# ASSESSMENT & TREATMENT OF ADHD IN COLLEGE STUDENTS

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1

# SEX DIFFERENCES IN PSYCHOPATHOLOGY

Sabbatical Highlight

2

Psychological Bulletin
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# Gender Differences in the Diagnosis of Mental Disorders: Conclusions and Controversies of the *DSM–IV*

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One of the more controversial issues in terms of mental disorder diagnoses has been their differential sex prevalence. The conclusions provided in the 4th edition of the American Psychiatric Association's (1994) *Diagnostic and Statistical Manual of Mental Disorders* were derived from systematic reviews of the research literature. However, this research is perhaps complicated by common sources of error. Two sources, in particular, are emphasized here: biases in sampling and biases within the diagnostic criteria themselves. The potential for such biases is illustrated for a wide variety of mental disorder diagnoses, and suggestions for research to address them are provided.

3

| | *Journal of Abnormal Child Psychology* 1987–1994 N = 254 | |
|---|---|---|
| | *n* | % |
| Empirical studies included in analyses | 243 | 100 |
| Both sexes included | 173 | 71 |
| Males only | 69 | 28 |
| Females only | 1 | <1 |

4

# Hartung & Lefler (under review)

## Psychological Bulletin

### Sex and Gender in Psychopathology: DSM-5 and Beyond

--Manuscript Draft--

| | |
|---|---|
| **Manuscript Number:** | |
| **Full Title:** | Sex and Gender in Psychopathology: DSM-5 and Beyond |
| **Abstract:** | Understanding sex and gender in psychopathology has complicated research efforts for years. Hartung and Widiger (1998) reviewed differential sex and gender prevalence rates as presented in the American Psychiatric Association's (APA) 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994). Sources of error contributing to conclusions about sex prevalence rates were emphasized, including biases in sampling and biases within the diagnostic criteria themselves. The current review includes an update of sex prevalence rates as presented in the APA's 5th edition of the DSM (DSM-5; APA, 2013) and a discussion of continued potential biases and other concerns such as terminology and measurement issues. We |

5

| | | *Journal of Abnormal Child Psychology* 2010–2015 N = 647 | | *Journal of Abnormal Psychology* 2010–2015 N = 572 | |
|---|---|---|---|---|---|
| | | *n* | % | *n* | % |
| | Not included in analyses | 44 | 7[a] | 54 | 9[a] |
| 1 | Did not specify sex of participants | 28 | 4[a] | 20 | 3[a] |
| | Meta-analysis, review or correction | 11 | 2[a] | 34 | 6[a] |
| | Empirical studies included in analyses | 603 | 100[b] | 518 | 100[b] |
| 2 | Both sexes included | 547 | 91[b] | 435 | 84[b] |
| | Males only | 39 | 70[c] | 25 | 30[c] |
| | Females only | 17 | 30[c] | 58 | 70[c] |
| 3 | Analyzed or controlled sex | 399 | 63[d] | 245 | 46[d] |

6

## Sex- and Gender-Neutral Research

- "We have found that most mental health research largely ignores sex (and gender) differences; this sex-neutral and gender-neutral approach is biased, it risks undermining scientific validity and efficiency, and it could contribute to a failure of health providers to deliver gender-sensitive mental health treatments and services, to the detriment of both men and women." (p. 10; Howard et al., 2017)
- ADHD example:
  - ADHD is more common in boys than girls
  - Sex/gender differences in ADHD are likely due to differences in genetic and cognitive liabilities or biological sex differences (Arnett et al., 2015)
- Anxiety example:
  - Anxiety disorders are more common in females
  - Femininity and anxiety were positively correlated and masculinity and anxiety were negatively correlated (Carter et al., 2011)
  - Sex/gender differences in anxiety are likely due to gender role orientation

