

INTERVENTION FOR ADOLESCENTS WITH ADHD: ACADEMIC AND SOCIAL FUNCTIONING EFFECTS

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AGENDA

- Rationale for school-based intervention for adolescents with ADHD
- Purpose and aims of the Bridges to Educational Success in Teens (BEST) study
- Participants and measures
- Description of Challenging Horizons Program for high school students with ADHD
- Impact on academic, behavioral, and social functioning
- Interpretation of findings, limitations, implications, and future directions

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ACADEMIC FUNCTIONING OF ADOLESCENTS WITH ADHD

- Lower GPA & class levels
- Increased risk of tardiness and absenteeism, and higher drop out rates
- Lower standardized test achievement scores and school grades
- Difficulty with task completion, studying, homework, and notetaking
- Executive functioning deficits
 - Self-regulation, decision making, engaging in goal-directed behavior
- Secondary school students with ADHD have deficits in reading, math, and spelling
 - Continue into adolescence with moderate to large effect sizes



(Biederman et al., 2004; DuPaul & Langberg, 2015; Evans et al., 2001; Kent et al., 2011; Kuriyan et al., 2013; Murray et al., 2015; Raggi & Chronis, 2006)

BEHAVIORAL AND SOCIAL FUNCTIONING OF ADOLESCENTS WITH ADHD

- Chronic ADHD symptoms, especially inattention & impulsivity
- Risk for conduct disorder
- Unstable and poor peer relationships
 - Victimization related to bullying
- High risk behaviors (e.g., driving, drug use, delinquency)
- Associated with:
 - Emotion dysregulation (Bunford et al. 2015)
 - Impulsivity and Inattention symptoms (Zoromski et al., 2015)
 - Disorganization

TREATMENTS FOR ADOLESCENTS WITH ADHD

- Stimulant Medication (Smith, Pelham, Evans et al., 1998)
 - ADHD symptoms, delinquent behavior, defiance, teasing
 - Middle School - STAND, HOPS, CHP
 - Improvement in inattention
 - Mixed results regarding social functioning
 - CHP HS Pilot study (Evans et al., 2014) ($d_t - d_c$)
 - Symptoms
 - Inattention (.28)
 - HI (.14)
 - Functioning IRS
 - Relationships with peers (.21)
 - Parent-child (-.07)
 - Family (.70)
- Evans et al. (2016); Langberg et al. (2012)

GAPS IN TREATMENT OUTCOME LITERATURE

- Few prior studies of school-based intervention for high school students with ADHD
- Limited research on academic and social functioning of high school students with ADHD
- Given chronic nature of academic and social deficits experienced by individuals with ADHD and the importance of both functioning areas in predicting long-term adult outcome it is critically important to develop and evaluate intervention to improve academic performance and social functioning in high school

RESEARCH QUESTIONS

1. What are the effects of a multi-component school-based intervention on
 - Organizational skills
 - Homework performance
 - GPA of high school students with ADHD
 - ADHD & DBD symptoms
 - Social functioning?
2. Group differences at 6-month follow-up?
3. Group x Time interaction such that groups differ in slope over time?

METHODOLOGY

RECRUITMENT

- Schools in partnership with Ohio University & Lehigh University
 - Rural, suburban, and urban high schools
- High school students recruited via flyers & school staff across 3 years
- Eligibility Assessment
 - Semi-Structured clinical interview & psycho-educational testing
 - Inclusion: ADHD-I or ADHD-C and $IQ \geq 75$
 - Exclusion: Severe substance use; bipolar disorder, psychosis, or OCD
- Randomly assigned within school to CHP or Community Care (CC), stratified by gender and medication status at baseline

SCHOOLS

- School Size: $M = 1,883$ students (range: 755 to 3235)
- Free/Reduced Lunch: $M = 42\%$ (range: 15.8% to 69.6%)
- Special Education: $M = 19\%$ (range: 15.5% to 22.1%)
- Caucasian: $M = 67\%$ (11.4% to 95.8%)

PARTICIPANTS

- 186 participants (92 CHP; 94 CC)
- 79% male; 47% 9th grade, 34% 10th grade; 18% 11th grade
- 68% had a previous diagnosis of ADHD
- 10% Hispanic/Latino
- 14.5% Black; 1% Asian, 74% Caucasian; 5% other; 5% not reported
- 37.1% received ADHD medication at pre-treatment
- 64% with IEP or 504 plan
- 65% with two parent figures in the home
- Income
 - 13% < \$25K, 34% between \$25K and \$75K; 35% between \$75K and \$125K; 9% >\$150K;

PRIMARY OUTCOME MEASURES

	Rater	Eligibility	Baseline	Mid Year	End of Year	Follow Up
ADHD Symptoms (ARS-5)	Parent	X		X	X	X
Disruptive Behavior Disorders Rating Scale	Parent	X		X	X	X
Social Skills Improvement System	Parent & Student	X		X	X	X
Children's Organizational Skills Scales	Parent	X	X	X	X	X
Homework Problems Checklist	Parent	X	X	X	X	X
Grade Point Average (GPA)	School	GPA (Pre-treatment overall GPA, Quarterly GPA Treatment Year & After)				
School Functioning Scale	Teacher & Student	8 occasions across treatment & follow-up year				

BEST PROGRAM: INTERVENTION OVERVIEW

- School-based intervention
- Designed to improve academic, social, and family functioning
- Interventions focus on training in
 - Organizational skills,
 - Problem solving skills
 - Academic skills
 - Interpersonal skills training
 - Parenting
- Developed from the Challenging Horizons Program (CHP)
 - Modified to be developmentally appropriate for high school students with briefer coaching sessions and more emphasis on problem-solving, self-monitoring, and self-advocacy skills

BRIDGES TO EDUCATIONAL SUCCESS FOR TEENS

Individual Sessions

Organizational Skills

- Planner Use
- Materials Organization

Academic Skills

- Study Strategies
- Test Taking Strategies

Check & Connect

- Problem Solving

Sessions

- 2x per week
- 15-20 minutes

Interpersonal Skills Group

Identifying Self

- Real self
- Ideal self
- Expected Self

Setting Social Goals

Sessions

- 10 weeks
- 60-90 minutes

Parent Group

Psychoeducation

Homework Management (Contracting)

Problem Solving

Sessions

- 10 Weeks
- 60-90 minutes

HOMWORK MANAGEMENT PLAN

- Completed with both parent/caregiver and teen
- Components:
 - Reasonable **goal**: Grades?
 - Setting HW **time**: What time and where will homework be completed?
 - Preferably when parent/caregiver is home
 - Setting **amount of time** for teenager to do homework
 - What if the teen has no HW?
- Rules
 - If no HW, parent/caregiver gives teen something to do
 - Parent/caregiver occasionally checks on child during HW time
 - HW time should not be interrupted
- Everyone **signs** the contract



BEST Homework Management Plan

1. Deciding on a reasonable goal.
The goal of this plan is for _____ (name of teenager) to _____

2. Setting a homework time when a parent/caregiver is at home.
_____ (name of teenager) will complete homework every day at _____,
right after/right before _____.

Special situations (e.g., days with football practice):
On days with a different schedule due to after-school activities, _____ (name of
teenager) will complete homework at _____, right after/right before _____.

3. Setting an amount of time for the teenager to do homework.
_____ (name of teenager) will complete homework every day for _____ minutes.

