Adult ADHD

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Harvard Medical School
## Disclosures

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<tr>
<th>Company</th>
<th>Role/Support Details</th>
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Dr. Spencer receives research support from Royalties and Licensing fees on copyrighted ADHD scales through MGH Corporate Sponsored Research and Licensing.

Dr. Spencer has a US Patent Application pending (Provisional Number 61/233. 686), through MGH corporate licensing, on a method to prevent stimulant abuse.
DSM V ADHD

- Descriptors added to facilitate application across the life span
- Cross-situational requirement strengthened to “several” symptoms in each setting
- Onset criterion several symptoms present prior to age 12
- Comorbid diagnosis with autism spectrum disorder allowed
- Adult symptom cutoff now five symptoms both for inattention and for hyperactivity/impulsivity.
Symptoms of Hyperactivity Often Manifest Differently In Adults

DSM IV Symptom Domain
- Squirms and fidgets
- Can’t stay seated
- Runs/climbs excessively
- Can’t play/work quietly
- “On the go” / “Driven by motor”
- Talks excessively

Common Adult Manifestation
- Workaholic
- Overscheduled/overwhelmed
- Self-select very active job
- Constant activity leading to family tension
- Talks excessively

Symptoms of Impulsivity Often Manifest Differently In Adults

Impulsivity in adulthood often carries more serious consequences

**DSM IV Symptom Domain**
- Blurts out answers
- Can’t wait turn
- Intrudes/interrupts others

**Common Adult Manifestation**
- Low frustration tolerance
  - Losing temper
  - Quitting jobs
  - Ending relationships
  - Driving too fast
  - Addictive personality

Symptoms of Inattention Often Manifest Differently in Adults

**DSM IV Symptom Domain**
- Difficulty sustaining attention
- Doesn’t listen
- No follow through
- Can’t organize
- Loses important items
- Easily distractible, forgetful

**Common Adult Manifestation**
- Difficulty sustaining attention
  - Meetings, reading, paperwork
- Paralyzing procrastination
- Slow, inefficient
- Poor time management
- Disorganized

Toward a Dual Pathway Model of ADHD

**Directed Attention**
- Executive circuit
  - Inhibitory deficits
  - Executive dysfunction

**Fascination**
- Reward circuit
  - Reduce time to reward
  - Delay aversion

MRI Findings in Adult with ADHD

Dorsolateral Prefrontal Cortex (DLPFC): Blue
Anterior Cingulate Gyrus (CGa): Blue
Volume Increase: Red    Volume Decrease: Blue

Seidman et al, Biological Psychiatry. 2006; 60:1071-80
Methylphenidate Increases Dorsal ACC & DLPFC in Patients with ADHD

MPH-OROS Higher than Placebo at 6 Weeks

Bush et al. AGP. 2009
## Deficient Emotional Self Regulation

1. Quick to get angry or become upset
2. Easily frustrated
3. Over-react emotionally
4. Easily excited by activities going on around me
5. Lose my temper
6. Argue with others
7. Am touchy or easily annoyed by others
8. Am angry or resentful

**Scoring:** Never (0), Sometimes (1), Often (2), Very Often (3)

**DESR:** ≥ 95th percentile of total scores in Controls

Surman et al, AJP In Press  www.mghcme.org
Deficient Emotional Self-Regulation

- Found in 61% of adult ADHD subjects
- Only partially accounted for by lifetime comorbidity
- ADHD + DESR had significantly greater impairment
  - QLES-Q (all items)
  - SAS-SR (all items except parenting)
- Marital Status
  - 22.9% vs. 34.7%
    - Divorced
      - 19.5% vs. 8.9%
- Traffic accidents and arrests  \( p<0.05 \)
Diagnosis of ADHD in Adults: Adult ADHD Scales

Symptom Assessment Scales

- Brown ADD Scale
- Conners Adult ADHD Rating Scale
- Wender-Reimherr Adult Attention Deficit Disorder Scale
- ADHD Rating Scale
- Barkley Current Symptoms Scale
- Adult Self-Report Scale v 1.1 (18-item symptom assessment and screener)
- Adult Investigator Symptom Report Scale (AISRS)

Diagnostic Scales

- Conners Adult ADHD Diagnostic Interview
- Barkley Current Symptoms Scale (with supplemental Barkley scales)
- Brown ADD Scale Diagnostic Form
- Kiddie-SADS Diagnostic Interview ADHD Module
- **Adult ADHD Clinician Diagnostic Scale (ACDS v1.2)**

Cross-national prevalence and correlates of adult ADHD

• Large epidemiologic study in 10 countries using the identical methodology of the NCS-R.