7

## ASSESSMENT & TREATMENT OF ADHD IN COLLEGE STUDENTS

8

# Is ADHD a Problem in College Students?

- 2-8% of college students have ADHD (DuPaul et al., 2009)
  - 25% of those receiving UDSS services have ADHD (Advokat, 2010)
- Students with ADHD who attend college have/are:
  - Lower GPAs (Weyandt & DuPaul, 2006; Weyandt et al., 2013)
  - More academic impairment (Lewandowski et al., 2008; Weyandt & DuPaul, 2006)
  - More depression, anxiety & emotional lability (Weyandt et al., 2013)
  - More likely to be on academic probation (Heiligenstein et al., 1999)
  - Less likely to graduate from college (Norwalk et al., 2009; Weyandt & DuPaul, 2006)
  - Higher rates of substance use & abuse (Upadhyaya et al., 2005)
- Adults with ADHD have/are:
  - Greater risk for obesity (OR = 1.5; Nigg, 2013)
  - More speeding tickets & auto accidents (Barkley, 2015)
  - Higher rates of physical injury (OR = 1.5-1.8; Nigg, 2013)
  - Higher rates of suicide completion (OR > 4; Nigg, 2013)
  - Shorter life expectancy (12-19 years shorter; Barkley, 2018)

9

# ASSESSMENT

10

# Unanswered Assessment Questions

- Are the DSM-5 criteria developmentally appropriate for adults?
  - Is the DSM symptom cutoff of 5 for adults valid?
- Are college-student self-reports valid?
  - Do college students over-report their ADHD symptoms?
  - Are there sex differences in prevalence of ADHD symptoms?
- Is there a form of ADHD that does not begin in childhood?
  - Does adult-onset ADHD exist? (Moffitt et al., 2015; Caye et al., 2016; Agnew-Blais et al., 2016)

11

# Developmentally Appropriate ADHD Criteria

Fedele*, Hartung, Canu & Wilkowski (2010)

- **Are the DSM-5 criteria developmentally appropriate for adults?**
- Barkley et al. (2007) found 9 items to be optimal for adults with a mean age of 35
  - Item set included: 18 DSM ADHD items + 87 EF items
  - We examined same item set in college students
- Participants were 1,047 college students (56.5% female) from three universities
- Confirmatory factor analysis and logistic regression
  - A novel set of 17 items was identified as potential college students ADHD criteria
- These items may be more sensitive to ADHD in college students than DSM criteria

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12

**Table 2** Cognitive inflexibility and disinhibition items

| Item | Source |
|---|---|
| Trouble organizing my thoughts or thinking clearly | CI |
| When shown something complicated to do, cannot keep information in mind so as to imitate or do it correctly | CI |
| Not very flexible in my behavior or approach to a situation; overly rigid in how I like things done | CI |
| Unable to come up with or invent as many solutions to problems as others seem to | CI |
| Have trouble putting my thoughts down in writing as well or as quickly as others | CI |
| In trying to accomplish goals or assignments, find I am not able to think of as many ways of doing things as others | CI |
| Have difficulty explaining things in their proper order or sequence | CI |
| Unable to "think on my feet" or respond as effectively as others to unexpected events | CI |
| Make decisions impulsively | DI |
| Unable to inhibit my reactions or responses to events or others | DI |
| Make impulsive comments to others | DI |
| Likely to do things without considering the consequences for doing them | DI |
| Change my plans at the last minute on a whim or last minute impulse | DI |
| Quick to get angry or become upset | DI |
| Over-react emotionally | DI |
| Get silly, clown around, or act foolishly when I should be serious | DI |
| Accident prone | DI |

*CI* cognitive inflexibility, *DI* disinhibition

13

# Lowering the Threshold for ADHD in Adults

Hartung, Lefler, Canu, Stevens*, Jaconis*, LaCount*, Shelton*, Leopold & Willcutt (2016)

- Rather than adopting adult criteria, DSM-5 retained the same 18 symptoms:
  - Added developmentally-specific examples to each symptom
  - Lowered the cutoff from 6 to 5 symptoms for individuals who are 17 and older
- **Is the DSM symptom cutoff of 5 for adults valid?**
  - Participants were 2,577 undergraduates (65.8% females) from four universities
  - We examined cutoffs of 4, 5 and 6 symptoms in terms of impairment

14

**Table 1.** Barkley and Weiss Impairment Means by Inattention Symptoms.

| Inattention | n | Barkley impairment (10 items) M | Barkley impairment (10 items) SD | Weiss impairment (70 items) M | Weiss impairment (70 items) SD |
|---|---|---|---|---|---|
| 0-2 | 2,016 | 0.37$^{a}$ | 0.40 | 0.36$^{a}$ | 0.28 |
| 3 | 177 | 0.98$^{b}$ | 0.50 | 0.68$^{b}$ | 0.36 |
| 4 | 113 | 1.16$^{c}$ | 0.52 | 0.82$^{c}$ | 0.36 |
| 5 | 103 | 1.32$^{c,d}$ | 0.49 | 0.94$^{c,d}$ | 0.47 |
| 6 | 60 | 1.49$^{d,e}$ | 0.48 | 1.07$^{d,e}$ | 0.43 |
| 7-9 | 108 | 1.69$^{e}$ | 0.55 | 1.18$^{e}$ | 0.54 |

