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Early Learning Program Characteristics and Child Outcomes: Lessons from Tennessee

Dale C. Farran, PhD
Vanderbilt University

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Support for Pre-K Intervention

- "Deep research base" derives from small, boutique studies conducted 50 or more years ago
- Appeal of pre-k intervention is stronger today as the achievement gap grows for children from different income groups
- Heckman and others have promised states immediate and long term benefits from programs for 4 year olds.
- Scaling up is a "concept" not a **defined** set of practices.
  - Original programs bear no resemblance to current state programs
  - Increasingly dominated by public school model

TN-VPK: Typical Statewide Program

- Starting in 1998 with small pilot program, legislation created Voluntary Pre-K program 2005.
- Current program:
  - 935 pre-k classrooms in 135 of the 136 Tennessee school systems across all 95 Tennessee counties;
  - Serving more than 18,000 children.
  - Targeted: FRPL eligibility
  - Met 9 of 10 NIEER Benchmarks for quality programs
  - 93% of classrooms are in public schools
  - No central, enforceable vision for program
  - No coaching or PD funding with follow through

Expensive

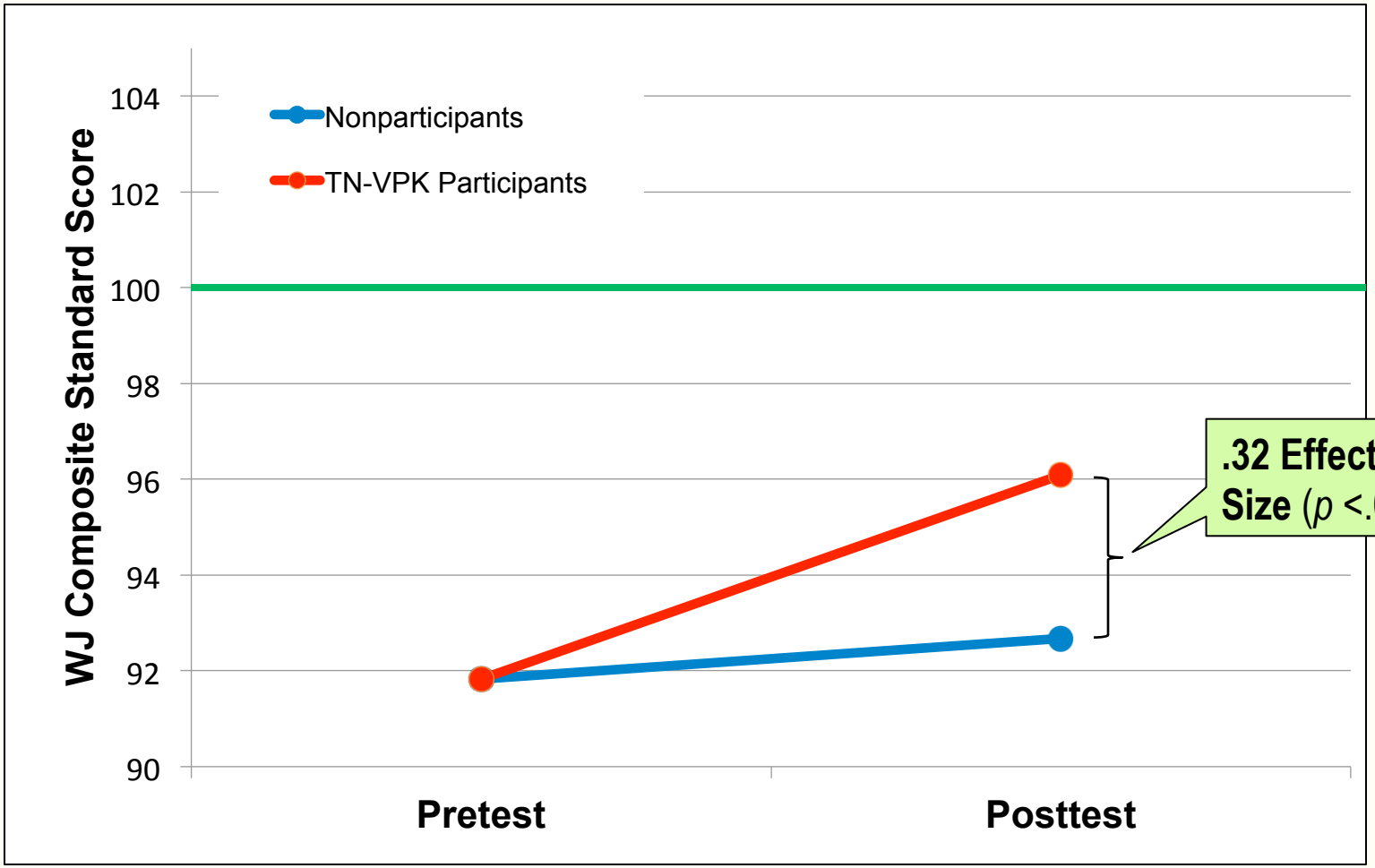
Research on Statewide Implementations: What Do We Need to Know?

