Is it Program Error or User Error? Using Implementation Indices to Measure School Health Program Outcomes

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NOPREN/PAPREN School Wellness Working Group

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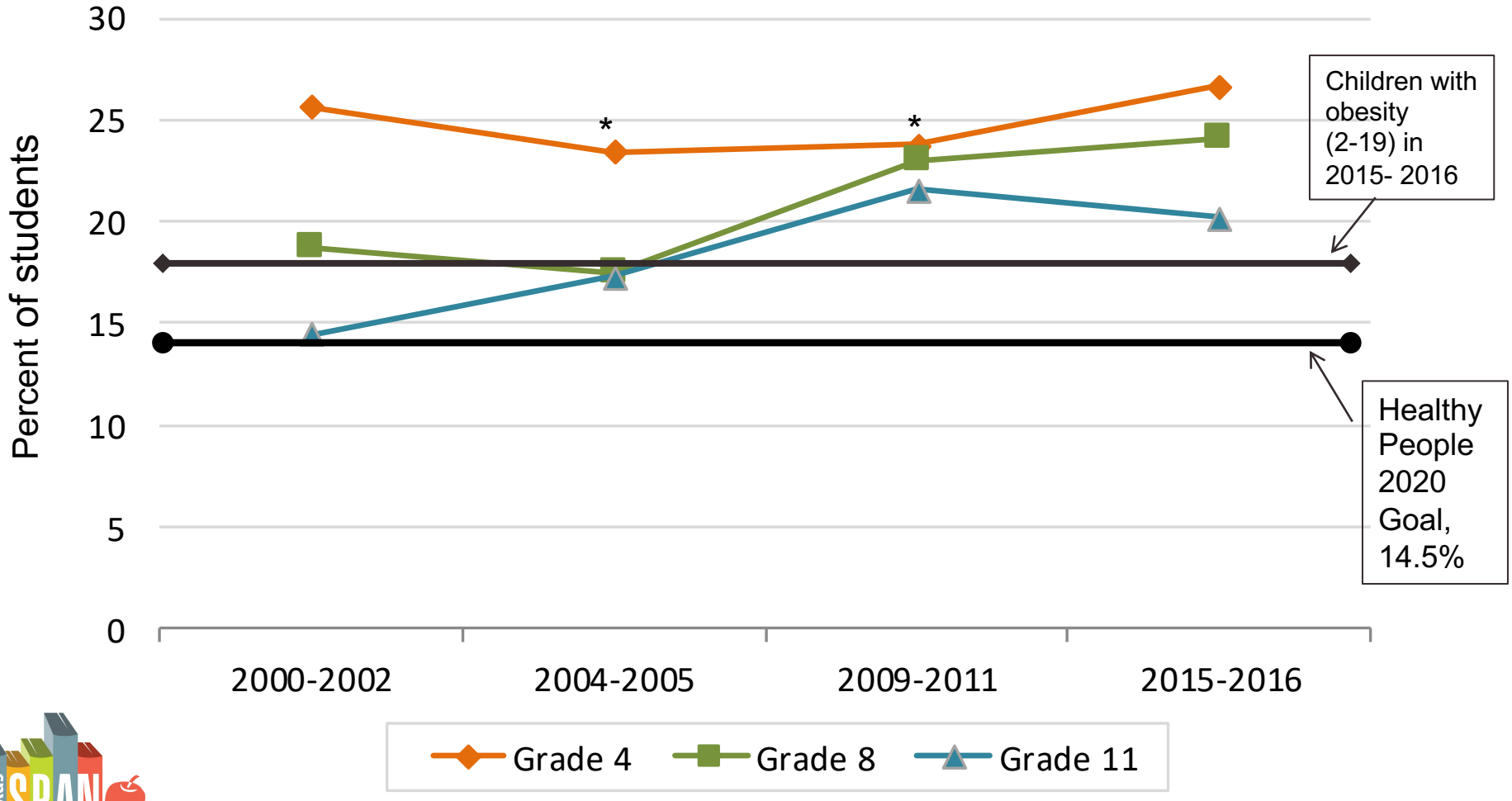
Today's Talk

- Obesity in Texas children
- CATCH Implementation
  - Travis County CATCH study
  - Implementation index and outcomes
- TX CORD
  - School study
  - Implementation index and outcomes
- Other indices
  - School PA policy & student activity using SPAN

Trends in Prevalence of Child Obesity in Texas (2000-2016)



Texas School Physical Activity and Nutrition Survey

*significant, p<0.05

Hoelscher, in preparation

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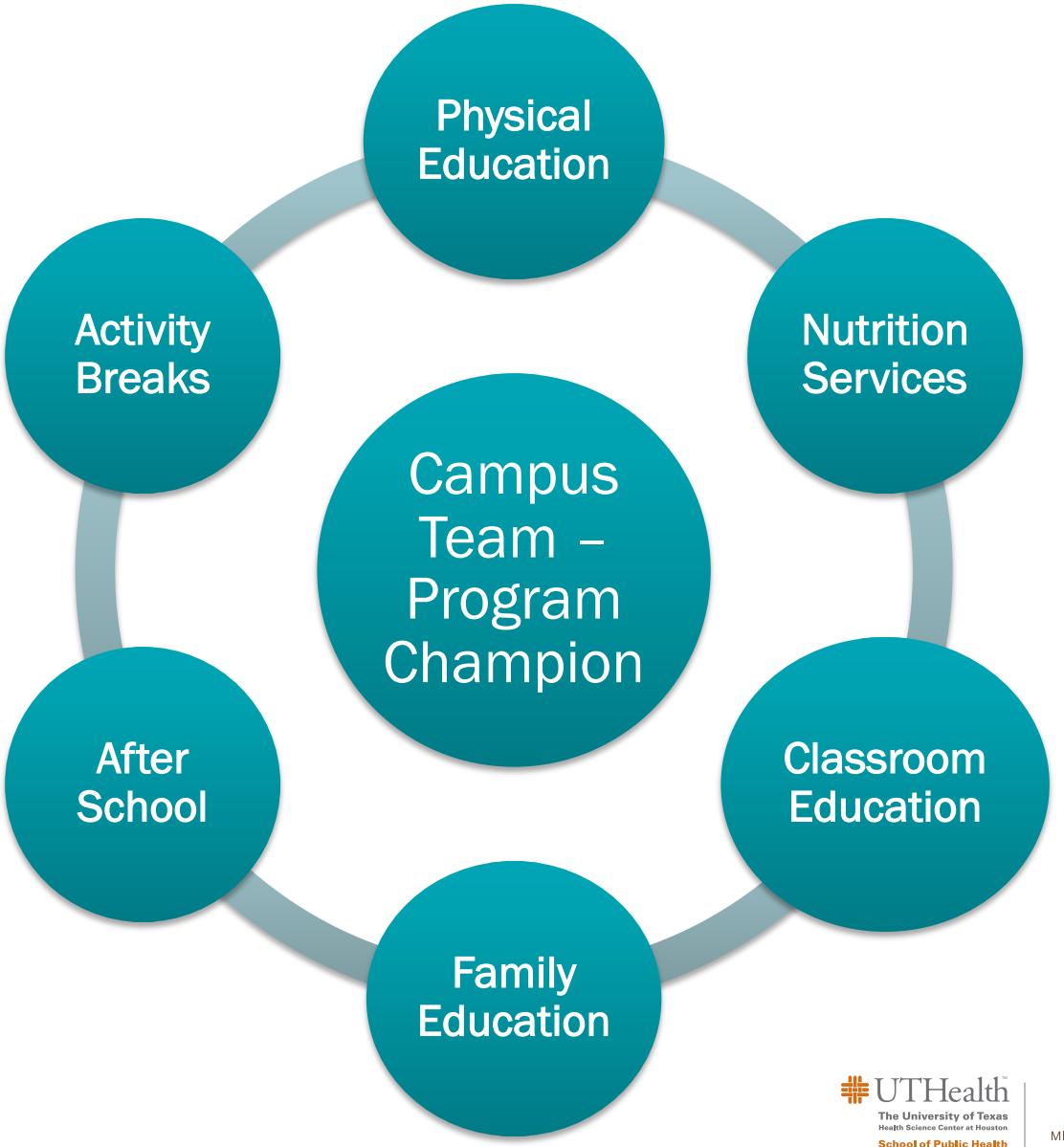
CATCH Model for Implementation



