Cognitive Behavior Therapy for Children with Attention Deficit Hyperactivity Disorder

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Introduction

• ADHD - lifelong developmental disorder
  
  (Kessler et al, 2009)

• Core symptoms: hyperactivity, impulsivity, inattention
  
  (DSM IV)

• Impairments: cognitive, social & emotional
  
  (Kessler et al, 2009)

• Boys diagnosed 3-4 times more than girls
  
  (Scott Levin Inc, 2001)

• Manifestations of ADHD vary at different developmental stages
  
  (Fabiano et al, 2009; Chronis et al, 2007, Daly et al, 2007)
Introduction

• Stimulants - primary mode of treatment

• Medication does not improve functional impairments

• Therefore, functional impairments warrant additional treatment

• In addition, co-morbid disorders must be treated

• Cognitive Behavior Therapy (CBT) effective; more so as part of multimodal treatment package
Functional Impairment in Patients With ADHD Compared to Those Without

- Repeat a grade
- < high school
- Teen pregnancy
- STD
- Substance abuse
- Accident prone
- Serious car accident
- Arrested

Subjects (%)

ADHD in Childhood

- Affects 3-5% school aged children
  - (Jensen, 1999)

- 85% children continue to have ADHD as adolescents
  - (Biederman, 2000)

- Early intervention reduces long term negative impact of ADHD
  - (Kessler et al, 2005)
CBT studies

• Mixed results in children

• Improvement demonstrated in:
  – core ADHD symptoms  
    \[\text{(Durlach et al, 1991; Froelich et al, 2002)}\]
  – impulsivity  
    \[\text{(Pelham et al, 1998)}\]
  – behavioral and social adjustment  
    \[\text{(Kendall & Braswell, 1985)}\]
  – academic performance  
    \[\text{(DuPaul & Eckert, 1997)}\]
Hinshaw et al, 1984

- Comparative and combined effects of CBT and medication for hyperactive boys
- Effects of self evaluation and medication on social behaviours in a playground setting studied
- 24 hyperactive boys, 8-13 years, compared with 8 normal controls
- 4 treatments compared in combinations:
  - methylphenidate vs. cognitive behaviour reinforced self evaluation
  - methylphenidate vs. extrinsic reinforcement
  - placebo vs. cognitive behaviour reinforced self evaluation
  - placebo vs. extrinsic reinforcement
- Medication status was crossed with intervention order
Hinshaw et al, 1984

- 2 observers scored participants’ behaviours as:
  - appropriate
  - negative
  - non social

- CBT included:
  - self instructions training for academic activities
  - controlling anger in peer provocation situations
  - learning self evaluation through instructions
Intervention order 1: Reinforced self evaluation on day 1 followed by Reinforcement alone on day 2.
Intervention order 2: Reinforcement alone on day 1 followed by Reinforced self evaluation on day 2.
Hinshaw et al, 1984

- CBT and medication group showed best outcomes; medication helped make accurate self statements.

- Strengths: Use of a control group, naturalistic setting

- Limitations: Small sample size, short duration of the programme, no follow up, limited generalisability of results.
Hinshaw, Henker & Whalen, 1984

- A double blind trial
- An improvement over their earlier study.
- 24, 8-13 year old boys on stable dose of methylphenidate for 3 months, attending a 5 week summer program, compared with 9 normal boys
- CBT (structured, script based, 1 1/4 hours per week for first 2 weeks) focusing on stress inoculation delivered in individually tailored sessions; included training in:
  - problem solving skills
  - self talk strategies
  - attitudes toward medication
  - self instruction
Fig. I. Mean scores for Self-control by training condition and by test.

p < 0.01
Hinshaw and Henker, 1984

- Results: CBT group used more purposeful coping strategies
- Overall improvement in fidgeting, verbal retaliation and vocalisation
- Methylphenidate impacted the intensity of behaviour

Strengths
- Double blind nature
- Individually tailored CBT

Limitations:
- favouring boys with positive response to medication
- observation limited to overt coping strategies
- brief intervention procedure
- limited generalisation
Fehlings et al, 1991

- Evaluated the effectiveness of CBT in improving home behaviour of children with ADHD

- 25 boys, 7-13 years old, not on stimulant medication for ADHD, randomised to:
  - either CBT (n=13)
  - supportive therapy (n=12)

- CBT:
  - 12, twice weekly, training sessions in problem solving skills
  - 8 once every two weeks parent training sessions

Results:
- Improvements in hyperactivity and self esteem due to CBT
- no improvement was seen on parent and teacher measures

