.g., “When I get a good mark I’m often not sure how I’m going to get that mark again”) - reversed.
  - 1 (*strongly disagree*) to 7 (*strongly agree*).

- *Relational support* from the teacher-student relationship scale (Martin & Marsh, 2008).
  - 4 items, e.g., “In general, my teachers give me the help and support I need”.
  - 1 (*strongly disagree*) to 7 (*strongly agree*).

- 20 multiple choice literacy and numeracy items of escalating difficulty

- Covariates: age, gender, SES, prior achievement, disabilities

Analyses

- Confirmatory factor analysis (CFA) and structural equation modeling (SEM) with M*plus* 7.31 (Muthén & Muthén, 2015).
- Maximum likelihood method of estimation.
- Missing data using M*plus* full information maximum likelihood defaults (FIML).
- The comparative fit index (CFI > .95) and root mean square error of approximation (RMSEA < .05) used as fit indices.
- Substantive factors (self-efficacy, control, relational support) were entered alongside covariates (age, gender, SES, disability, prior achievement) as predictors of achievement.
- Multi-group analysis was conducted such that ADHD and non-ADHD parameters were estimated in the one model.

Results

Figure 1a. *non-ADHD Sample (controlling for covariates)*

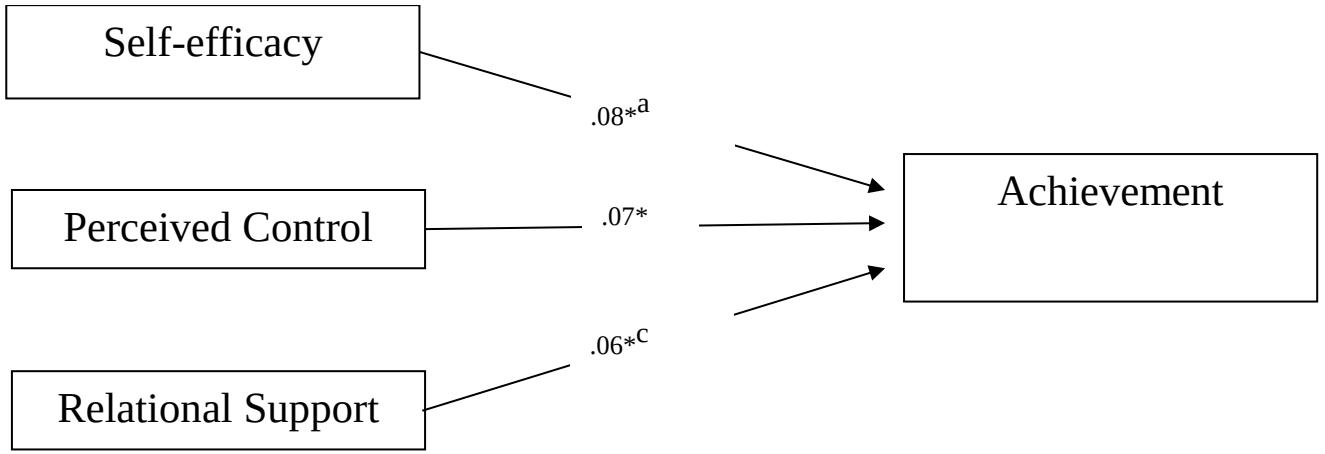
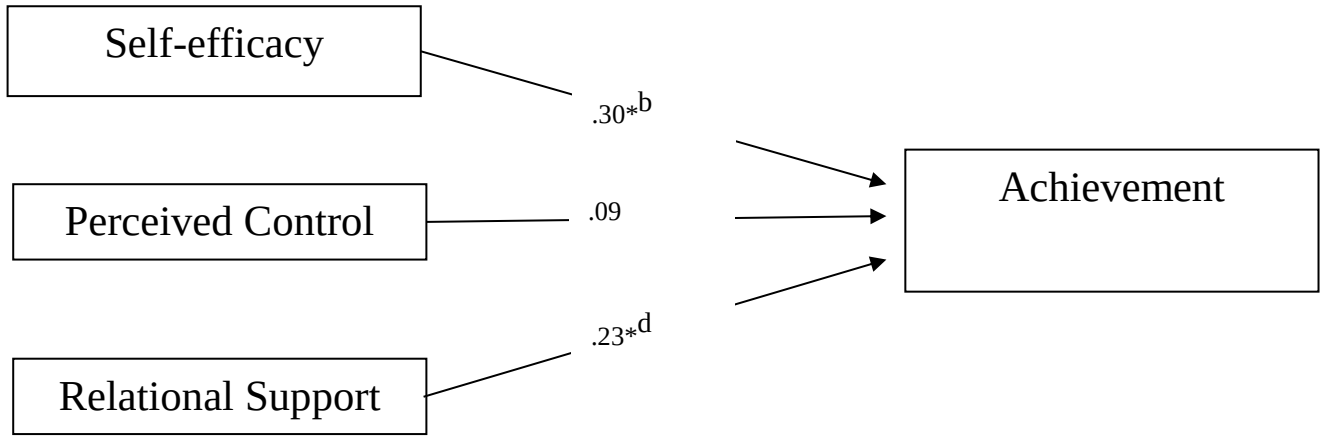