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CATCH Travis County

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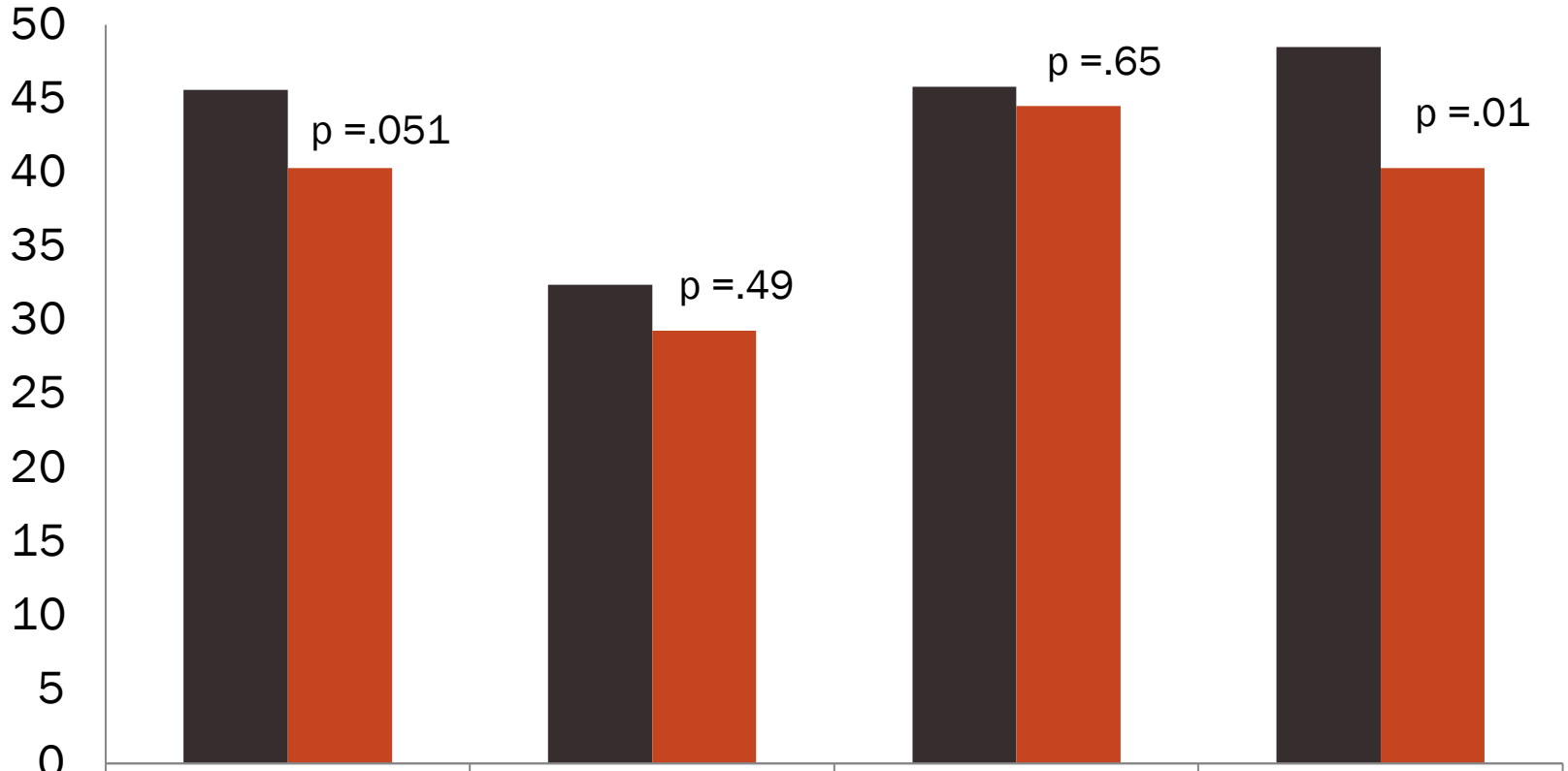
Reductions in Child Obesity Among Disadvantaged School Children With Community Involvement: The Travis County CATCH Trial

Deanna M. Hoelscher[1], Andrew E. Springer[1], Nalini Ranjit[1], Cheryl L. Perry[1], Alexandra E. Evans[1], Melissa Stigler[1] and Steven H. Kelder[1]

The objective of this study was to compare the impact of two intervention approaches on the prevalence of child overweight and obesity: (i) Coordinated Approach To Child Health BasicPlus (CATCH BP), in which schools were provided evidence-based coordinated school health program training, materials, and facilitator support visits, and (ii) CATCH BP and Community (BPC), in which BP schools received additional promotion of community partnerships

Travis County Dell Elementary CATCH Year 1 Results
Percent Overweight (≥ 85th % BMI)



	All (n=35)	Basic (n=5)	Basic Plus (n=15)	Basic Plus Comm (n=15)
Spring 07	45.6	32.4	45.8	48.5
Spring 08	40.3	29.3	44.5	40.3