*Note.* Barkley and Weiss Impairment item responses ranged from 0-3. For inattention, 0-2 includes participants who self-reported 0, 1, or 2 symptoms of inattention; 7-9 includes participants who self-reported 7, 8 or 9 symptoms of inattention. Within each impairment measure, means with no common superscripts are significantly different ($p < .01$).

15

## Self-Handicapping & ADHD Self-Reports

Jaconis*, Boyd, Hartung, McCrea, Lefler & Canu (2016)

- **Do college students over-report their ADHD symptoms?**
  - In Fedele et al. (2012) college women reported higher levels of IA, HYP, and impairment
- Jaconis et al. examined sex differences in ADHD and self-handicapping
  - Participants were 699 college students (66.2% females) from 3 universities
  - Women reported higher levels of hyperactivity/impulsivity
  - Women reported higher levels of claimed SH
  - Men reported higher levels of behavioral SH
- Assessed whether SH mediated the sex differences (or lack of)
  - Mediation was used because we were interested in whether SH accounted for sex differences in ADHD

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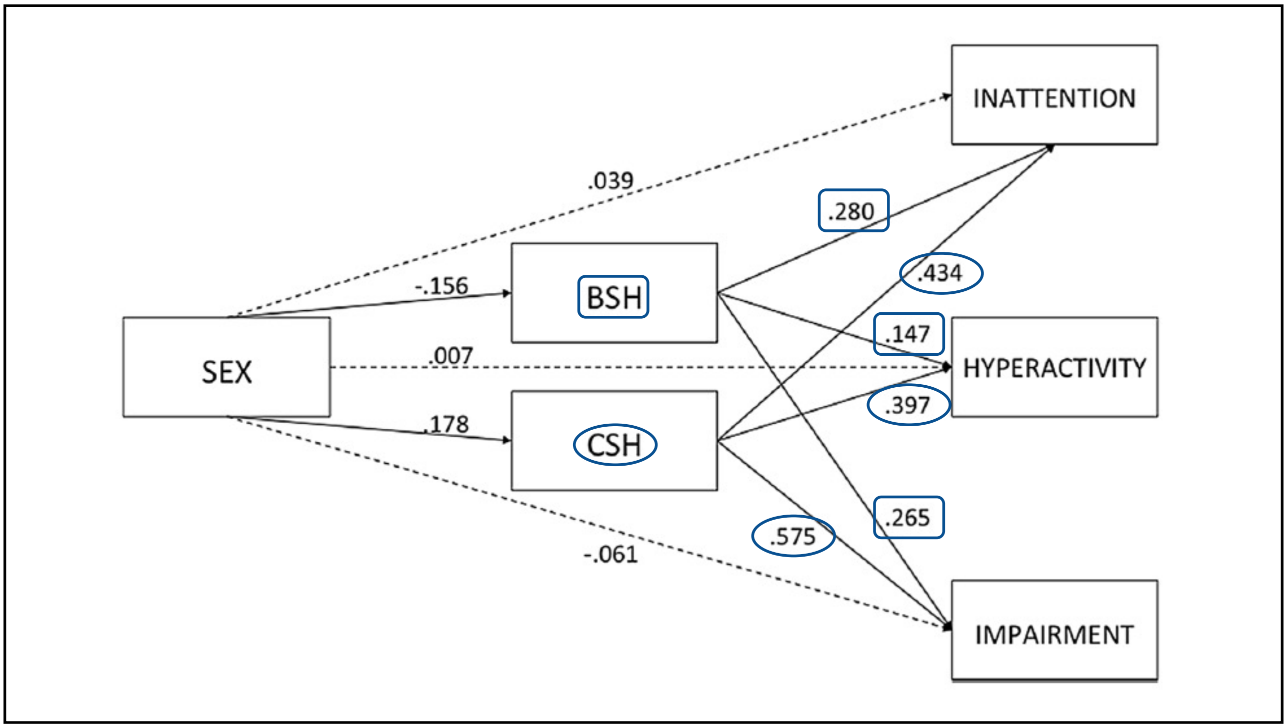
16