4. Weekends, snow days and holidays.
On weekends _____ (name of teenager) will _____

On snow days/holidays _____ (name of teenager) will _____

INDIVIDUAL SESSIONS

- Dosage: $M = 40.3$ ($SD = 15.9$); range 0 to 69 (median = 45)
 - Only 20% received less than 30 sessions
- Integrity Percentage Adherence (1094 intervention components)
 - $M = 92.9\%$ (range: 68% to 100%)
 - Most components were $> 80\%$
- Percentage Agreement: $M = 92.98\%$ (range: 76% to 100%)

PARENTING GROUP

- Dosage: $M = 4.3$ ($SD = 3.8$; range: 0 to 10)
 - 45% attended 5 or more sessions
- Percentage Adherence: $M = 78\%$ (range: 75% to 82%)
- Percentage Agreement: $M = 89\%$ (range: 78% to 100%)

ADOLESCENT INTERPERSONAL SKILLS GROUP

- Dosage: $M = 3.1$ ($SD = 3.3$; range: 0 to 10);
 - 37% attended 5 or more sessions
- Percentage Adherence: 92% (52% to 100%)
- Percentage Agreement: 91% (83% to 100%)

ANALYSIS & RESULTS

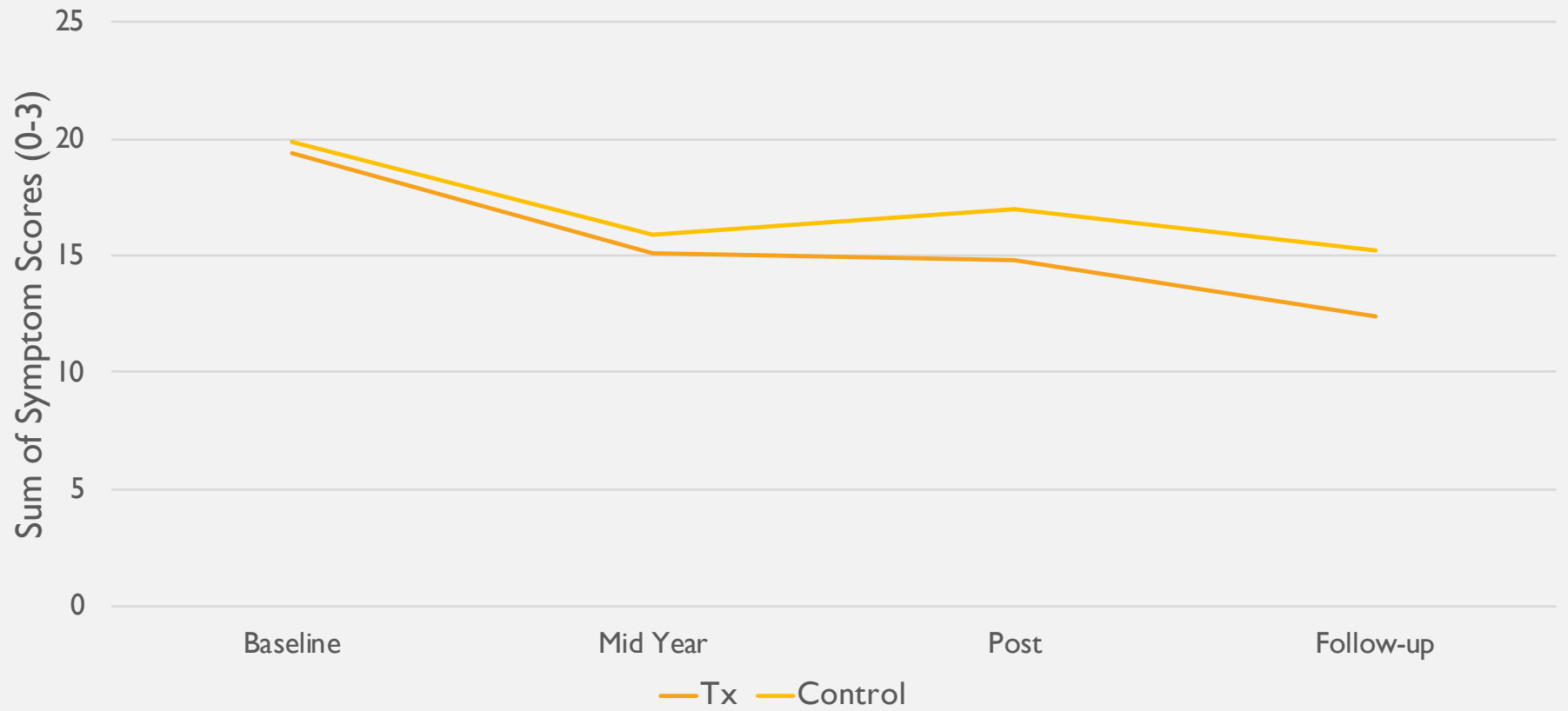
DATA ANALYSIS PLAN

- Intent-to-treat analysis
 - 2 of 92 CHP students did not attend a single session; 6 withdrew from tx due to moves
- Hierarchical linear modeling (HLM) across 4 (parent ratings) or 8 (GPA, SFS) time points
 - Intercept at 6-month follow-up
 - **Group x Time interaction**
- Cohen's *d* effect size at each time point (magnitude of between-group differences)