• Retrospective assessment of childhood-onset, persistent ADHD among 18 to 44-year-old respondents

• 11,422 respondents were screened in 10 countries.

Cross-national prevalence and correlates of adult ADHD


France

Italy

Spain

Lebanon

Mexico

Belgium

Netherlands

Italy

Germany

USA

Avg 3.4
## Impairments in 30-Day Functioning Associated With Adult ADHD

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>OR</th>
<th>OR Controlled for other disorders</th>
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</thead>
<tbody>
<tr>
<td>Time out of role</td>
<td>31.4</td>
<td>2.6 *</td>
<td>1.8 *</td>
</tr>
<tr>
<td>Low social functioning</td>
<td>10.7</td>
<td>3.1 *</td>
<td>1.5 *</td>
</tr>
<tr>
<td>Low cognition</td>
<td>20.5</td>
<td>3.9 *</td>
<td>2.2 *</td>
</tr>
<tr>
<td>Low mobility</td>
<td>16.9</td>
<td>2.2 *</td>
<td>1.5 *</td>
</tr>
<tr>
<td>Low self-care</td>
<td>4.2</td>
<td>1.5</td>
<td>0.9</td>
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*Fayyad et al. Br J Psychiatry. 2007 May;190:402-9*
Functional Impairments in Adults with ADHD

- Survey of a community sample of 500 adults with ADHD and 501 gender- and age-matched non-ADHD comparisons in a representative sample of adults in the US

Educational Impairment in High School

Percentage of Those Who Attended High School

- "C" average or lower: ADHD (52%) vs. Non-ADHD (27%)
- Had a tutor: ADHD (37%) vs. Non-ADHD (13%)
- Had special classes: ADHD (37%) vs. Non-ADHD (10%)
- Had to repeat a grade: ADHD (30%) vs. Non-ADHD (8%)

*p ≤ .001

Current Employment Status

Percentage of Each Group

Currently employed
- ADHD (N=500): 52%
- Non-ADHD (N=501): 72%

Employed full time
- ADHD (N=500): 34%
- Non-ADHD (N=501): 57%

Not currently employed
- ADHD (N=500): 48%
- Non-ADHD (N=501): 27%

Looking for work
- ADHD (N=500): 14%
- Non-ADHD (N=501): 5%

* $P \leq .001$
Average Household Income by Education Level Attained

<table>
<thead>
<tr>
<th>Education (Highest Degree Obtained)</th>
<th>ADHD</th>
<th>Control</th>
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<tbody>
<tr>
<td>Less than High School</td>
<td>$29,577</td>
<td>$23,859</td>
</tr>
<tr>
<td>High School / Some College</td>
<td>$38,738</td>
<td>$46,741</td>
</tr>
<tr>
<td>College / Some Post-grad</td>
<td>$63,086</td>
<td>$66,683</td>
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<tr>
<td>Post-graduate Degree</td>
<td>$52,404</td>
<td>$91,316</td>
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Impact of Psychometrically Defined Deficits of Executive Functioning in Adults With Attention Deficit Hyperactivity Disorder

Joseph Biederman, M.D.
Carter Petty, M.A.
Ronna Fried, Ed.D.
Jessie Fontanella, B.A.
Alysa E. Doyle, Ph.D.
Larry J. Seidman, Ph.D.
Stephen V. Faraone, Ph.D.

Objective: The association between deficits in executive functioning and functional outcomes was examined among adults with attention deficit hyperactivity disorder (ADHD).

Method: Subjects were adults who did (N=213) and did not (N=145) meet DSM-IV criteria for ADHD. The authors defined having deficits in executive functioning as having at least two measures of executive functioning with scores 1.5 standard deviations below those of matched comparison subjects.

Results: Significantly more adults with ADHD had deficits of executive functioning than comparison subjects. Deficits of executive functioning were associated with lower academic achievement, irrespective of ADHD status. Subjects with ADHD with deficits of executive functioning had a significantly lower socio-economic status and a significant functional morbidity beyond the diagnosis of ADHD alone.