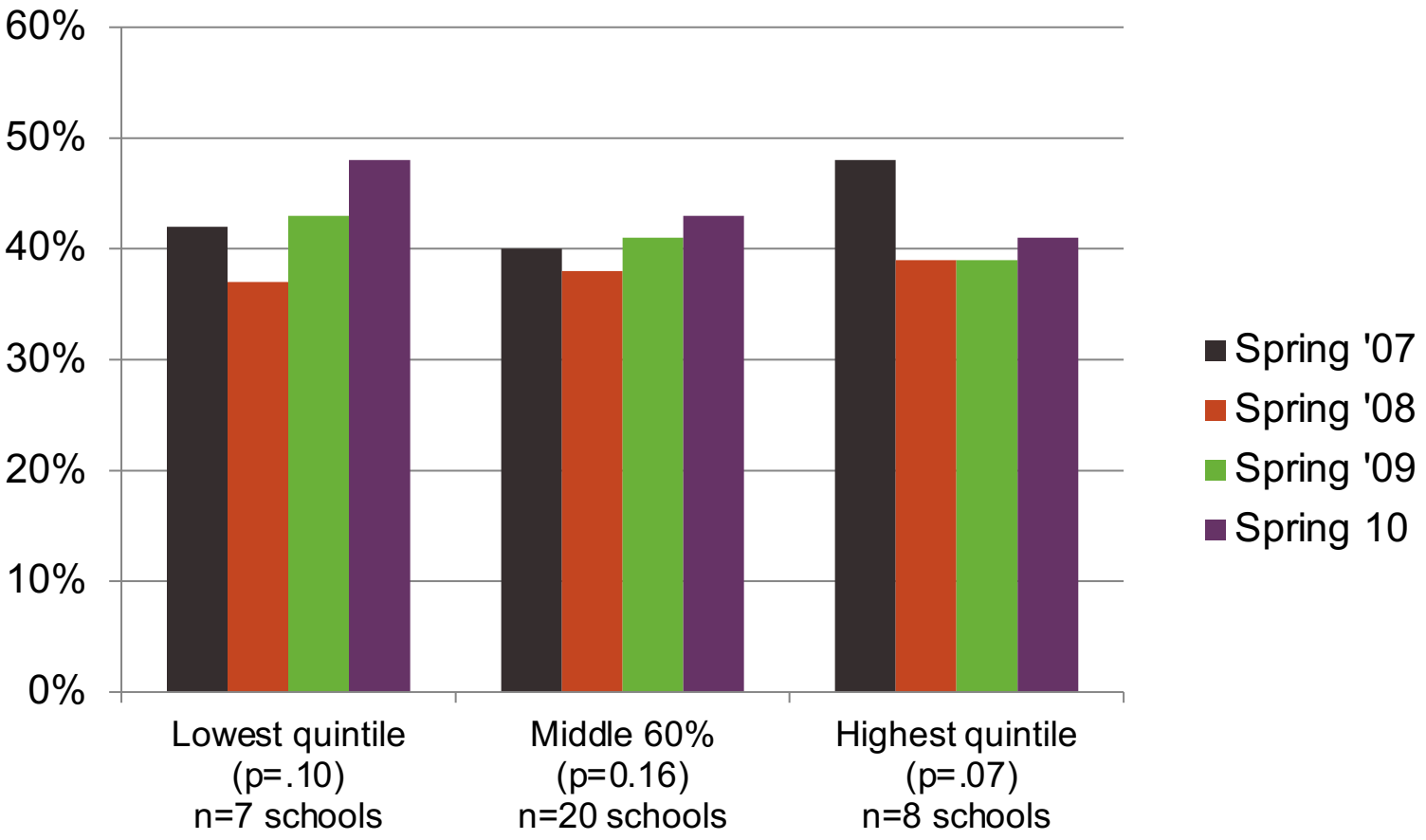
N students = ~ 1,100

Source: Hoelscher et al., 2010

CATCH BPC School Actions
(2007-2008)

- **CATCH Community Café**
  - Provide opportunities for students to have a taste of healthful foods (n=7)
  - Implement school gardening program (n=6)
  - Implement guided play during recess (n=2)
  - Implement a physical activity break during class-time (n=5)
  - Increase role modeling of PA by principal and school staff (n=6)
  - Create a safe play space for children by opening the schoolyard after school and providing attendants to ensure children's safety (n=7)
- **Number of CATCH facilitator visits**
  - BPC (n = 172 visits) compared to BP (n = 129 visits)
- **'Best Practices' workshops**
  - n= 13 attended all three, n = 15 attended 2 or more

Implementation Leads to Better Outcomes
Travis County CATCH Trial, 2007-2010



Hoelscher et al., in preparation

What is associated with better outcomes in CATCH schools?

- ***Environment***
  - Number of CATCH meetings,
  - CATCH committee activity rating,
  - Weekday themed events,
  - Participation in 1 or more of 5 named CATCH activities,
  - CATCH kick-off week,
  - Number of WOW days (teacher-led physical activity),
  - Number of morning announcements in the last month, and
  - Extent to which CATCH activities are coordinated with staff.
- ***Classroom activities***
  - Teacher attended CATCH training,
  - Number of CATCH lessons taught,
  - Number of health lessons taught,
  - Whether teacher coordinated classroom activities to align with CATCH, and
  - Student report of CATCH lessons.
- ***Parent communication***
  - Level of parent communication, and
  - CATCH materials sent home.
- ***Cafeteria***
  - Extent to which good meal practices were followed, and
  - Promotion activities for healthy foods.

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- Centers for Disease Control and Prevention
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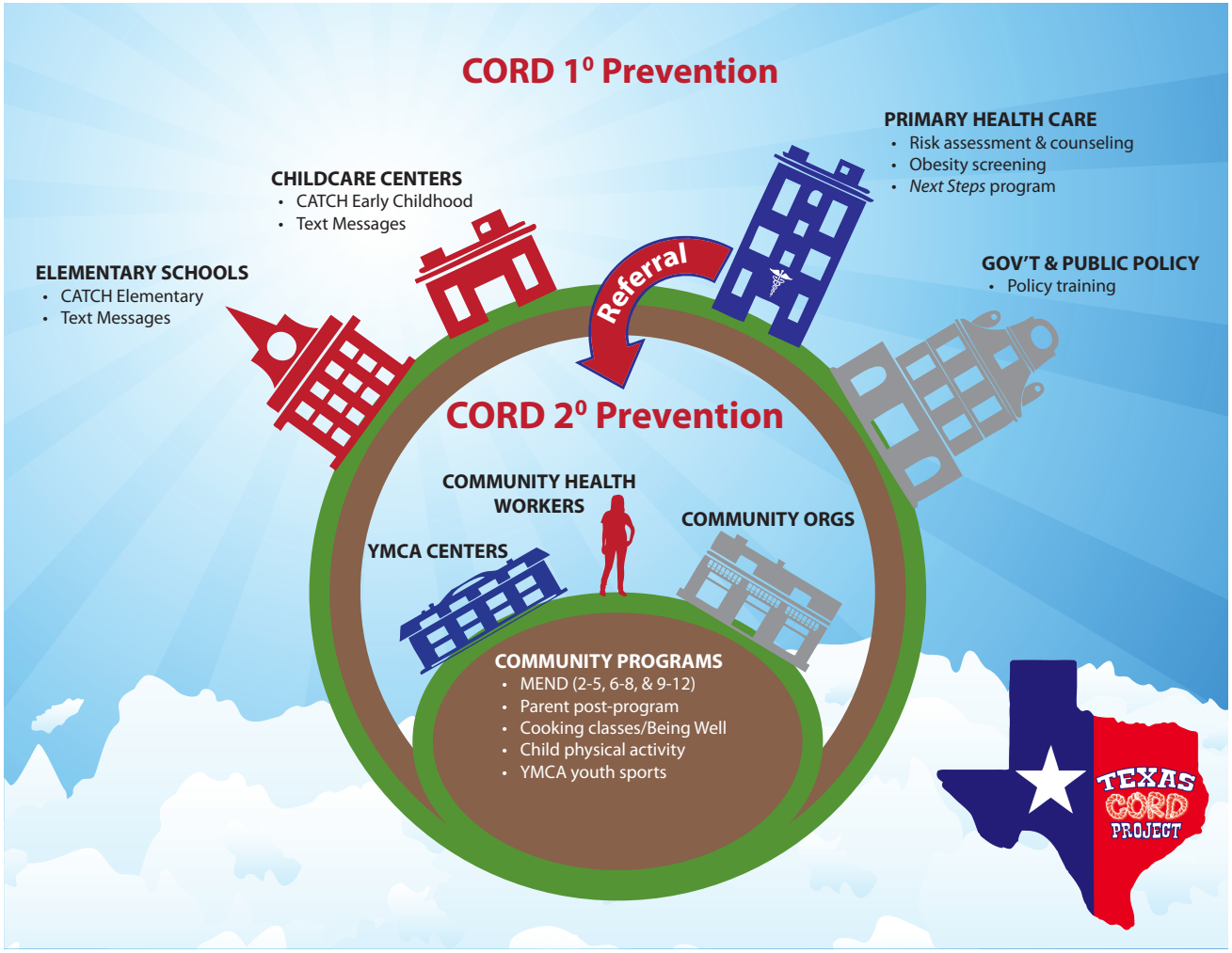
TX CORD Study Design



Hoelscher et al., 2015

TX CORD Study Aims

- To implement and evaluate a primary prevention obesity program in low-income, ethnically diverse catchment areas in Austin and Houston, TX, USA
- To implement and evaluate the efficacy of a systems approach to child obesity on reducing BMI z-scores by embedding a 12-month family-based secondary prevention program within a community primary prevention program.
- To quantify the incremental cost-effectiveness of the 12-month family-based secondary prevention program relative to primary prevention alone.

Primary Prevention School Process Evaluation

- TX CORD Primary Prevention outcome process evaluation data were collected from schools and school teachers. Scores created for year 1 and year 2 of implementation.
  - 2012 (baseline)
  - 2013 (year 1 of implementation)
  - 2014 (year 2 of implementation)

- CATCH constructs included
  - CATCH Coordination and Organizational Environment, CATCH classroom, CATCH Family Outreach, CATCH Child Nutrition Services, and CATCH Coordination Guide.

- The other non-CATCH related constructs included
  - CSHP classroom, PE & PA, Communication with Parents, Principal Support, CORD Coordination with other components, Health policies, non-CATCH PA policies, non-CATCH PA activities, and non-CATCH Nutrition policies.