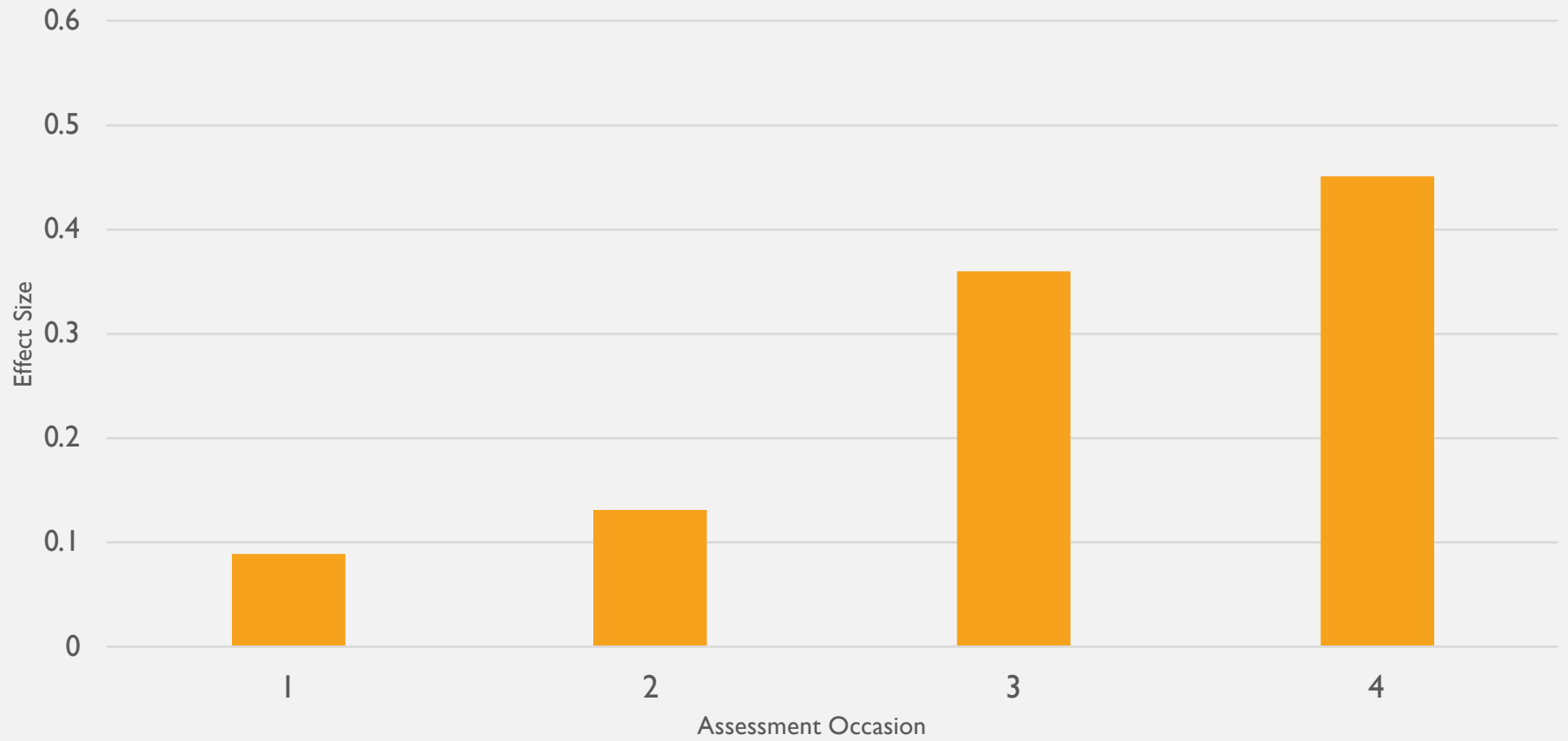
GROUP X TIME INTERACTION EFFECTS

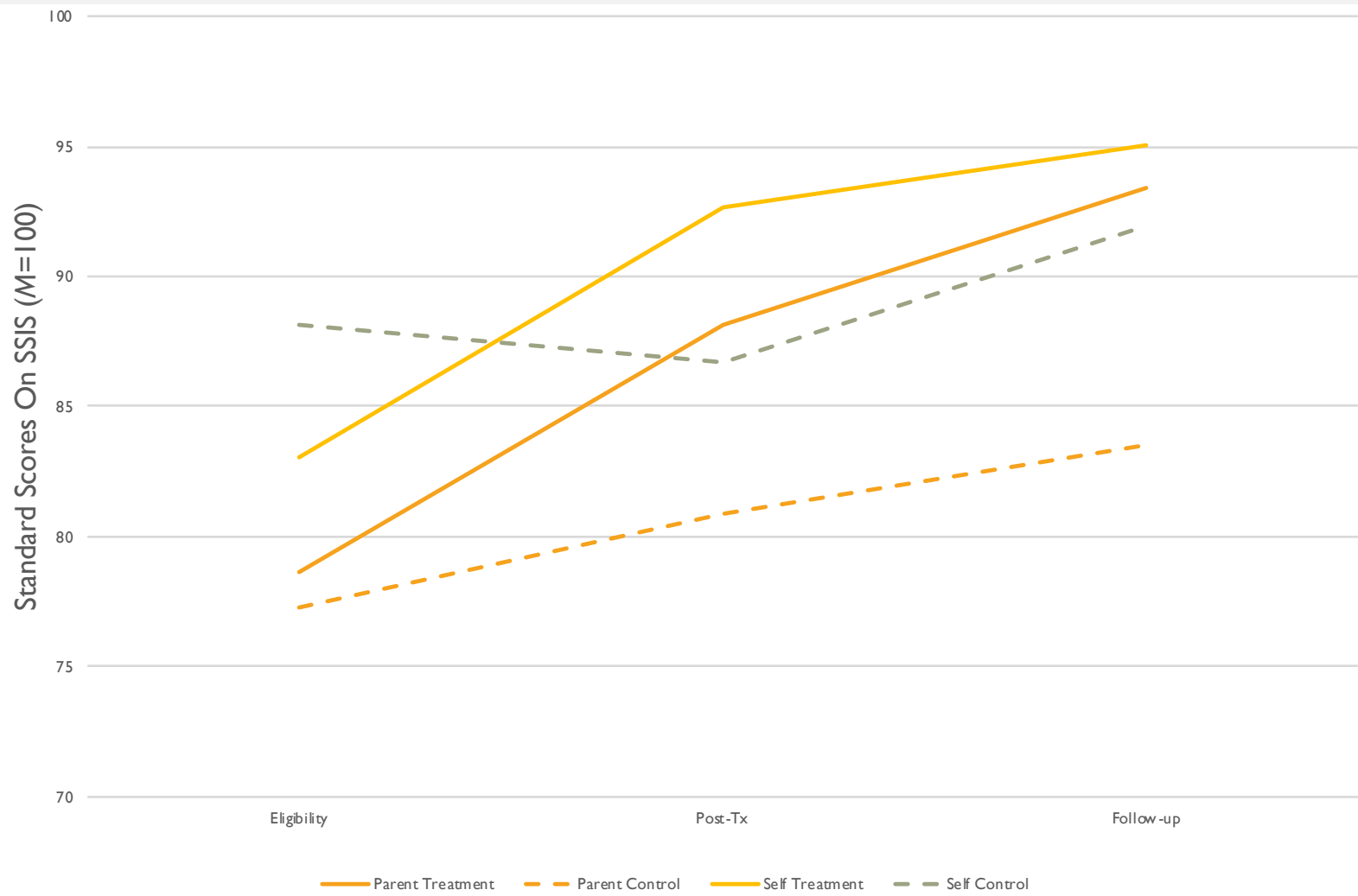
- ARS-5 Inattention symptoms ($p = .008$)
 - Post-treatment $d = .43$; Follow-up $d = .50$
- SSIS-RS parent and adolescent ratings ($p = .002$)
 - Post-treatment $d = .40$; Follow-up $d = .52$ (parent) and within normal range
 - Post-treatment $d = .26$; Follow-up $d = .12$ (adolescent)
- COSS parent ratings ($p < .01$)
 - Follow-up $d = -.58$
- HPC parent ratings ($p < .05$)
 - Follow-up $d = -.44$
- GPA quadratic ($p = .024$) and cubic ($p = .013$)
 - Cumulative GPA in treatment year $d = .29$
- Trends for DBD ratings but no significant interaction effects
- No significant effects for teacher or adolescent SFS ratings

Parent Ratings of Inattention Symptoms (possible range 0-27)