17

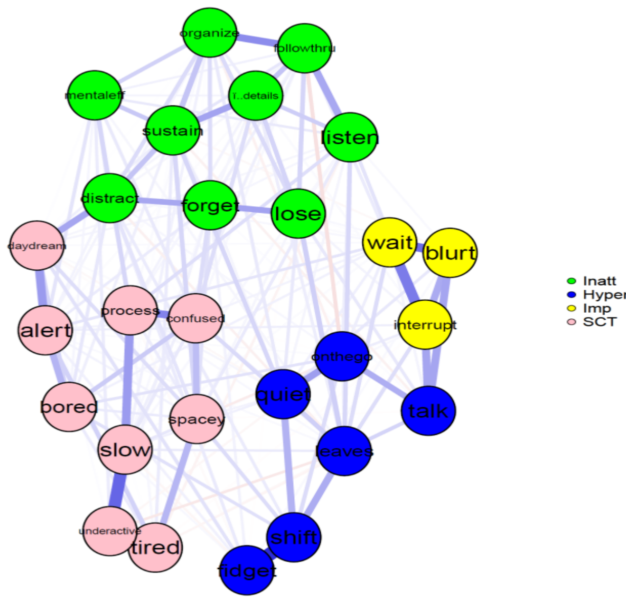
## Structure of ADHD Networks Through Adulthood

Lee, Goh, Shelton* & Hartung (in preparation)

- **Are emerging adult self-reports valid?**
  - Adults don't always have a reliable collateral informant
- Participants
  - 8,458 adults on MTurk
    - Age range 18 to 80 (M = 34.85, SD = 11.48); 62.1% female
  - 860 reported a prior diagnosis of ADHD
    - Age range 18 to 72 (M = 31.42; SD = 9.09); 55.5% female
- Examined the structure of self-reported ADHD symptoms across age groups:
  - 18-25 years (n = 1,882; 57% female)
  - 26-44 years (n = 4,912; 61% female)
  - 45-64 years (n = 1,488; 71% female)

18

Network for 18- to 25-year-olds




19

# Defining “Late-Onset” ADHD

Hartung, Shelton* & Canu (under review)

- **Is there a form of ADHD that does not begin in childhood?**
- Participants
  - 8,458 adults on MTurk
    - Age range 18 to 80 (M = 34.85, SD = 11.48); 62.1% female
  - 860 reported a prior diagnosis of ADHD
    - Age range 18 to 72 (M = 31.42; SD = 9.09); 55.5% female
- Self-reported
  - Inattention
  - Hyperactivity/Impulsivity
  - Impairment
- ADHD symptom onset & diagnosis
  - Have you ever been diagnosed with ADHD?
  - At what age were you diagnosed?
  - How old were you when these symptoms began?