Primary Prevention School Process Evaluation

- Mean standardized elementary school teacher implementation index scores were created
  - CATCH items (17 items)
  - Overall items (63 items)
  - The teacher scores were then aggregated to represent scores at the school level

- Similarly, mean standardized elementary school implementation index score were created
  - CATCH items (49 items)
  - Overall items (140 items)

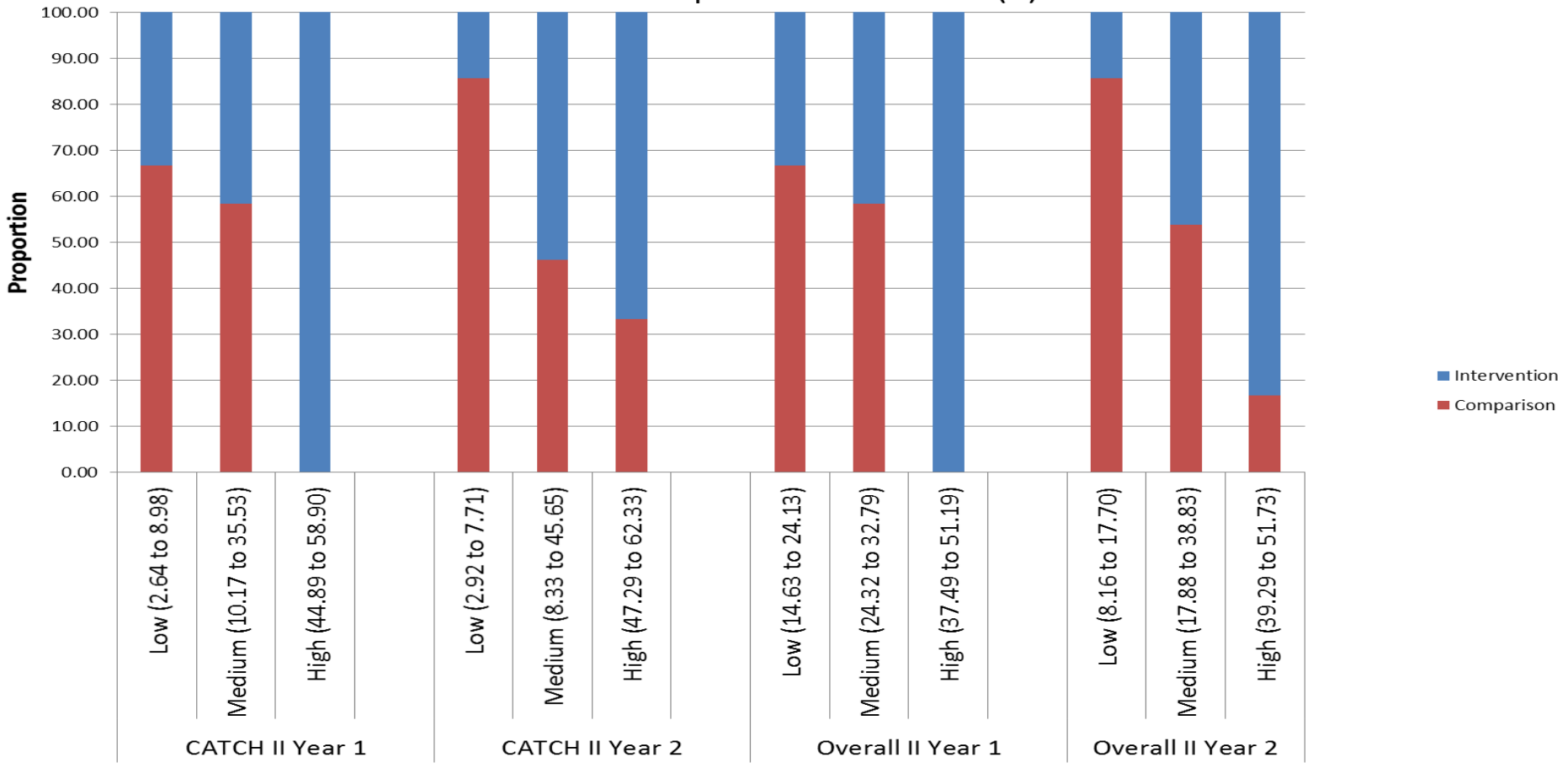
- Mean overall and CATCH aggregated implementation index scores were created for each school from the school and collapsed school teacher scores. Based on their aggregated mean CATCH and overall implementation index score, schools were classified as:
  - High implementers (upper quartile)
  - Medium implementers (middle two quartiles)
  - Low implementers (lower quartile)

CATCH and Overall Implementation by Year

	Intervention Schools (mean, SE)	Comparison Schools (mean, SE)	p value
Year 1	n = 13	n = 12	
CATCH	32.62 (5.50)	18.40 (3.36)	0.047
Overall	33.81 (3.13)	25.25 (1.79)	0.034
Year 2	n = 12	n = 15	
CATCH	39.89 (5.66)	14.47 (4.72)	0.002
Overall	35.49 (3.63)	21.98 (2.43)	0.004
Years 1 & 2	n = 25	n = 27	
CATCH	33.32 (5.16)	15.01 (3.01)	0.003
Overall	32.90 (3.17)	23.09 (1.46)	0.006

Primary Prevention School Process Evaluation

Figure 1: Proportions of schools at each quartile of aggregated mean CATCH and overall implementation index (II)



Quartiles of CATCH and Overall aggregated mean Implementation Index scores (Year 1 and 2 of implementation)

TX CORD Implementation on Student Outcomes

- Examined among 2nd and 5th graders, respectively
  - Differences by implementation level overtime in:
    - Body Mass Index (BMI)
    - Nutrition & PA (SPAN measures)
    - Psychological Outcomes
- Mixed effects regressions
  - School as a random effect
- Maximum likelihood estimation
  - Uses all available data
- Effect of interest
  - Interaction between
    - Implementation Level (Low, Medium, High)
    - Time (Baseline, Follow-up)

TX CORD Implementation on Student Outcomes

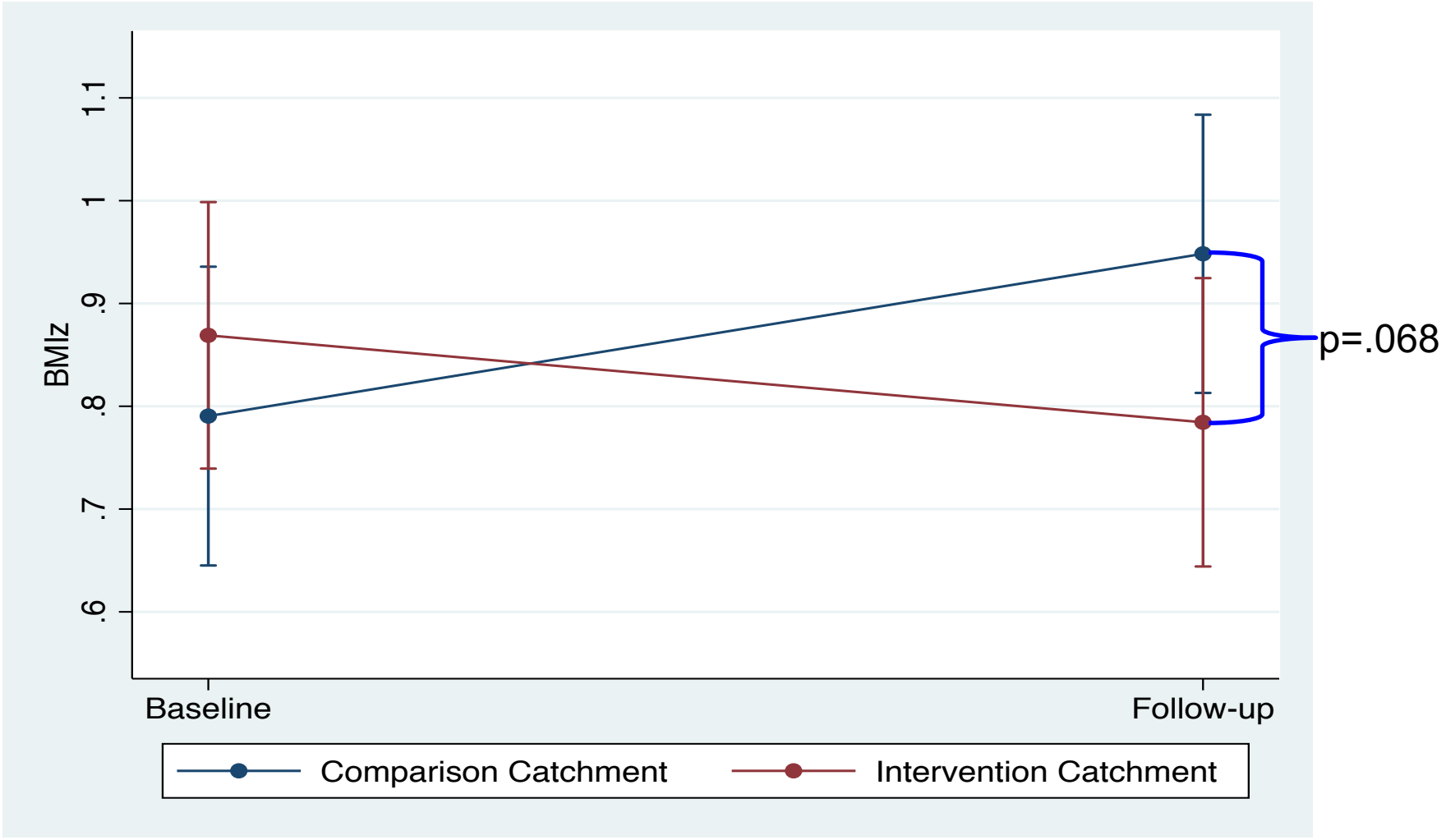
- Children with conditions limiting either nutrition or physical activity not included
- Covariates – All models
  - Parent Education
  - Family Poverty to Income Ratio
  - Single Parent Status
  - Child Ethnicity
  - Child Gender