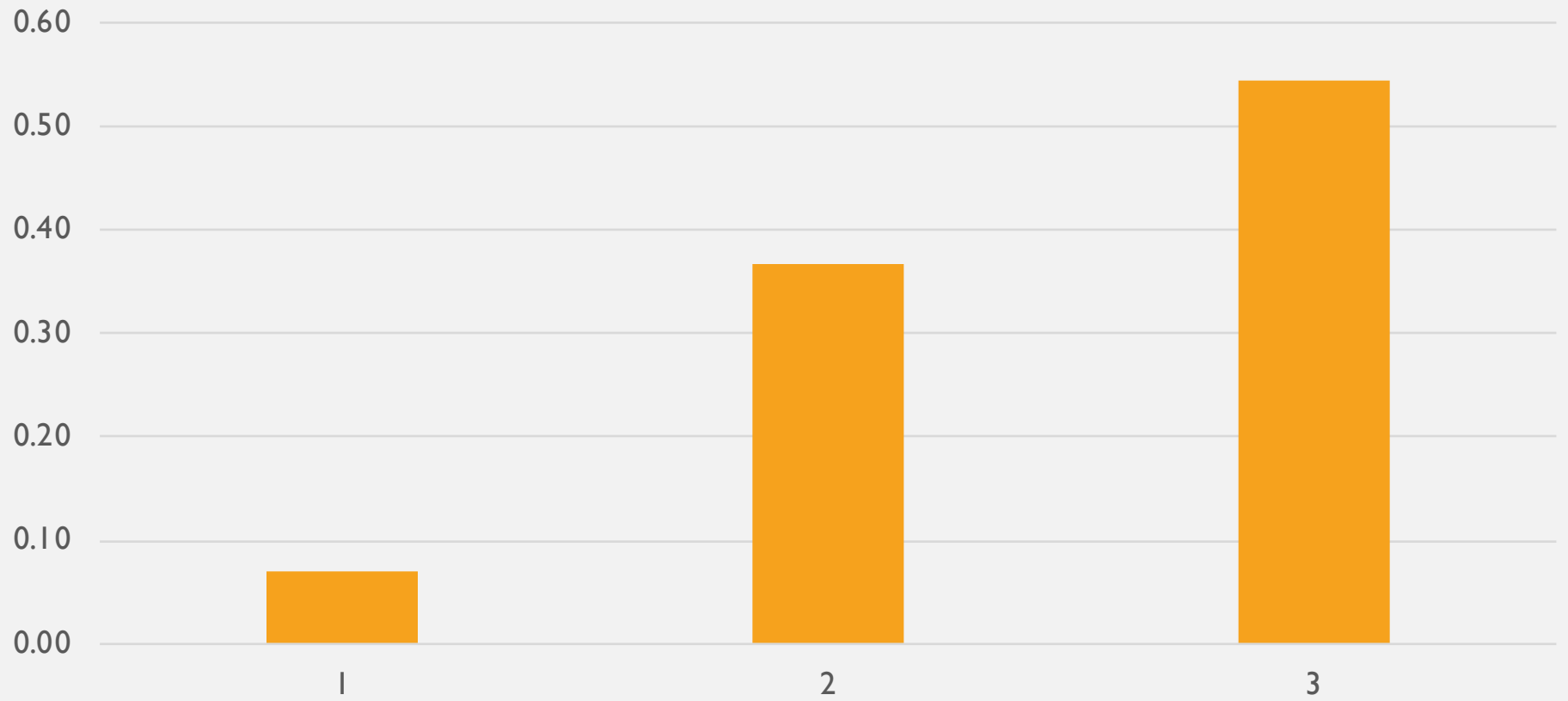


Effect Sizes Parent Ratings of Inattention Sx

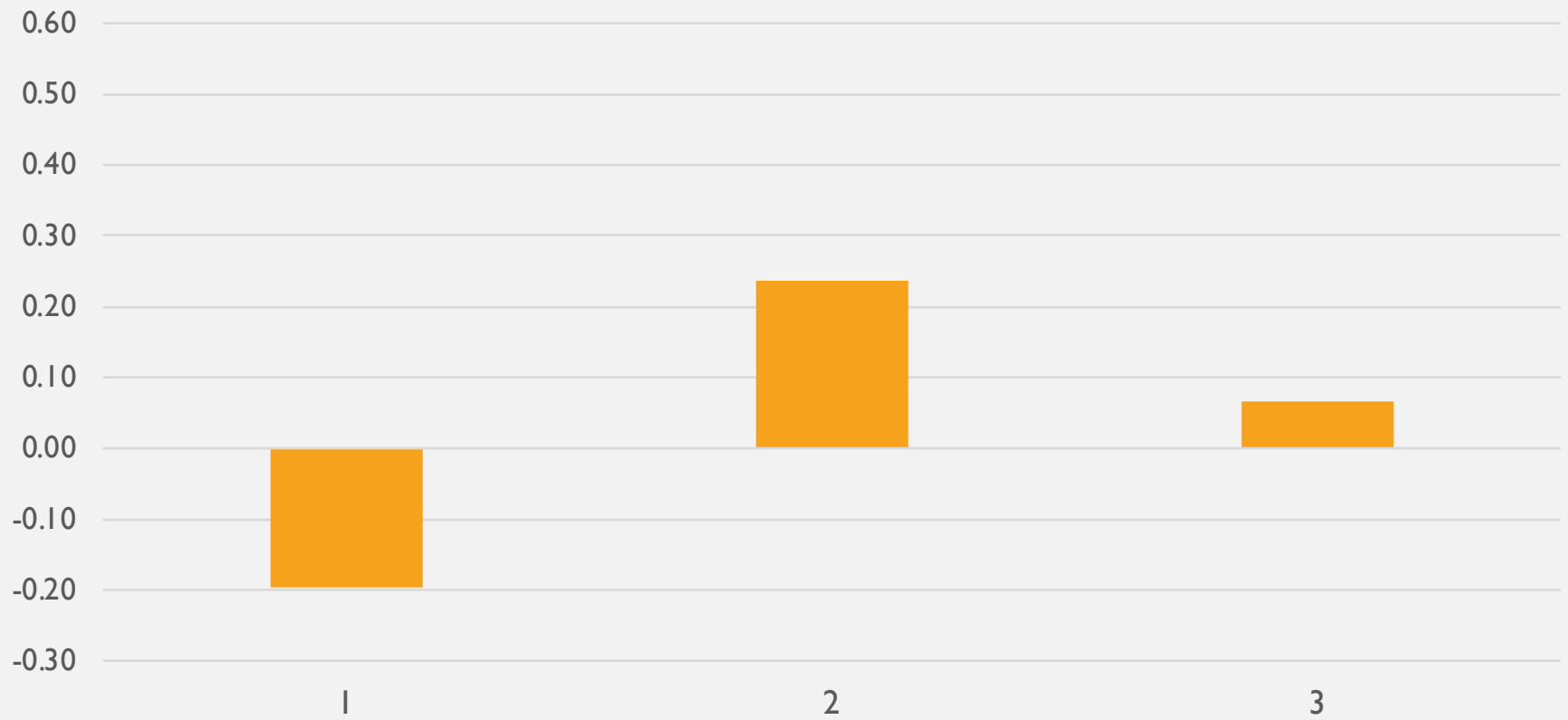


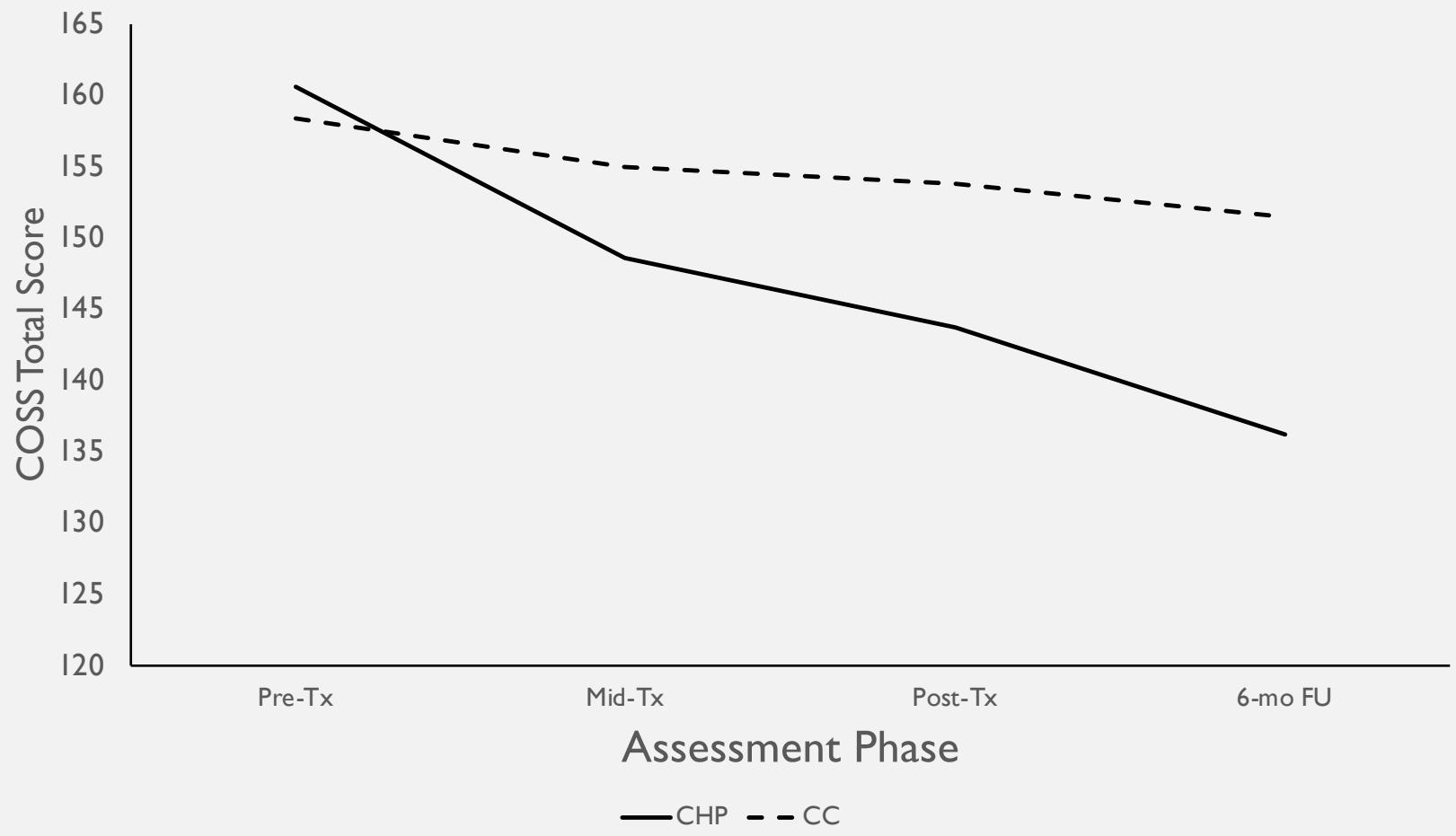