Figure 1b. *ADHD Sample (controlling for covariates)*

Superscripts ‘a’ and ‘b’ differ at $p<.01$
Superscripts ‘c’ and ‘d’ differ at $p<.05$



Study 2

Hyperactivity-Inattention, Medication, and Achievement: A Study of Students and Classrooms

- Currently under peer review
- Envisaged release of findings early 2019

Introduction

Introduction

- It is well established that hyperactivity and inattention (H-I) have negative effects on students' academic and developmental outcomes (Barkley, 2006; Purdie, Hattie, & Carroll, 2002).

- Pharmacological intervention can significantly reduce H-I symptomatology (Vaughan, Roberts, & Needelman, 2009).

- Whereas the bulk of research investigating H-I and medication has focused on students (i.e., these studies conduct student-level analyses), research into classroom climates and processes suggests numerous reasons why it is critical to also examine these issues at the classroom level.

Rationale for Classroom-level Research

- When students are nested within classrooms, their classroom becomes potentially differentiated from other classrooms, and the behaviors and outcomes of its students and the class itself both influence and are influenced by the classroom membership (Goldstein, 2003; Marsh et al., 2012).
- It is not uncommon for classrooms to comprise more than one student who presents with H-I or is prescribed psychostimulant medication.
- H-I can comprise externalizing behaviors that can disrupt classroom outcomes (Barkley, 2006).
- Teachers (and schools) are increasingly held to account for their class's achievement (Harris, 2011; Lingard, Thompson, & Sellar, 2016).
- Taken together, given the potentially numerous student- and class-level factors and processes implicated in H-I, the present study investigated the role of psychostimulant medication (the most frequently administered medication for H-I symptoms) in reducing the negative effects of H-I on achievement.

Psychostimulants and H-I

- Because the dopaminergic system is implicated in the pathophysiology of ADHD and its H-I symptomology (Vaidya & Gordon, 2013), medication that targets dopamine is found to be helpful in reducing H-I among children with ADHD.

- Dopamine is a neurotransmitter associated with movement and attention.

- In psychostimulant medicine, the therapeutic effect is achieved by steady increases of dopamine, aimed at mimicking the way dopamine is naturally produced in the brain.

- Recent research (Erlij et al, 2012) has suggested that ADHD is caused by abnormalities of dopamine signaling in the brain, and that, in ADHD patients, the dopamine D4 receptor gene is abnormal.

- This research has identified a network of nerve terminals (located in the basal ganglia and the thalamus) where stimulation of dopamine D4 receptors depress motor activity.
  - Thus, enhancing dopamine D4 transmission in the basal ganglia and the thalamus may be part of the mechanism that explains how psychostimulants reduce, for example, hyperactivity.

Aims

1) Investigate the role of psychostimulant use in reducing the effects of H-I on achievement in year 3 and in year 5.

2) Investigate the unexplored role of class-average psychostimulant status in reducing the effects of class-average H-I on class-average achievement in year 3 and in year 5.