School Age Children: Covariates

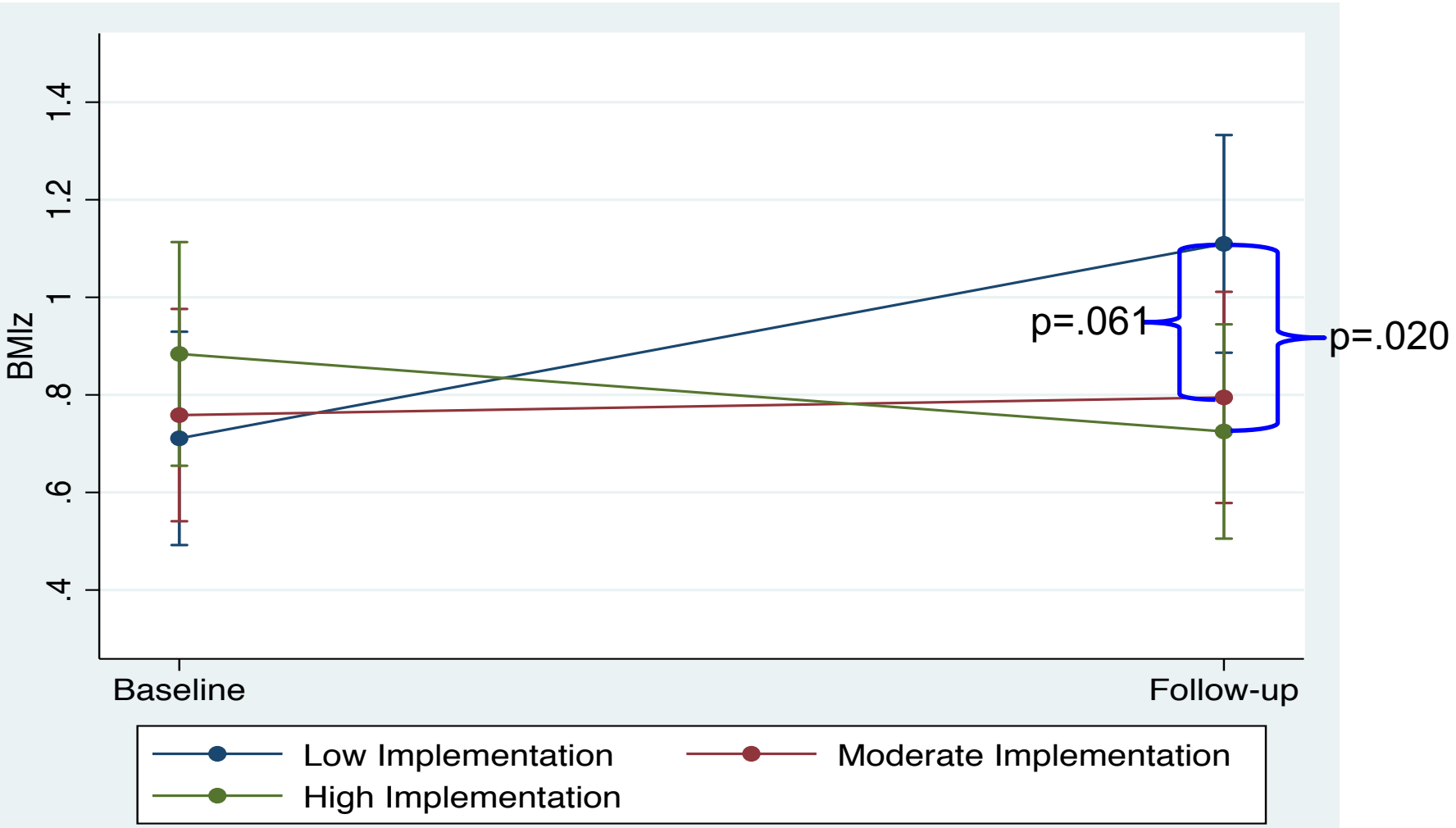
	2nd Grade N Children=696, N Schools=32		5th Grade N Children=511, N Schools=31	
Socio-Demographic Covariates:	Baseline M (SE) or %	Follow-up M (SE) or %	Baseline M (SE) or %	Follow-up M (SE) or %
Parental Education	3.46 (.06)	3.45 (.06)	3.31 (.09)	3.47 (.09)
Poverty to Income	3.46 (.06)	3.45 (.06)	3.31 (.09)	3.47 (.09)
Single Parent	30%	28%	34%	28%
Child Female	58%	57%	54%	64%
Child Race/Ethnicity				
- Latino	82%	83%	84%	85%
- Black	13%	11%	13%	12%
- Other	5%	6%	3%	3%

Note. There were no statistically significant differences between baseline & follow-up groups by grade, respectively.