Effect Sizes Parent SSIS SS

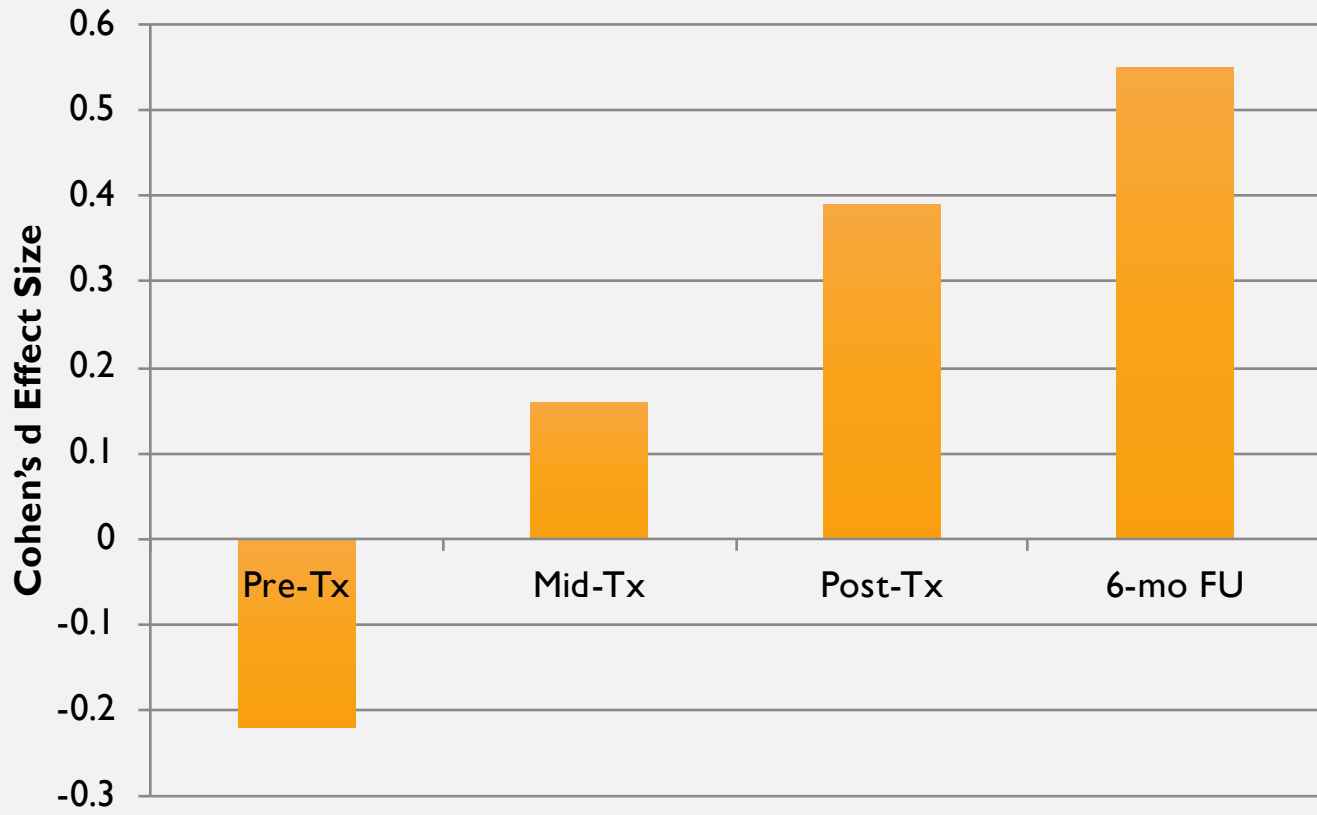


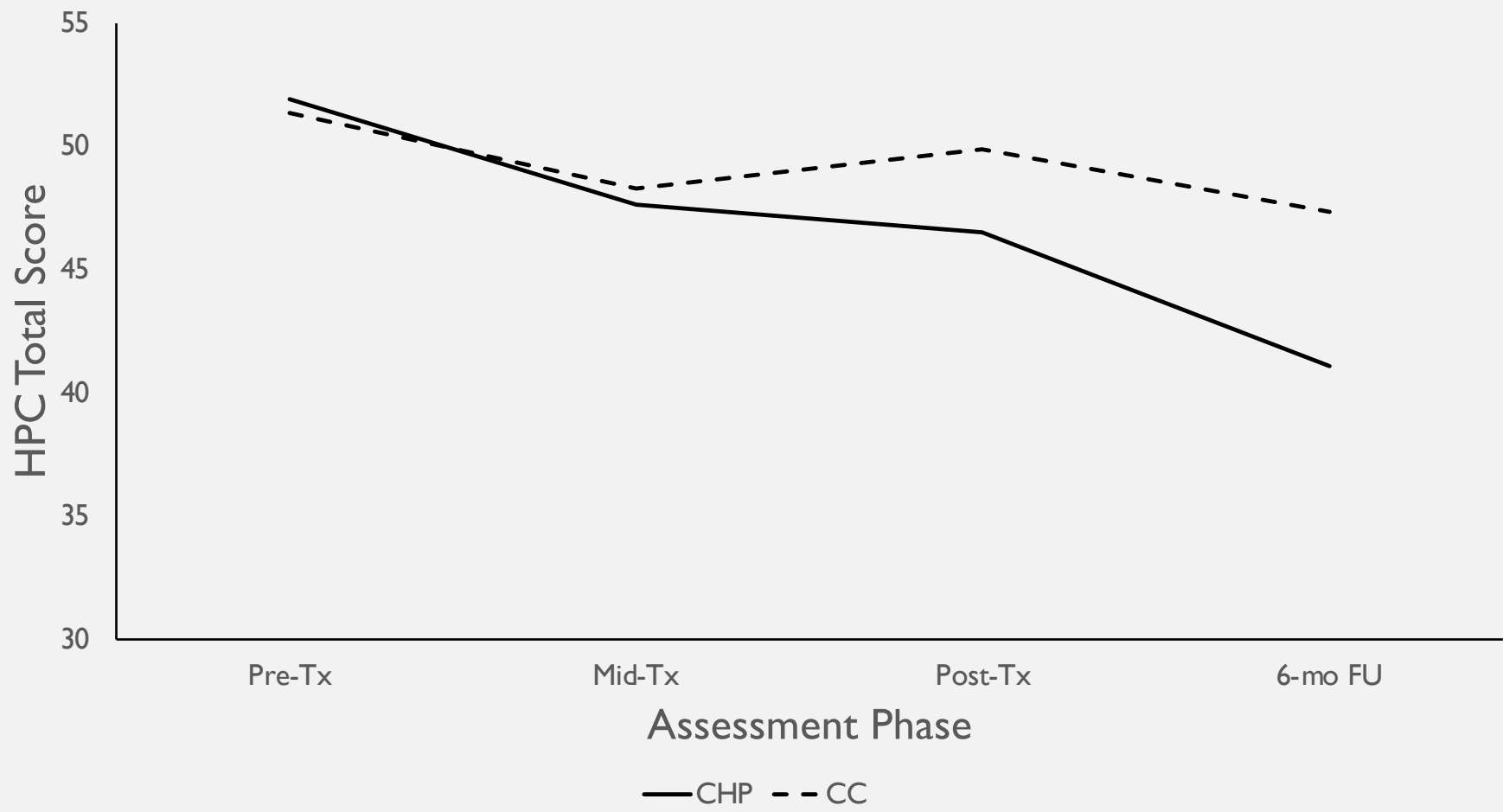
Effect Sizes Adolescent Self-Ratings SSIS SS