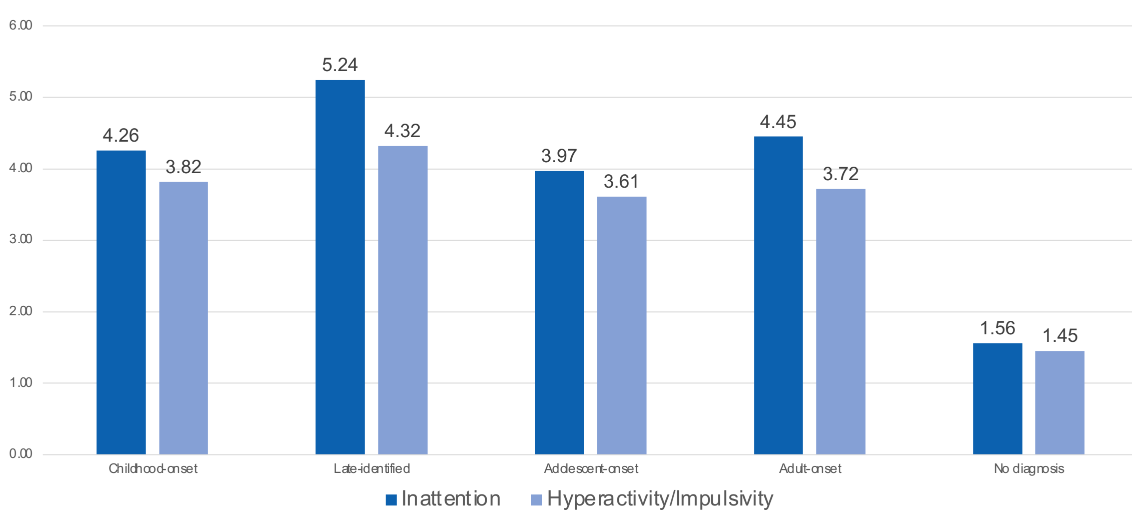
20

# ADHD Onset Patterns

| | Symptom onset < age 12 | Symptom onset ≥ age12 |
|---|---|---|
| Diagnosis < age 18 | Childhood Onset<br>n = 290 (34%) | Adolescent Onset<br>n = 185 (22%) |
| Diagnosis ≥ age 18 | Late Identified<br>n = 190 (22%) | Adult Onset<br>n = 195 (23%) |

21

# ADHD Symptom Counts by Onset Patterns




22

## Assessment Conclusions

- DSM-5 criteria may not be ideal for adults
  - Lowering the threshold may not be the answer
  - Need to focus on impairment in diagnosis of ADHD in college students
- More work is needed on the validity of adult self-reports
  - More work is needed on sex differences in adults
  - Normative data may be clinically useful given reporting styles
  - Study in progress that will compare self-reports to collateral reports
- Be wary of adult onset ADHD
  - Collateral reports are important to establish childhood onset
  - Depression, anxiety, and substance use may explain “adult onset”

23

# TREATMENT

24

## Unanswered Treatment Questions

- Do stimulants work for college students with ADHD?
  - Do stimulants help college students without ADHD?
  - How serious is the diversion problem on college campuses?
- Is CBT effective for college students with ADHD?
  - Which components of CBT are necessary?
  - Do these treatments benefit academically at-risk students?
  - Would an internet-based intervention be acceptable?
- Is physical exercise an effective treatment for ADHD?
  - Do college students with ADHD have less healthy lifestyles?
  - Can we effectively treat ADHD with acute physical exercise?
  - Can we reduce risk for obesity with chronic physical exercise?

25

## Treatment Targets

- Core symptoms
  - Inattention
  - Hyperactivity-impulsivity
- Underlying deficits
  - Executive functioning
- Key areas of impairment
  - Disorganization & poor time management
  - School problems
  - Social & relationship problems
  - Risky behaviors
- Comorbid problems
  - Self-esteem problems
  - Anxiety & depression
  - Substance use disorders

26

## Medication Treatment

- Limited research in adults & college students
  - 200 studies in children
  - 10 studies in adults
  - 1 study in college students (DuPaul et al., 2012)
- What we know about medication treatment in adults
  - Results are less impressive in adults
  - Only 50% of adults have positive response compared to 70% of children (Biederman & Spencer, 2002)
  - Adults report more concerns about side effects
  - Concerns about diversion on college campuses

27

## Stimulant Misuse in College Students

Hartung, Canu, Cleveland*, Lefler*, Mignogna*, Fedele*, Correia, Leffingwell & Clapp (2013)

- **How serious is the diversion problem on college campuses?**
- Over-selected stimulants users from four universities ($N$ = 1,153):
  - Appropriate users (had rx & took as prescribed; $n$ = 146)
  - Medical misusers (had rx & misused; $n$ = 25)
  - Non-medical misusers (did not have rx & used; $n$ = 274)
- Findings
  - Men were more likely to engage in non-medical misuse than women ($p$ = .009)
  - 81% of non-medical misusers obtained from a friend (PRN)
  - Concerning patterns of polysubstance misuse in both types of misusers
    - More marijuana and pain med use

28

## Stimulant Effectiveness in College Students

### Hartung & Looby (grant proposal submitted)

- DuPaul et al. (2012)
  - Double-blind, placebo-controlled, crossover design with ADHD and controls
  - Found reductions in ADHD and EF problems but deficits remained compared to controls
- Two questions:
  - **Do stimulants work for college students with ADHD?**
    - Replicate DuPaul et al. (2012)
  - **Do stimulants help college students without ADHD?**
    - In particular, college students who have misused for academic gain
- Examine the acute effects of Vyvanse on executive functioning
- Expectations
  - Stimulants will result in improved attention and memory only in students with ADHD
  - Results could be used to discourage stimulant misuse among students without ADHD