- Treatment gains maintained at 5 months follow up
Fehlings et al, 1991

Piers Harris Self Concept Scale

Baseline Post Intervention 5 months post intervention

p < 0.035
Werry Weiss Activity Scale - Parent rating

Significant at p=0.03*
Fehlings et al, 1991

Behavior Problem Checklist- Attention Problem Subscale- Parent rating

Not significant at p=0.05*

Behavior Problem Checklist- Attention Problem Subscale- Teacher ratings

p=0.06
Brown et al, 1986

- Methylphenidate and adjunctive cognitive behavioural self control therapy in children with ADHD (DSM III)

- Double blind trial
  - all evaluators blind to drug and training conditions of children
  - No staff member involved in training or testing of children

- 33 children, 28 boys, 5 girls, 5.8 to 13.1 years

- Inclusion Criteria:
  - Conner's Teacher or Parent rating Scale score=15
  - One year behind in at least one subject as per Wide range Achievement Test
  - Low average IQ at least

- Children randomly assigned to:
  - Methylphenidate/ Attention Control (n=7)
  - Cognitive therapy/ Placebo (n=10)
  - Methylphenidate/ Cognitive Therapy (n=9)
  - Attention Control/ Placebo (n=7)
Brown et al, 1986

• Assessment:
  – Cognitive performance in the lab
    • Matching Familiar Figures Test
    • Children’s Checking task
    • Wechsler Intelligence Scale for Children-Revised
  – Academic achievement:
    • Wide Range Achievement Test
    • Durrell Analysis of Reading difficulty
    • Detroit Test of Learning Disability
  – Behaviour at home and at school:
    • Conner’s Parent Rating Scale
    • ADDH Comprehensive Teacher’s Rating Scale
Brown et al, 1986

• Treatment:
  – 10-40mg Methylphenidate twice daily (0.3mg/kg body weight)
  – Cognitive Behavioural Self Control Training:
    • Individual training
    • Twice weekly one hour sessions
    • 22 sessions over 3 months
    • Primary goals:
      – Cope effectively
      – Problem solving
      – Self evaluation of performance
    • Techniques:
      – Modelling
      – Self evaluation
      – Strategy training
  – Attention control:
    • No problem solving training
    • Exposure to equivalent training tasks
    • 22 one hour sessions over 3 months

• Follow up- 3 months after treatment got over
Brown et al, 1986

- Results:
  - Multivariate F ratio pre to post:
    - MFFT (impulsivity) = p<0.06; not maintained at f/u
  - All other analyses yielded non significant f ratios
  - No pre to post test differences in groups taking methylphenidate
    - ? Due to rebound effect as medication stopped one week prior to post treatment assessment

<table>
<thead>
<tr>
<th>Cognitive training/ Placebo</th>
<th>Methylphenidate/ Attention Control</th>
<th>Methylphenidate/ Cognitive training</th>
<th>Attention control/ Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretreatment</td>
<td>Post treatment</td>
<td>3 months F/u</td>
<td></td>
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</tbody>
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**Matching Familiar Figures Test Error Measure**

![Bar chart showing mean score over time for different treatment groups](chart.png)
Brown et al, 1986

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• **Discussion:**
  
  – Non significant academic and behavioural improvements:
    
    • ? Generalisability of cognitive training outside lab setting
    • Circumscribed effect of Cognitive Therapy (CT) MFFT (impulsivity)- In CT without active medication group:
      – Encouraging finding
      – Attests to the promise of CT
Literature against CBT for children with ADHD

• Lack of controlled trials of CBT for children with ADHD
  – Antshel and Barkley, 2008
  – Baer and Nietzel, 1991
  – Abikoff et al, 1991

• No improvements in the behaviour of children with ADHD, teacher ratings and child self reports
  (Bloomquist et al, 1991)
Conclusion- Childhood ADHD

• Few controlled studies on CBT with children with ADHD
• Underdeveloped cognitive facilities and perceptive abilities
• CBT demands active participation
• CBT may help improve academic performance and core symptoms of ADHD in children
• CBT more useful as part of a multimodal package
• Results must be interpreted with caution considering the limitations of CBT studies
Multimodal Studies in Children with ADHD

• First (2-site) multimodal treatment study
  (AACAP ADHD research award, 2005)
Study Design Features

- Random Assignment, Parallel Groups Study

  - Methylphenidate + Multimodal Treatment (MMT)
  - Methylphenidate + Attention Control (ATT)
  - Conventional Methylphenidate Treatment (MED)
Multimodal Treatment Components