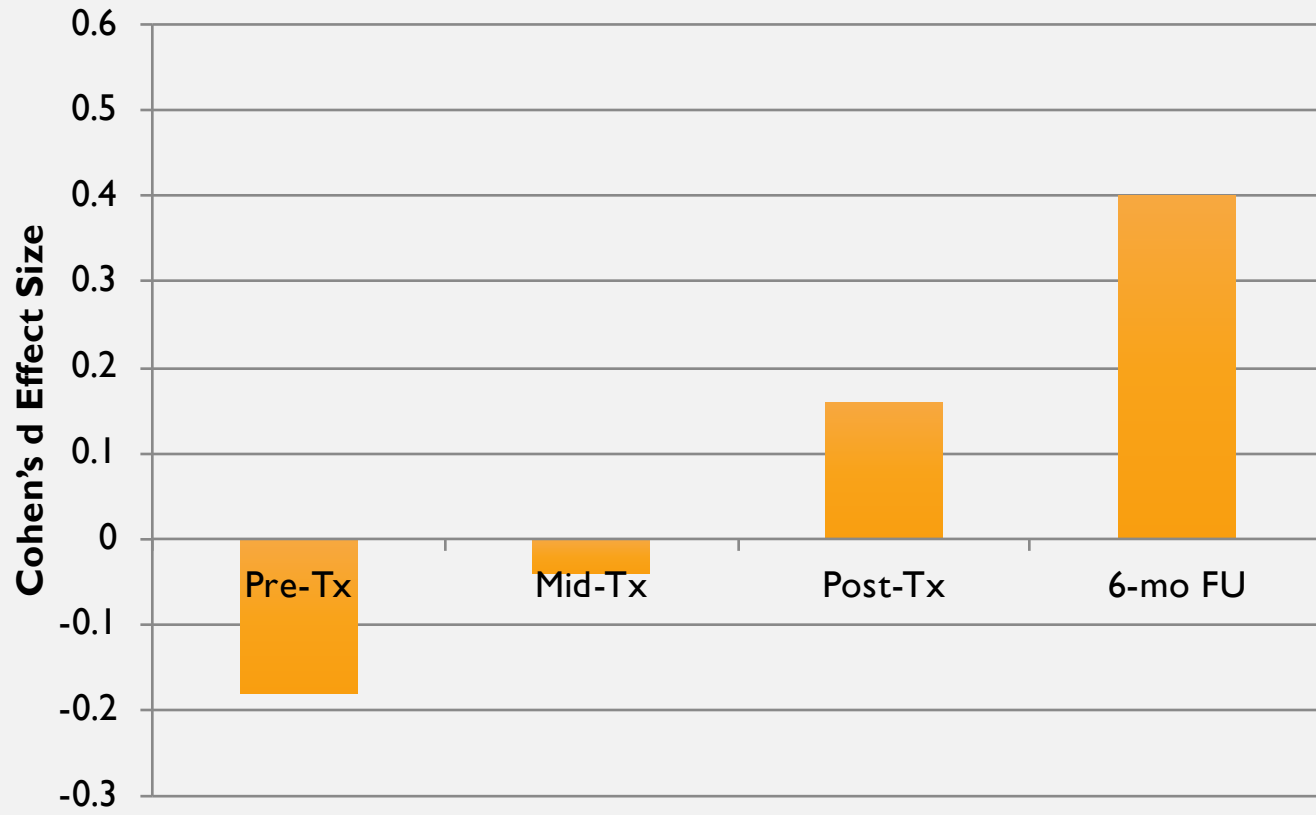


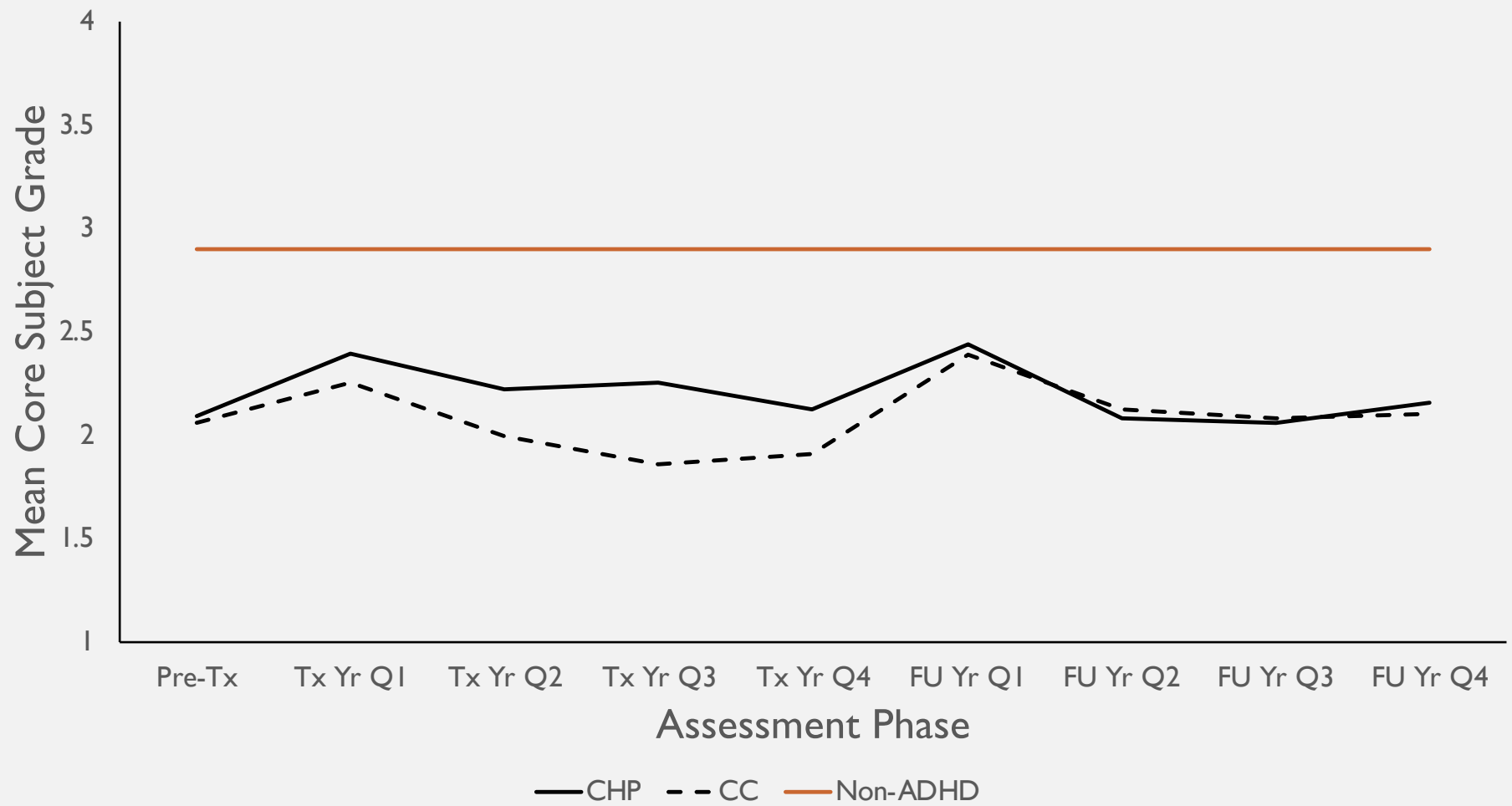
COSS



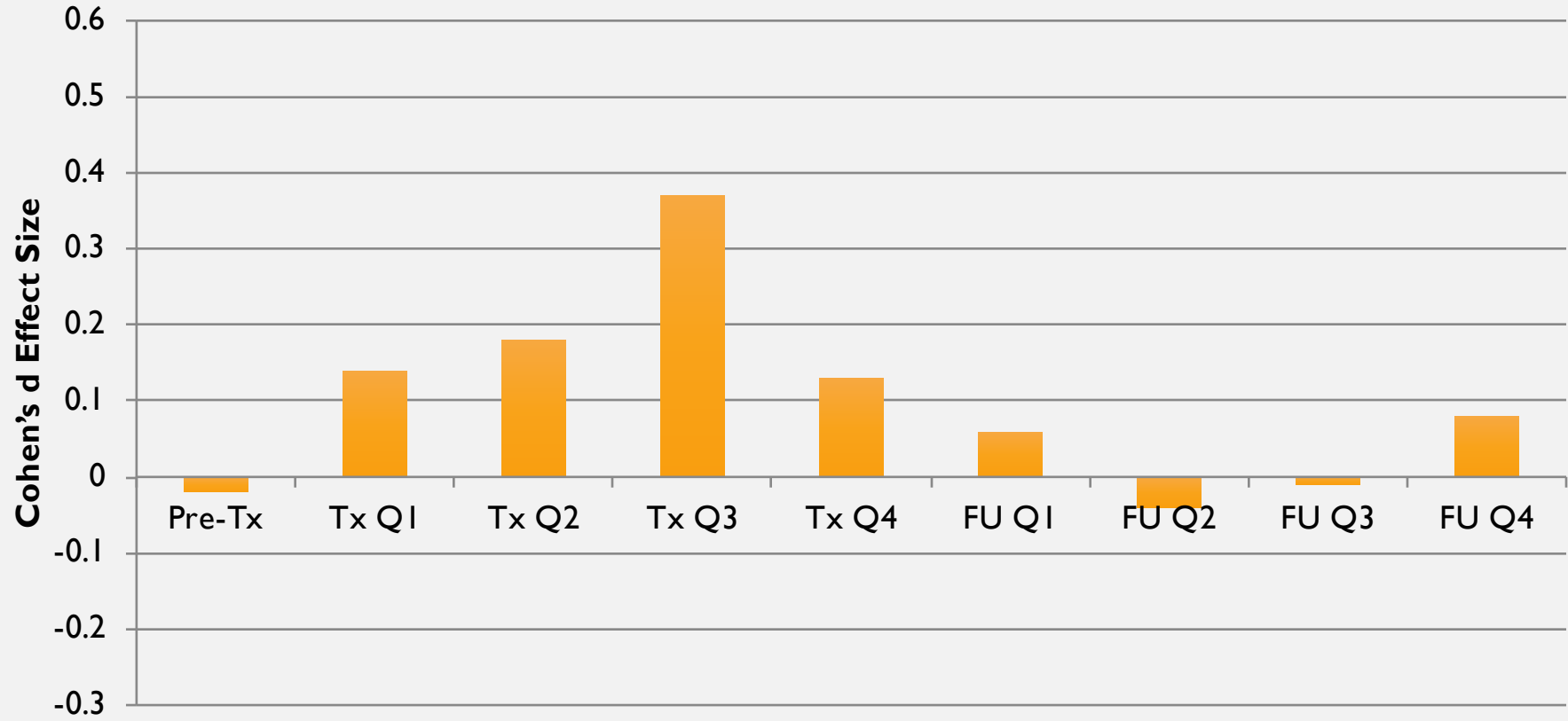


HPC Total





GPA

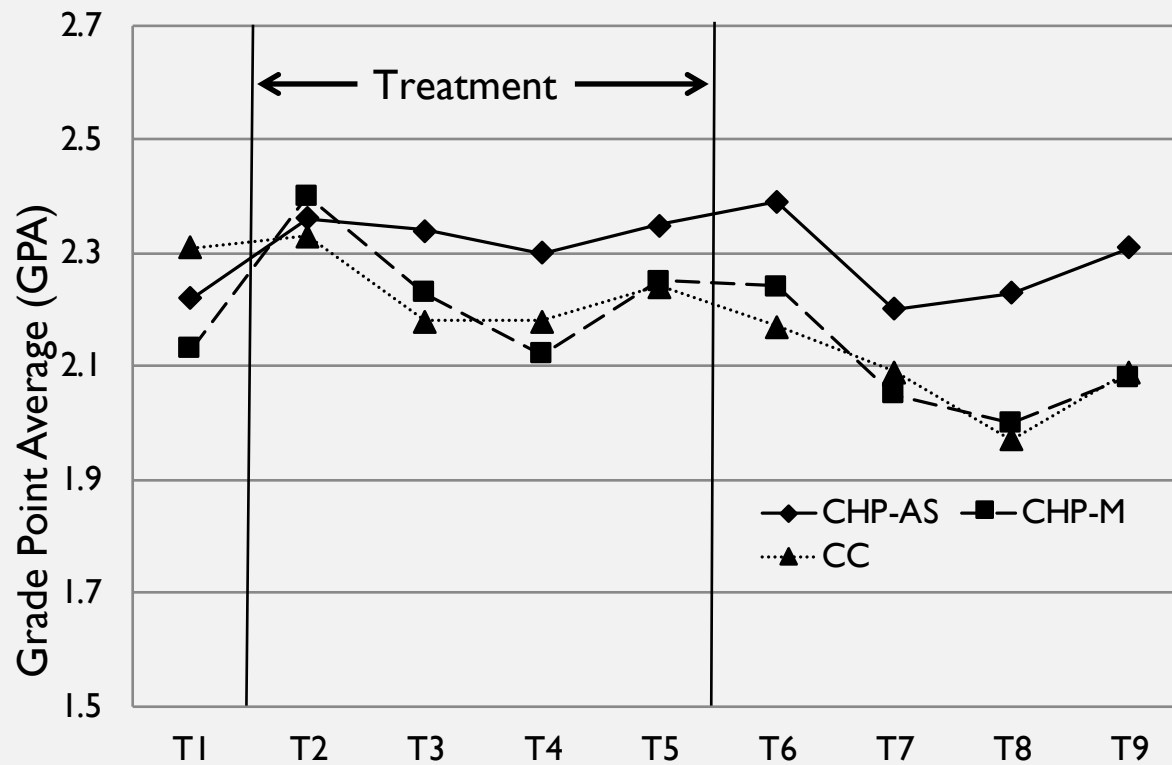


INTERPRETATION OF FINDINGS,
LIMITATIONS, IMPLICATIONS, &
FUTURE DIRECTIONS

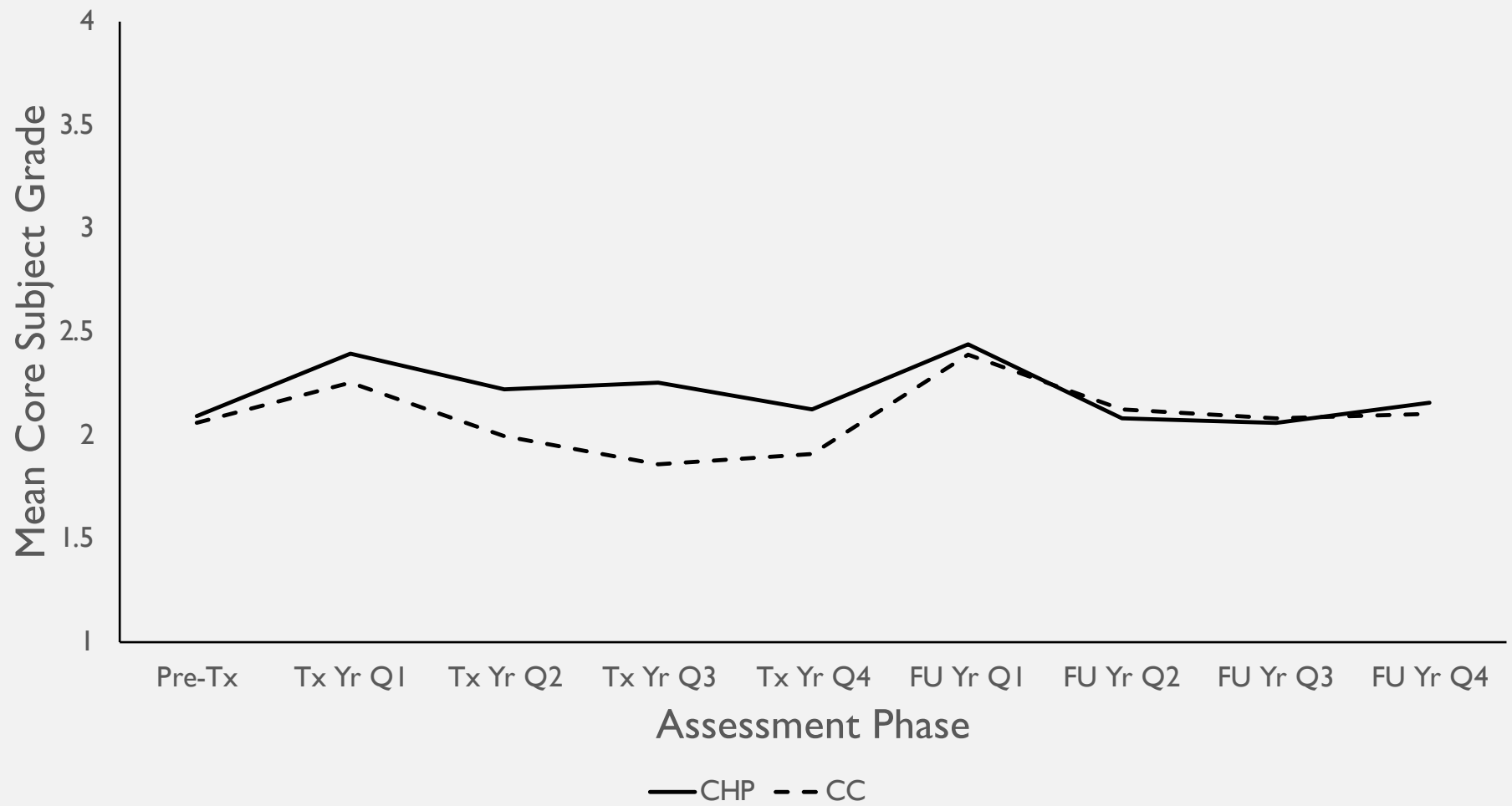
FINDINGS

- Significant tx effects on parent-rated organizational skills & HW completion/management
 - COSS score below clinical range (T-Score < 60) at follow-up for BEST group
 - Similar outcomes to findings with middle school students with ADHD (CHP, HOPS)
- Significant tx effect on GPA trajectory with small to medium increases in grades during treatment year and small difference at end of follow-up year
 - Similar to findings of protective effects for middle school students with ADHD (CHP); however, maintenance of effects during follow-up year not found

CHALLENGING HORIZONS PROGRAM: GRADE DATA ACROSS MARKING PERIODS



Evans et al. (2016)



INATTENTION SYMPTOMS

- Meaningful reductions in inattention symptoms
 - Compared to findings from middle school CHP RCT
 - Similar, but smaller, effect sizes for inattention symptoms at follow-up (.63 MS; .50 HS)
 - Similar absolute improvements