29

## Medication Conclusions

- Strengths
  - Short term improvements in EF and core symptoms
- Limitations
  - Stimulants do not equalize academic achievement in college students (Advokat, 2010)
  - Only 50% of adults have positive response compared to 70% of children (Biederman & Spencer, 2002)
  - Abuse potential especially on college campuses
  - Problematic side effects
  - Lack of skill acquisition or long-term effectiveness
  - Lack of improvement in impairment
    - “The medication helps me focus but it doesn’t tell me what to focus on” (Solanto, 2011; p. 1)

30

## Psychosocial Treatment

- Behavioral and cognitive components
  - Organization, time management & planning (behavioral)
  - Avoiding procrastination (cognitive-behavioral)
  - Adaptive thinking skills for self-concept issues (cognitive)
- Preliminary studies suggest effectiveness
  - Adults (Safren et al., 2005; Solanto, 2011)
  - College students (LaCount et al., 2015; Eddy et al., 2018)

31

## Group & Individual CBT for College Students

LaCount*, Hartung, Shelton*, Clapp & Clapp (2015)

- **Is CBT effective for college students with ADHD?**
- Open trial conducted in UW Psychology Clinic
  - Adapted Safren et al. (2005) CBT for adult ADHD to college students
  - Combined group & individual treatment (10 weeks)
- Participants were undergrad & grad students
  - 12 completers, 5 non-completers

32

# Results

- Significant reductions with medium to large effects sizes for some DVs
- Medium effect sizes but not statistical significance for other DVs
- Intent-to-treat analyses resulted in moderate attenuation of effects

*Completer Analysis (N = 12)*

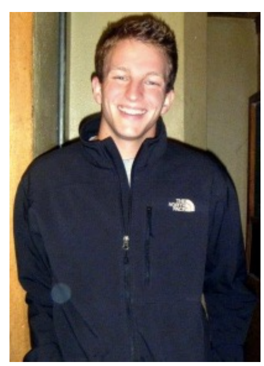
| | Pre-Treatment | | Post-Treatment | | Difference | | | Paired samples *t*-tests | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | 95% CI | *p* | Cohen's *d* | 95% CI |
| Inattention | 5.75 | 2.34 | 3.58 | 2.78 | 2.17 | 3.33 | [0.29, 4.05] | .045 | 0.93 | [0.00, 1.68] |
| Hyperactivity | 3.67 | 1.92 | 2.17 | 2.79 | 1.50 | 3.26 | [-0.34, 3.34] | .139 | 0.78 | [-0.36, 1.27] |
| School | 2.14 | 0.43 | 1.92 | 0.41 | 0.22 | 0.34 | [0.03, 0.42] | .047 | 0.51 | [-0.29, 1.33] |
| Work | 1.75 | 0.46 | 1.46 | 0.55 | 0.29 | 0.41 | [0.06, 0.52] | .033 | 0.63 | [-0.26, 1.38] |
| Self-concept | 2.13 | 0.83 | 1.77 | 0.82 | 0.37 | 0.83 | [-0.10, 0.84] | .154 | 0.44 | [-0.38, 1.25] |
| Life skills | 2.27 | 0.49 | 2.04 | 0.54 | 0.23 | 0.67 | [-0.15, 0.61] | .263 | 0.47 | [-0.37, 1.25] |

33

# Organization & Time Management Training for ADHD

LaCount*, Hartung, Shelton* & Stevens* (2018)

- **Which components of CBT are necessary?**
- Dismantling study examining OTMP component
- Students with elevated ADHD symptoms & academic impairment
  - Randomly assigned to intervention (*n* = 22) and control conditions (*n* = 15)
  - Intervention was 3 group sessions of OTMP
- Intervention components were:
  - Using calendar and task lists
  - Prioritization & breaking tasks down
  - Avoiding procrastination



34

# Results

- Group x Time interactions suggested improvement for intervention group
  - Medium to large effect sizes