Conclusions: Psychometrically defined deficits of executive functioning may help identify a subgroup of adults with ADHD at high risk for occupational and academic underachievement. More efforts are needed to identify cost-effective approaches to screen individuals with ADHD for deficits of executive functioning.
EFDs in Adults

Biederman et al. AJP 2006

<table>
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<th>Controls</th>
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<tr>
<td>Percent With EFDs</td>
<td>31%</td>
<td>16%</td>
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Impact of Executive Functioning Deficits in Adults with and without ADHD

EF measurements included: sustained attention/vigilance, planning and organization, response inhibition, set shifting and categorization, selective attention and visual scanning, verbal and visual learning, and memory

Workplace Impairment

Percentage of Those Employed Who "Strongly Agree"

- Easy to concentrate on work: 33% ADHD (N=261) vs. 59% Non-ADHD (N=301)
- Able to handle large work loads: 52% ADHD vs. 74% Non-ADHD
- Unless very interested, unable to pay attention for long periods of time: 46% ADHD vs. 20% Non-ADHD
- Organized at work: 39% ADHD vs. 69% Non-ADHD
- Sometimes have difficulty following instructions: 5% ADHD vs. 11% Non-ADHD
- One of the first that would be considered for a promotion: 31% ADHD vs. 45% Non-ADHD

* P≤.001, † P≤.05, ‡ P≤.01
A Simulated Workplace Experience for Nonmedicated Adults With and Without ADHD

- Eighteen non-medicated adults with ADHD and 18 without were evaluated in a full-day work simulation.
- Participants were compared on self-reported ADHD symptoms, objective observations, and written task performances.
- There was a significant difference in performance on reading comprehension and math fluency as well as observer-rated and self-reports for behavior,
- Findings suggest that adult ADHD is associated with significant deficits in performance on tasks, internal experiences, and external observations of core symptoms of ADHD.

Biederman et al. Psychiatric Services 2005; 56:1617-1620
Conclusions

• Though all subjects reported trouble focusing on boring tasks, ADHD subjects had more trouble than controls sitting still.

  ▪ Internal struggle with symptoms of ADHD reported by ADHD subjects across the board, despite lack of observer rating of externalized symptoms.

  • Consistent with previous research: Adults with ADHD more likely to appear calm but suffer from internal restlessness than children with same diagnosis.
What About Driving?
ADHD
Motor Vehicle Driving

In computer-simulated driving tests, ADHD drivers had more

- crashes
- scrapes
- erratic steering

On checks of official driving records, the ADHD group had more

- citations for speeding
- license suspensions
- crashes (including more causing bodily injury)

Accidents and Near Misses

*Indicates P<0.05 after controlling for gender, age, time of day and the age*ADHD interaction

(Reimer et al., submitted)
Poor interpersonal skills

- Trouble Making friends
- Marital problems
- Impulsive comments
- Quick to anger
- Verbally abusive
- Poor follow-through
- Perceived as immature
- Failure to appreciate other’s needs
- Poor listening
- Trouble sustaining friends

Barkley and Murphy 2000
Relationship Problems in High School

Percentage of Those Who Attended High School

- Fit in with peers: ADHD (27%) vs. Non-ADHD (60%) p<.001
- Popular in school: ADHD (19%) vs. Non-ADHD (36%)
- Got along with teachers: ADHD (44%) vs. Non-ADHD (63%)
- Liked by adults: ADHD (46%) vs. Non-ADHD (67%)
- Good relationship with parents: ADHD (35%) vs. Non-ADHD (64%)

Relationship Problems as Adults

Percentage of Each Group

- Ever divorced
  - ADHD (N=500): 28%
  - Non-ADHD (N=501): 15%

- Ever separated
  - ADHD (N=500): 10%
  - Non-ADHD (N=501): 5%

Percent "Strongly Agree"

- Good relationship with parents
  - ADHD (N=500): 47%
  - Non-ADHD (N=501): 70%

- Fits in well with peers
  - ADHD (N=500): 40%
  - Non-ADHD (N=501): 70%

* P≤.001, † P≤.01

Kaplan-Meier Curves for PSUD Onset in ADHD Adults

Wilens & Biederman et al, 1995
Rates of Lifetime vs. Interval Disorders in ADHD Subjects vs. Controls at the 16 Yr F-U: Mood and Anxiety Disorders

Biederman et al. JCP 2012
in a large Swedish registry, 51,707 individuals with ADHD were compared to 258,535 matched controls. Individuals with ADHD had an increased risk of both attempted (OR = 8.46) and completed suicide (OR = 12.22) compared with matched control participants, even after adjusting for comorbid psychiatric disorders (OR = 3.62 and OR = 5.91, respectively).
ADHD: The Disorder

Symptom domains
- Hyperactivity
- Inattention
- Impulsivity

Psychiatric comorbidities
- Anxiety and mood disorders
- Disruptive behavior disorders (conduct disorder and oppositional defiant disorder)

Functional impairments
Self
- Low self-esteem
- Accidents and injuries
- Smoking
- Substance abuse
- Delinquency
School / Work
- Academic difficulties, underachievement
- Employment difficulties
Home
- Family stress
- Parenting difficulties
Social
- Poor peer relationships
- Socialization deficit
- Relationship difficulties

Lead to