	Middle School	High School
Baseline	19.3	19.29
Post	12.87	14.8
Follow-up	10.82	12.52

SOCIAL FUNCTIONING

- Meaningful gains in social behavior
- Compared to findings from middle school CHP RCT
 - No gains for middle school students in ITT (some in CASE)
 - HS students improved

	Middle School	High School
Baseline	82.14	78.64
Post	85.11	88.11
Follow-up	87.01	93.40

OTHER FINDINGS

- Like with the middle school CHP study, magnitude of social & behavioral benefit (but not academic performance) over control condition increased during follow-up year without treatment for adolescents in the CHP condition
- Gains in high school study were achieved with much less student contact time per week than the middle school study
 - Middle School – 4 ½ hours per week
 - High School – about 30-40 min per week (plus 10 evening group meetings)
- Continued or more intensive academic support may be necessary for HS with ADHD

LIMITATIONS

- Parent and student ratings not masked
- Imperfect measure of social functioning of adolescents
- Missing data for some variables
- Dosage not accounted for in analyses (intent-to-treat)
- GPA across four subject areas may not match with focus of coaching/treatment sessions
- Block scheduling may impact accuracy of GPA in some cases

IMPLICATIONS FOR PRACTICE

- Multicomponent training intervention can be used to enhance organizational skills, materials management, and homework performance of high school students with ADHD
- Intervention may be protective vs. typical decline in GPA over school year for students with ADHD
- Multicomponent intervention will primarily impact academic performance, inattention symptoms, and social behaviors; enhancement of specific academic skills may require additional intervention
- Engagement with parents in formulating and implementing a homework management plan may be key in making academic gains; however this conclusion requires further analysis

FUTURE DIRECTIONS

- Completer and dose-response analyses
- Identify predictors (teen, family, school, intervention characteristics) of latent class trajectories (i.e., treatment response classes)
- More specific consideration of match between treatment focus and academic subject outcome (GPA)
- Consideration of booster sessions in follow-up year to help maintain and possibly increase gains
- Effectiveness study where school personnel deliver BEST intervention protocol



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