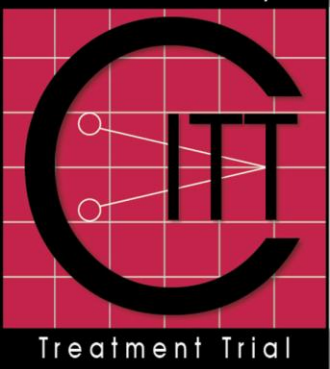




# **BEHAVIORAL AND EMOTIONAL PROBLEMS ASSOCIATED WITH CONVERGENCE INSUFFICIENCY IN CHILDREN**

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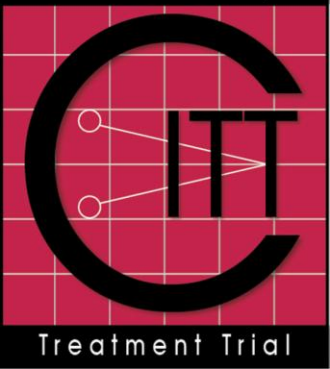
# Purpose

- Investigated behavioral and emotional characteristics in children presenting to eye care clinics with convergence insufficiency (CI) prior to treatment.
- Examine whether successful treatment of CI was associated with a reduction in adverse behaviors and emotional problems



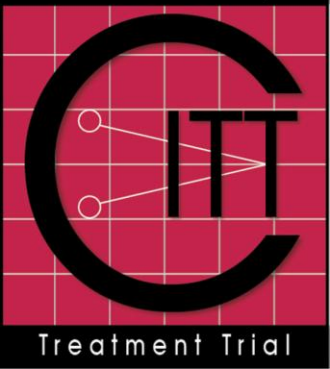
# Background

- CITT trial showed that children's symptoms improve following successful treatment on the CISS
- Many symptoms related to attention: difficulty concentration, loss of place, reads slowly.



# Background

- CITT trial showed that parents report fewer adverse academic behaviors following treatment of CI.
- Adverse academic behaviors related to attention: difficulty completing school work, avoiding reading and studying, and inattentiveness or distraction during reading.



# Methods

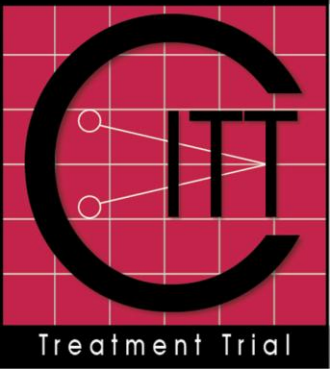
- Do children with CI have more ADHD like behaviors?
  - 53 school aged children with symptomatic CI
  - 8 children has parent reported ADHD.
  - Parents completed Conners 3 ADHD Index.
    - 10 item scale
    - Behaviors most associated with ADHD
  - Compared results to normative data.



# Methods

- Do children with CI have more emotional problems?
  - Administered Child Behavior Checklist (CBCL)
  - 53 school aged children with symptomatic CI.
  - The CBCL is designed to identify children with behavioral, emotional, or social problems.





# CBCL Syndrome Scale Scores

- Internalizing problems
  - anxious/depressed
  - withdrawn/depressed
  - somatic complaints
- Externalizing problems
  - rule breaking behavior
  - aggressive behavior



# Scoring

- CBCL Responses
  - *Not true Somewhat true Very true*
- Connors ADHD index:
  - *Not true at all Just a little true Pretty much true Very much true*



# Statistical Methods

- Scores compared to published norms for the Conners 3 ADHD index and the CBCL.
- T-scores (mean of 50 and SD of 10) were calculated for the Conners 3 ADHD index
- Z-scores (mean of 0 and SD of 1) for the CBCL.
- High scores indicate a problem