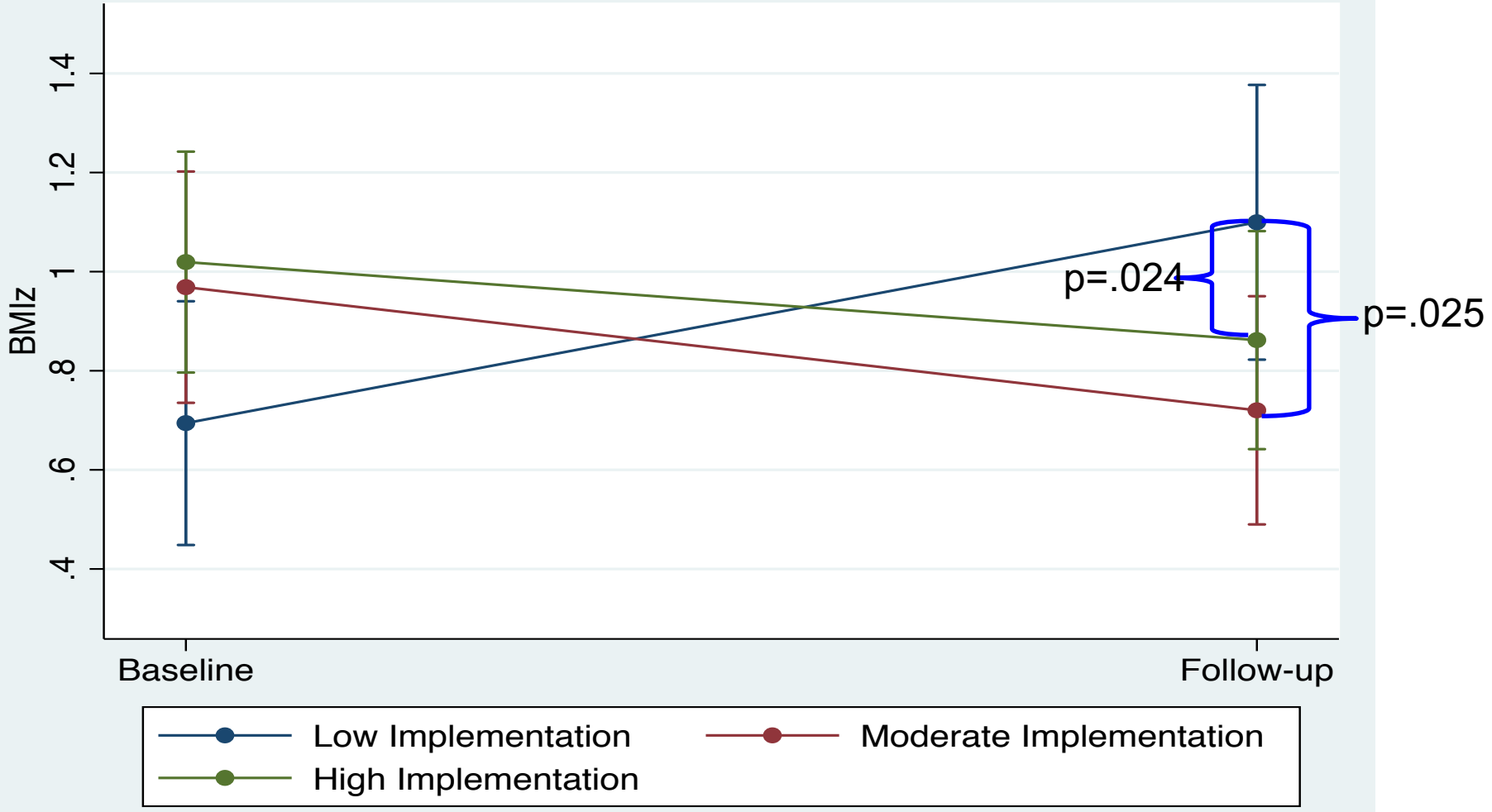
BMI z-score by CORD Catchment Area Over Time: 2nd & 5th Grade Combined



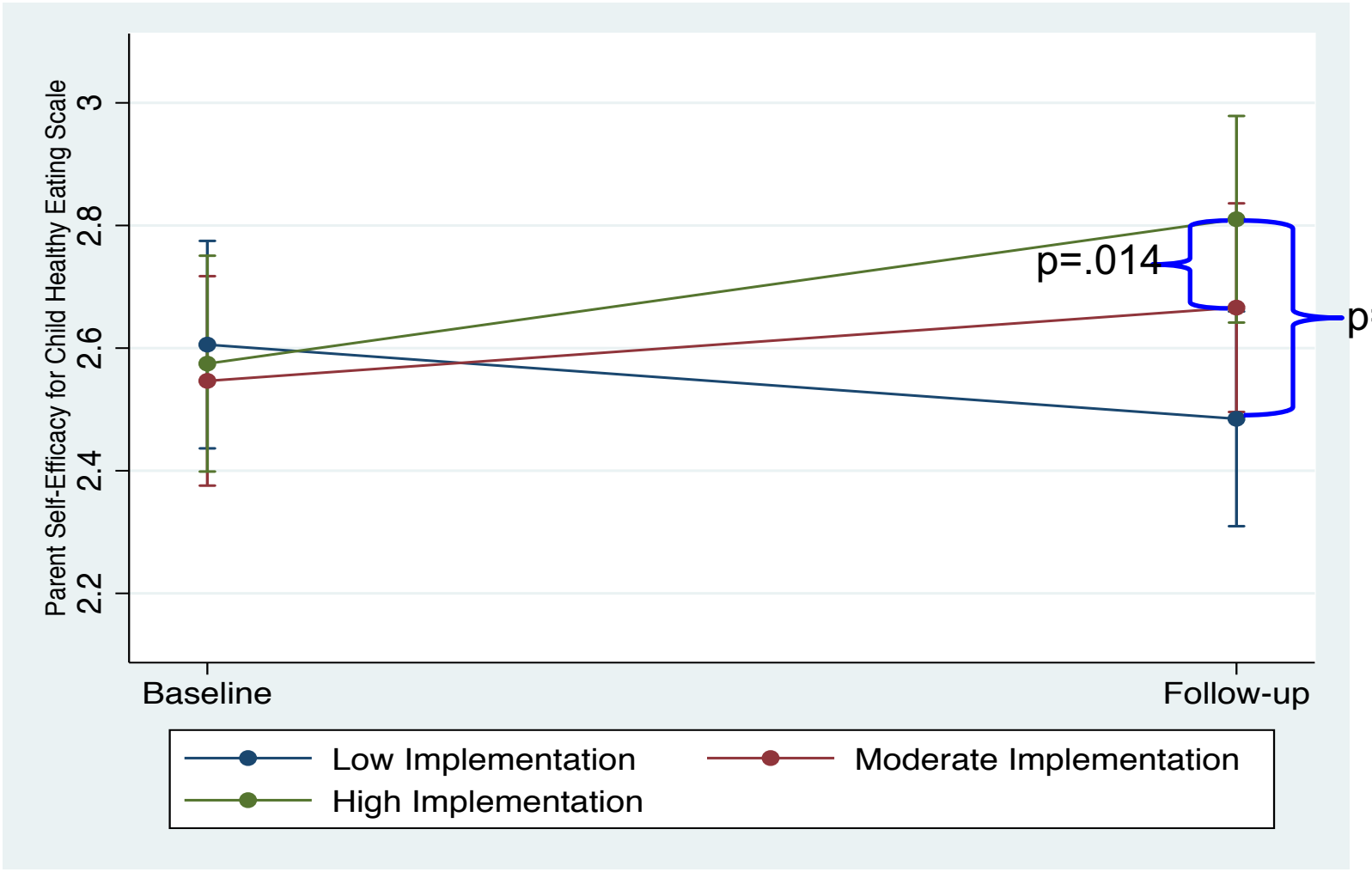
BMI z-score by CORD Implementation over time: 2nd Grade