Proposed Model

Hypothesized Model

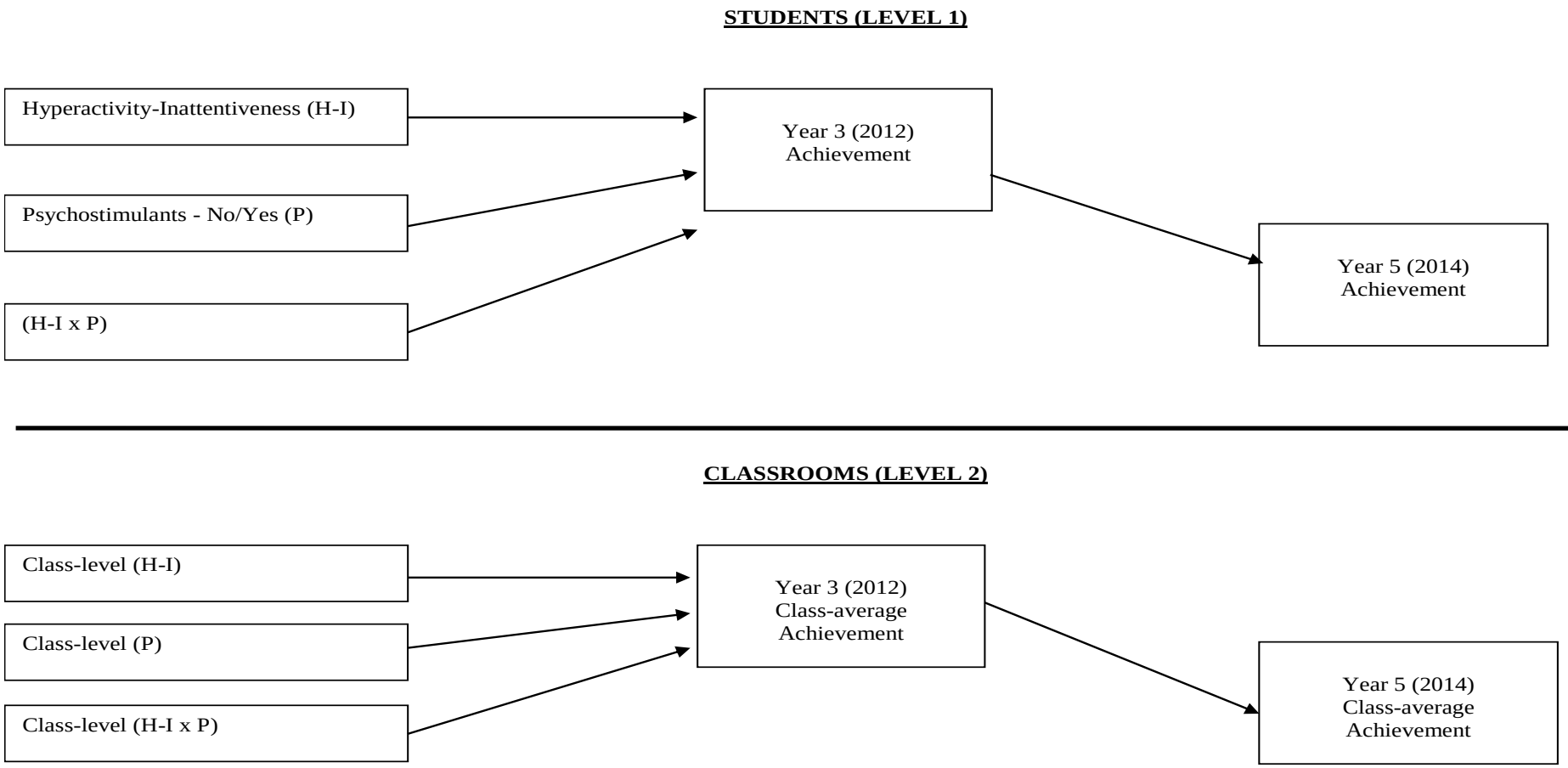


Figure 1. Hypothesized multilevel path model

Note. Model controls for age, gender, non-English speaking background (NESB), socio-economic status (SES), learning disability, and prior achievement

Method and Results

- **Currently under peer review**
- **Envisaged release of findings early 2019**

THANK YOU