**Table 2.** Comparison of Outcomes at Posttreatment.

| Variable | Intervention group ($n$ = 22) | | | | Comparison group ($n$ = 15) | | | | Group × Time interaction | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre $M$ | ($SD$) | Post $M$ | ($SD$) | Pre $M$ | ($SD$) | Post $M$ | ($SD$) | $F$(1, 35) | $p$ | $\eta_p^2$ | $d$[a] |
| School | 14.23 | (5.55) | 10.36 | (6.21) | 12.07 | (5.44) | 12.27 | (7.59) | 6.19 | .018 | .15 | .70 |
| OTMP | 30.27 | (17.56) | 42.27 | (25.94) | 25.73 | (21.15) | 28.67 | (20.05) | 1.70 | .201 | .05 | .68 |
| ADHD-I | 13.73 | (5.51) | 10.50 | (5.56) | 12.33 | (6.86) | 12.27 | (6.26) | 4.71 | .037 | .12 | .59 |
| ADHD-H/I | 12.41 | (5.88) | 8.09 | (5.66) | 8.80 | (6.00) | 9.67 | (5.77) | 18.71 | <.001 | .35 | .74 |

*Note.* School = academic impairment; OTMP = organization, time management, and planning skills utilization; ADHD-I = ADHD–inattention symptom severity; ADHD-H/I = ADHD–hyperactivity/impulsivity symptom severity.
[a]Effect size for within-group pairwise comparisons of intervention group participants, standardized using variability of scores at baseline.

35

# OTMP Skills Training for At-Risk Freshman

Stevens*, Hartung, Shelton*, LaCount* & Heaney (under review)

- Does OTMP benefit academically at-risk students?
- Synergy program for academically at-risk students
  - 3 guest lectures on OTMP skills
- Group x time interactions showed medium to large effects
- Intervention group improved more than controls on:
  - Inattention (p = .046; ηp2 = .06)
  - Overall impairment (p = .005; ηp2 = .12)
  - Family functioning (p = .006; ηp2 = .11)
  - Social functioning (p = .002; ηp2 = .14)
  - Self-concept (p = .025; ηp2 = .08)
  - Life skills (p = .037; ηp2 = .07)
- Intervention is promising for at-risk students
  - Need to look at longer term outcomes

36

## Internet-Based Intervention for ADHD
Shelton* & Hartung (in progress)

- **Would an internet-based intervention be acceptable?**
  - Examined acceptability, credibility, and expectancies using an MTurk survey
- Participants were 235 adults (55% females)
  - Ages 18 to 35
  - Prior diagnosis of ADHD
  - Currently high on ADHD symptoms
- Results
  - 58% preferred IBI over F2F treatment
  - 95% viewed IBIs as moderately acceptable
- Results suggest that the development of a full-scale IBI would be worthwhile

37

## Book Prospectus Under Review

**Surviving College: A Modular Treatment for College, and College-Bound, Students with ADHD or Other Learning Challenges**

Cynthia M. Hartung & Will H. Canu

38

## Psychosocial Conclusions

- Strengths
  - Students report satisfaction & benefits
  - May have a positive impact on students with ADHD & academically at-risk students
- Limitations
  - More research is needed (RCTs) to determine if time & cost effective
  - Not widely available on college campuses

39

## Physical Exercise

- PE leads to increased levels of BDNF and dopamine (Berwid & Halperin, 2012)
  - ADHD has been linked to poor health outcomes in adulthood (e.g., obesity)
- One RCT in children with ADHD (Hoza et al., 2014)
  - Physical exercise appears promising
  - No RCTs with adolescents or adults
- Effects of PE on ADHD:
  - Acute effects are those immediately following a single bout of PE
  - Chronic effects are cumulative over the course of regular PE
- We are currently conducting several studies with college students

40

## Healthy Lifestyles in College Students with and without ADHD

Serrano*, Hartung, LaCount & Smith (in preparation)

- Do college students with ADHD have less healthy lifestyles?
  - Targeting sleep, nutrition & physical activity could impact ADHD & health
- Participants were 2,216 undergrads (67% female) from 4 universities
  - 246 undergrads with significant ADHD symptoms
- Students with ADHD reported:
  - More sleep problems ($p < .001$; $\eta p2 = .02$)
  - More emotional eating ($p < .001$; $\eta p2 = .01$)
  - More alcohol use ($p < .001$; $\eta p2 = .02$)
  - More emotional drinking ($p < .001$; $\eta p2 = .02$)
  - No differences in physical activity in contrast to parent reports