BMI z-score by CORD Implementation over time: 5th Grade

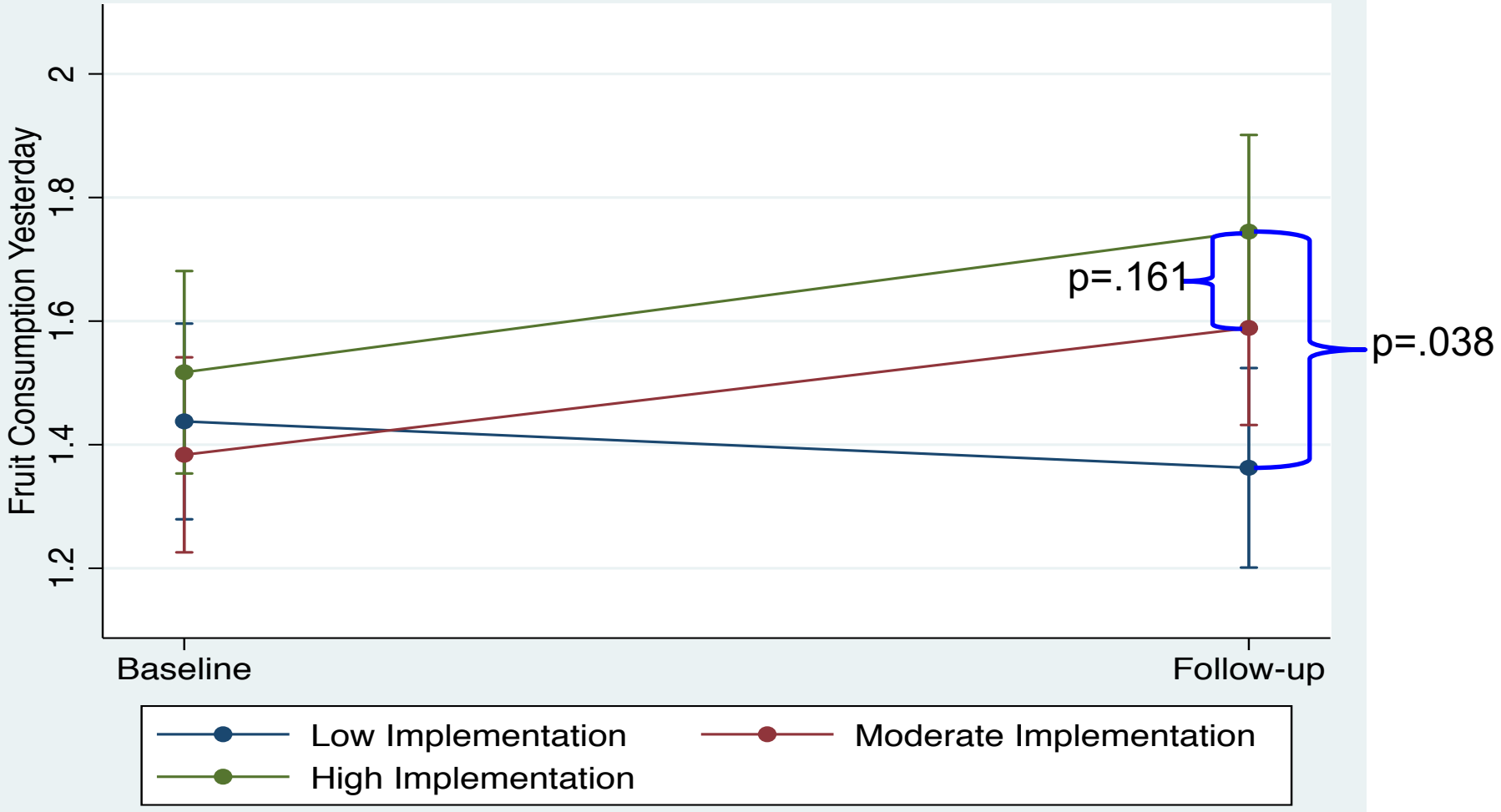


Healthy Eating Self-Efficacy by CORD Implementation over time: 2nd Grade



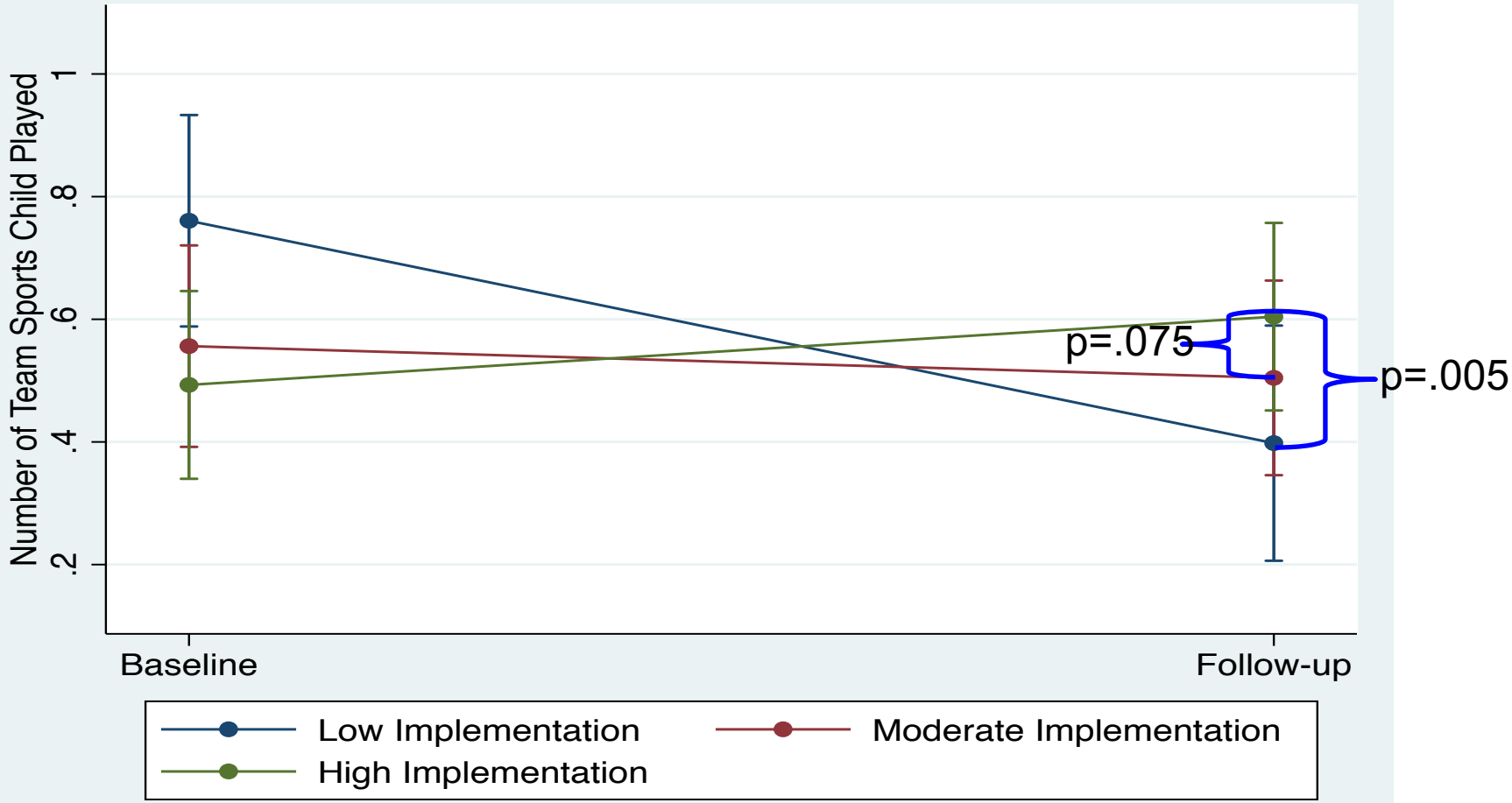
Healthy Eating Self-Efficacy Scale: I am sure that my child can eat: 1) broccoli instead of fries; 2) carrot sticks instead of chips; 3) fruit instead of candy (Not sure=1, Very sure=4), α=.83