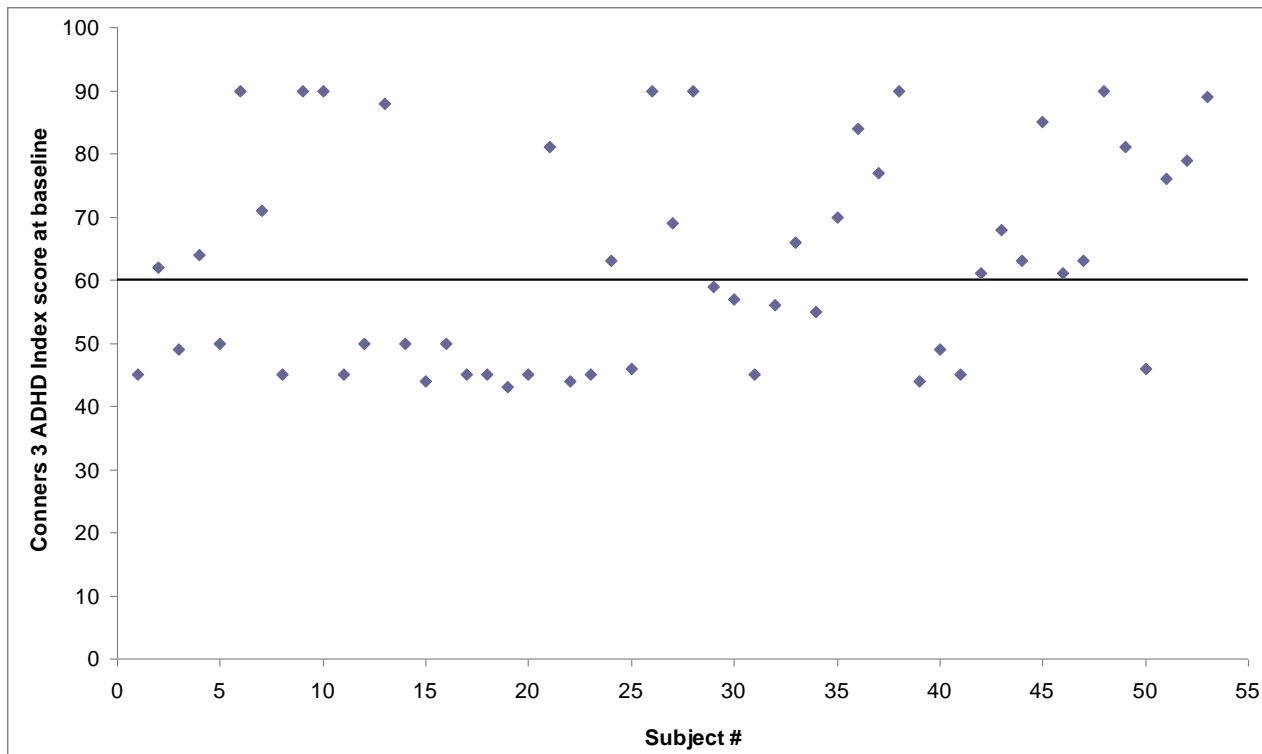


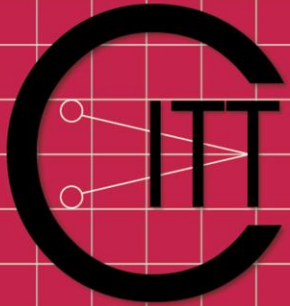
# Results-Conners 3 ADHD Index

- Conners 3 ADHD Index was significantly higher than normative values with a mean T-score of 63 ( $p < 0.001$ ).
  - 28 of 53 children had a T-score of 60 or higher.