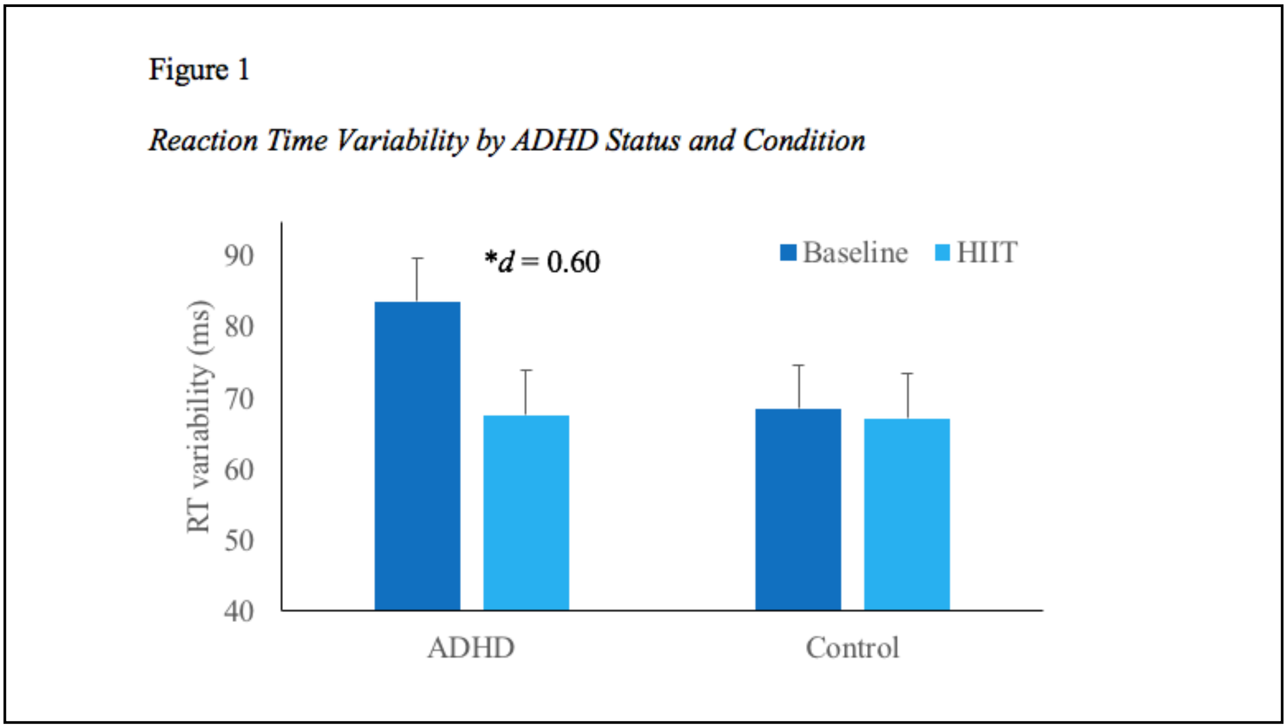
41

## Acute Effects of HIIT for College Students with ADHD

LaCount*, Hartung, Smith et al. (in preparation)

- **Can we effectively treat ADHD with acute physical exercise?**
- Examined the acute effects of 16 minutes of HIIT
  - Two counterbalanced sessions with and without exercise
- Preliminary analyses ($n$ = 30)
  - 14 ADHD, 16 controls
  - Repeated measures ANOVAs
  - Have not analyzed all measures yet

42




43

# Physical Exercise Conclusions

- Strengths
  - May result in short term improvements in EF and ADHD symptoms
  - PE may promote brain development (long-term improvements) (Berwid & Halperin, 2012)
  - Limited abuse potential & side effects
  - Ancillary health benefits
- Limitations
  - Do not know how long the effects last
  - May be a lack of skill acquisition or long-term effectiveness

44

# Treatment Conclusions

- Threshold for evidence-base depends (Arnold et al.,2013)
  - Safe vs. risky
  - Cheap vs. expensive
  - Easy vs. difficult
  - Sensible vs. unrealistic
- Safe, easy, cheap and sensible (SECS)
  - Lower threshold for evidence
  - Physical exercise
  - Organization, time management & planning
- Risky, unrealistic, difficult or expensive (RUDE)
  - Higher threshold for evidence
  - Stimulant medication
- Tested, ineffective, contraindicated, and known to cause harm (TICK)
  - Attachment therapies (Chaffin et al., 2006)

SOCIETY OF CLINICAL CHILD & ADOLESCENT PSYCHOLOGY

http://effectivechildtherapy.org/

SOCIETY OF CLINICAL PSYCHOLOGY

https://www.div12.org

45

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46