Child Fruit Consumption by CORD Implementation over time: 2nd Grade

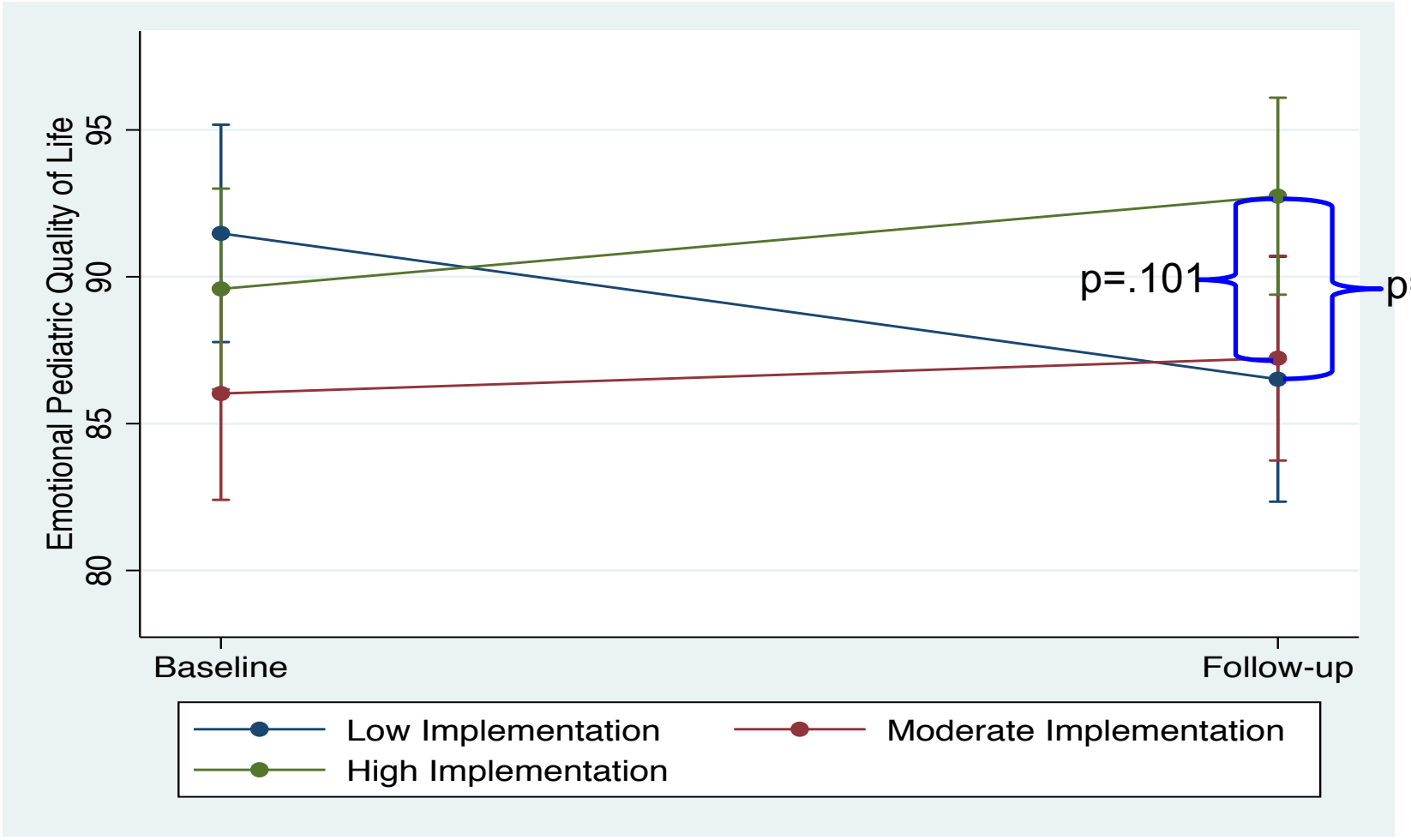


Child Fruit Consumption: Did child eat fruit yesterday? (No=0, 1 time=1, 2 time=2, >=3 times=3

Team Sports Played by CORD Implementation Over Time: 5th Grade



Emotional PQOL by CORD Implementation Over Time: 5th Grade



Emotional PQOL Adapted: My child is 1) satisfied with life; 2) happy (Never-Almost Always), α=.76

Conclusions: Elementary School

- No differences revealed when comparing Intervention vs. Comparison by grade level
  - Did see significant changes when grades were combined
  - Most likely to due to contamination & power issues
- Implementation level matters
- High implementation related to better outcomes than moderate or low implementation in most cases
- Results are a function of how well programs are implemented

TX CORD Study Team Investigators

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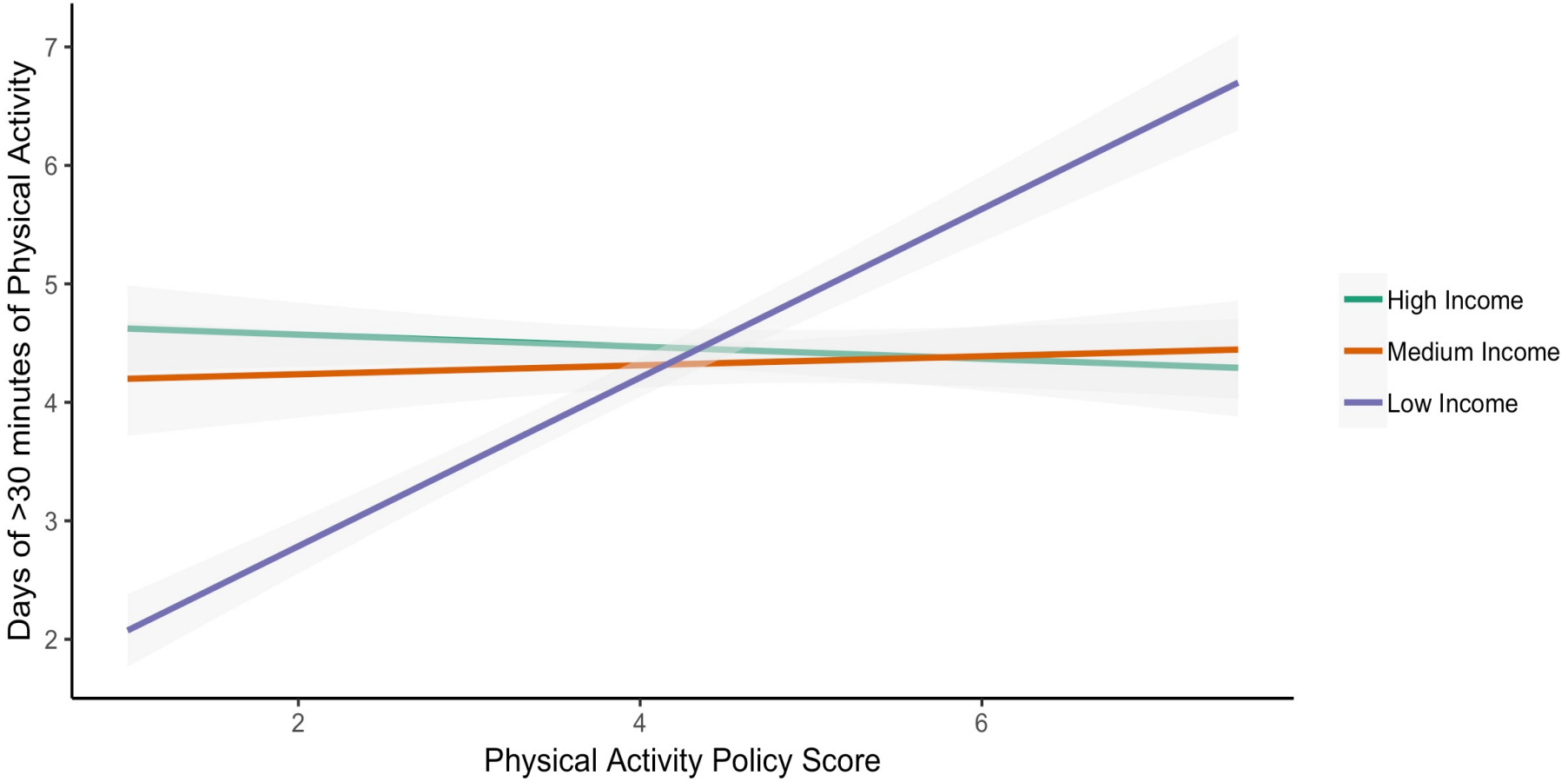
School Policies can Increase Physical Activity in Low-Income Schools (TX SPAN 2015-2016)

Figure 1: Interaction Plot of Economic Disadvantage and School Policy on Physical Activity



Ganzar LA , Ranjit,N, Saxton D, Hoelscher DM. Physical Activity Policies in Schools are Associated with Student Physical Activity Behaviors. Journal of Physical Activity and Health, 2019

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Future Directions

- Programs need to be fully implemented to show desired outcomes
  - How can we increase implementation of obesity prevention programs in schools?
- Implementation indices are a good way to measure program implementation
- Further work needs to be done on implementation of school-based health programs for obesity prevention.

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Thank you!

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