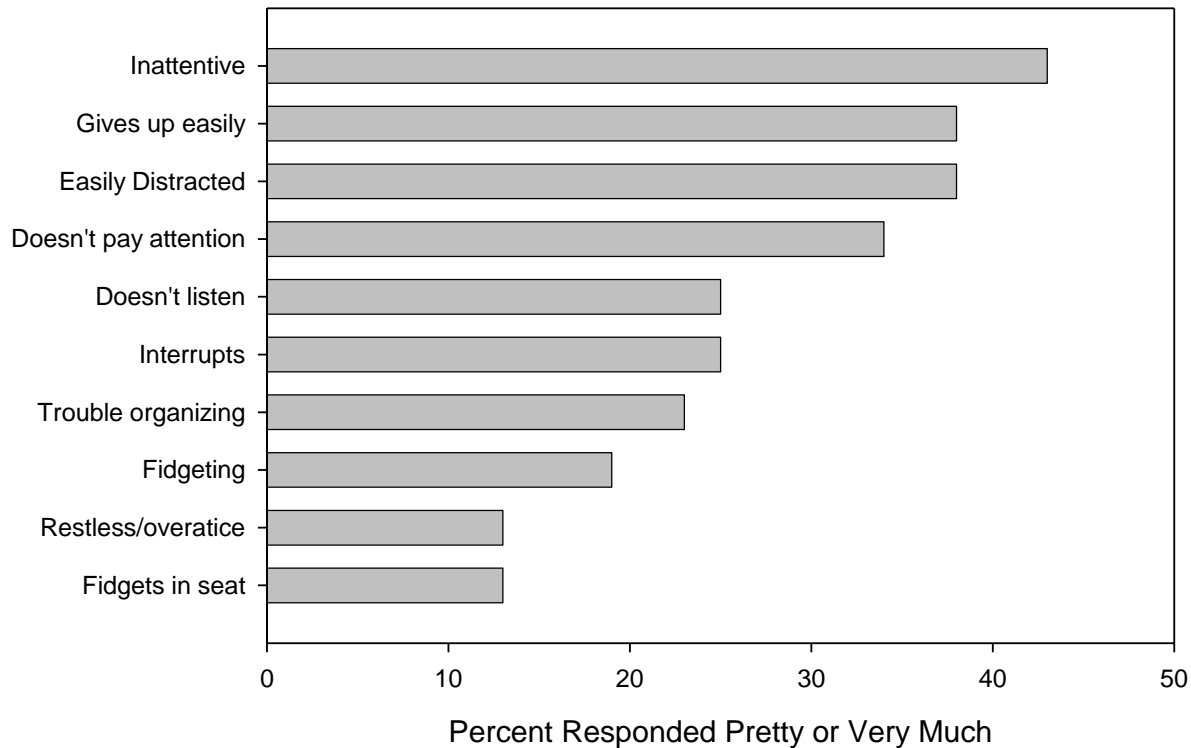


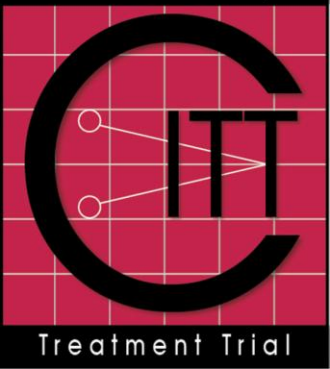
# Conners 3 ADHD Index Scores at Baseline





# Inattentive Symptoms more Common





# Results-CBCL

- CBCL
  - Internalizing problems were higher and approached significance.
    - Z-score of 0.48
  - Somatic problems were very high.
    - Z-score of 1.36 ( $p < 0.001$ )
  - Externalizing problems were significantly below average or low.
    - Z-score of -0.36 ( $p < 0.001$ )



## Study-2

- Examine whether successful treatment of CI was associated with a reduction in adverse behaviors and emotional problems.
- Non-randomized single treatment study with unmasked outcome visits.





# Methods-1

- 44 children with 3-sign CI completed 16 weeks of treatment
- Mean age = 11.5 years (std = 2.2)
- One parent of each child completed the Conners 3 ADHD Index – Parent (2008) and the CBCL at the eligibility examination and at 24 weeks after the eligibility exam.



# Treatment

- 16 weeks of Office Based Vergence Accommodative Therapy (OBVAT) according to CITT protocol.
- 8 weeks of maintenance therapy following the 16 weeks of OBVAT.
- Outcome assessment 24 weeks after enrollment.



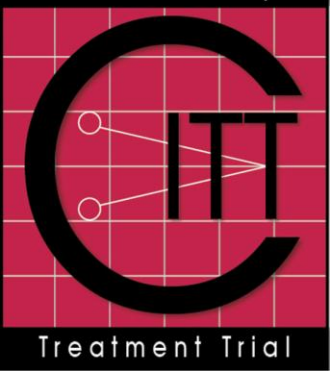
# CI Measures

	Eligibility	Week 24
CISS	30.20 (9.07)	12.94 (10.60)
NPC	14.54 (8.56)	3.40 (2.87)
PFV	12.02 (4.59)	33.03 (10.80)