- Methylphenidate
- Academic Skills Training
- Remedial Tutoring
- Psychotherapy
- Social Skills Training
- Parent Behavior Management Training
- Parent Counseling
- Daily School Report Cards
Mean Hyperkinesis Index on Conners Teacher Rating Scale

F (Group X Time) = 1.45, p = ns
Observed Levels of Classroom Interference

NORMS

- Baseline = 8.08 (6.13)
- Month 6 = 6.24 (4.72)
- Year 1 = 6.39 (5.38)
- Month 18 = 5.56 (5.37)
- Year 2 = 4.62 (4.43)

F (Group X Time) = 1.12, p = ns
Stanford Achievement Test: Scaled Score for Math Computation

\[ F (\text{Group} \times \text{Time}) = .13, \ p = \text{ns} \]
Possible Reasons for Results

1. Subjects – well-functioning families
   - not very comorbid

2. Interventions – not emersion
   - no marked focus on generalization
Multisite Multimodal Treatment Study (MTA)

- Long term efficacy of treatment for ADHD in children

- 579 children, 7-9.9 years old assigned to following 4 treatments for 14 months:
  - Medication management
  - Behavioural/ psychosocial treatment
  - Combination of medication management and psychosocial treatment
  - Standard community care
14-Month Outcomes
Inattentive Symptoms

Parent

Teacher

Time x Tx: F=21.5, p<.0001
Site x Tx: F=0.6, ns
Site: F=2.5, p<.04

Comb, MedMgt > Beh, CC

Comb, MedMgt > Beh, CC

Time x Tx: F=10.6, p<.0001
Site x Tx: F=0.9, ns
Site: F=2.7, p<.02

**Average Score**

**Assessment Point (Days)**
MTA Medication Doses: Comb vs. MedMgt
Dose by Weight Over 14 Months
Comorbidity in MTA sample

Comorbidity in the MTA Sample (N=579)

- ADHD alone: 179 (31%)
- ODD: 126 (21%)
- Tic: 14
- Conduct: 43 (7%)
- Anxiety + ODD: 67 (12%)
- Anxiety: 58 (10%)
- Mood: 5

MTA Study - 14 Month Comorbidity Outcomes

Hechtman et al. for the MTA Cooperative Group

*Sig. group diffs in # of comorbidities at 14 M:
Pairwise diffs: Comb < CC (p<.001).
Conners et al. for the MTA Cooperative Group
MTA – follow up 14 and 24 months

Percent "normalized" at 14-month endpoint across the four MTA groups.

Jensen et al, 2001
MTA Study - 14 Month Outcomes
Summary 1

- For children age 7-10 with ADHD (combined type), well-delivered medication is superior to Beh Mgt and may be sufficient for ADHD symptoms.

- Behavioral management is an acceptable treatment for those preferring not to use medication.
For some outcomes other than ADHD, the combination of medication and behavioral management may be preferable:

- parent-child conflict
- academic difficulties
- social skills
- anxiety symptoms
- oppositional/aggressive symptoms
- consumer satisfaction
MTA – 3 year follow up

- 485 out of 579 subjects followed up
- Treatment groups statistically similar at 36 months
- Significant increase in medication in BT group
- All groups showed improvement over baseline
MTA – 3 year follow up

Figure: Average ADHD, ODD and Columbia Impairment scale scores at 36 months

Jensen et al, 2007
MTA Timeline

- Baseline, 7.9.9 yrs
- 14 Mos, 8-12 yrs
- 24 Mos, 9-12 yrs
- 36 Mos, 10-14 yrs
- 6 Yrs, 13-18 yrs
- 8 Yrs, 14-20 yrs
- 10 Yrs

Analyses to 8 Years
80.3% sample retention

Study Treatments

LNCG (n=289) added here

Mean age=15

Mean age=17
MTA – 8 year follow up

• No differences between 4 treatment groups on repeated measures of:
  – psychiatric symptoms
  – academic function
  – social functioning

• No differences on new measures i.e.
  – grade point average
  – arrest by the police
  – psychiatric hospitalization

• Those on medication at 8 years were at no advantage.
GMM-defined Latent Classes of ADHD Sxs (Swanson et al, 2007)

Class 2 had a significantly (z = 3.33, p < 0.001) greater percentage of cases that had been initially assigned to Comb (62%) and MedMgt (55%) than to Beh (46%) and CC (45%).
Summary of Latent Classes

Best Outcome for Patients:

- Not exposed to alcohol/drugs prenatally
- Are in stable families
- Not on welfare
- Not comorbid
  - Behaviorally
  - Emotionally
- Less severe symptoms
- Better social functioning
Thank you!