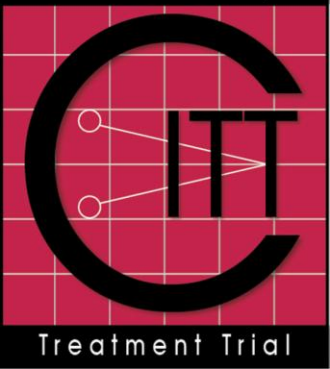
# Statistical Methods

- Pre and post therapy scores compared using paired t-tests

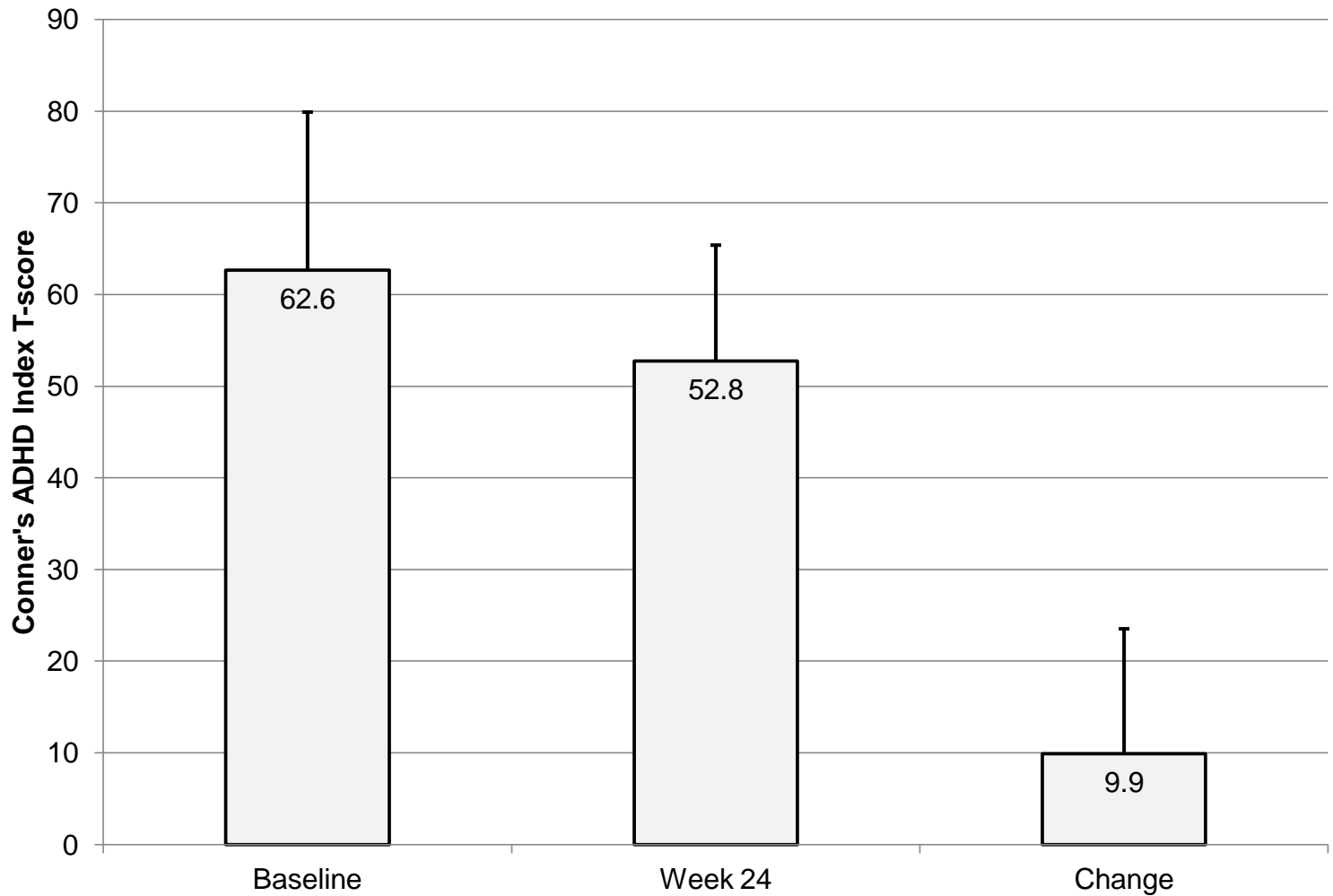


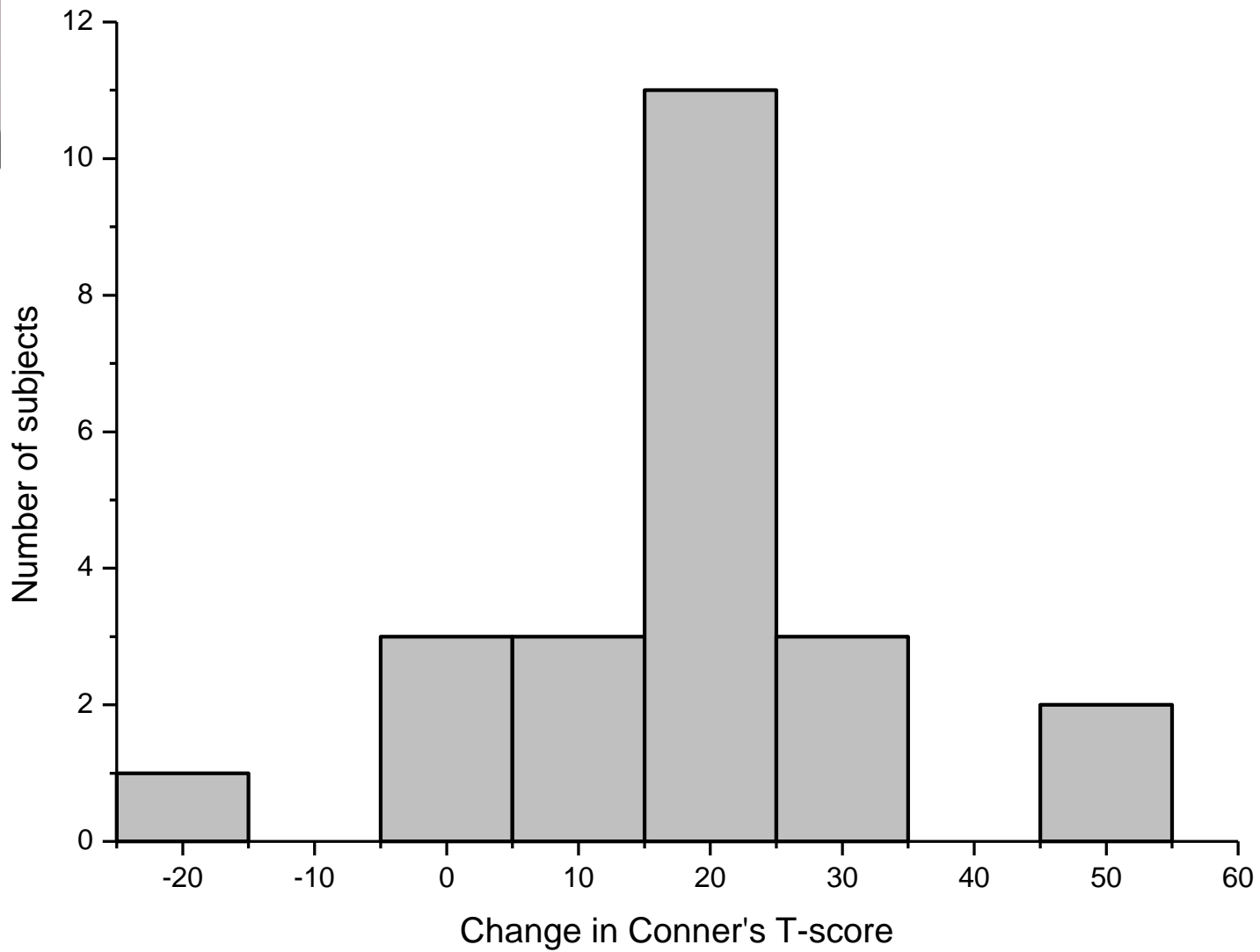
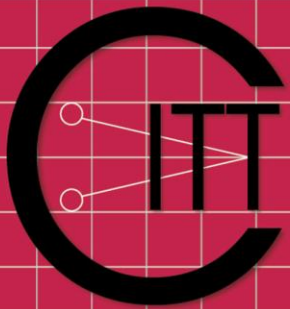
# Results-Conners 3 ADHD Index

- Conners 3 ADHD Index scores showed a significant improvement in behaviors following treatment ( $p < 0.0001$ ).
- Those with higher scores at baseline (T score  $\geq 60$ ) showed the largest improvement.



# Conners 3 ADHD Index







# Results- CBCL

- CBCL scores significantly improved for internalizing problems following treatment.
  - Effect size of 0.67 ( $p < 0.001$ )
- The biggest improvement was seen for somatic symptoms.
  - Effect size of 1.15 ( $p < 0.001$ )
- Externalizing problems showed no change.





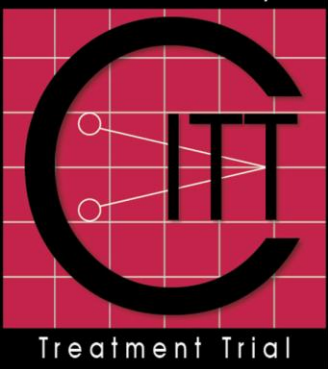
# Limitations

- Single treatment arm with no comparison group.
- No masking
- May overestimate the true impact of successful treatment of CI on measures of attention and emotional problems.



# Conclusions

- The parents of symptomatic CI children reported significant improvements in measures of attention as measured by the Conners 3 ADHD Index.
- The parents of symptomatic CI children reported significant decreases in internalizing problems as measured by the CBCL.



# Conclusions

- Need for randomized clinical trial investigating the impact of successful treatment of symptomatic CI on measures of attention and relationship to academic performance.
- Children with ADHD should be screened for CI.
- Children with inattentive ADHD and somatic complaints maybe at higher risk.