- Immediate post treatment effects (School Readiness) on emergent literacy, language, and math skills; classroom behaviors and social skills
- Sustainability of effects on achievement and school behaviors beyond kindergarten entry
- Enhancements to the program that have the greatest potential for improving effectiveness
- Effectiveness of alternative models for wide implementation

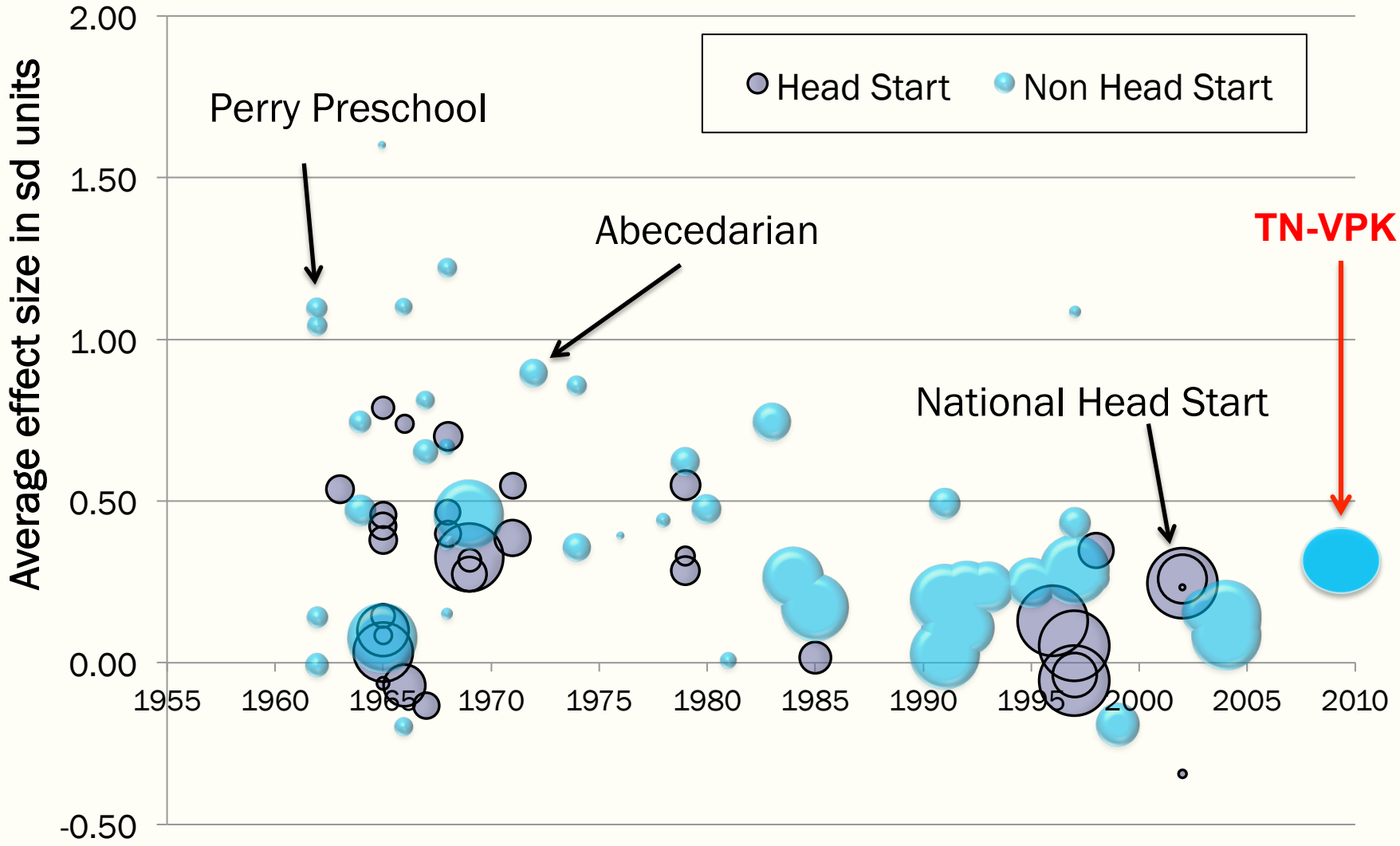
Addressing Some of These Questions: The Vanderbilt Study

- Funded in 2009 by the U.S. Dept. of Education (IES) in response to a joint grant proposal from Vanderbilt's Peabody Research Institute and the TNDOE Division of School Readiness and Early Learning (Grant #R305E090009).
- Three main components:
  - Randomized control trial in oversubscribed schools-- 2 cohorts, 2990 students, 80 schools, 29 districts; tracking through the state data system to 3rd grade and beyond (now 6th grade).
  - Intensive substudy of consented children in the full sample-- assessed each year by the research team; 1076 students, 58 schools, 21 districts.
- Study following the sample through middle school funded in 2014 by NICHD (Grant #1R01HD079461), proposal going in now for continued follow up.
  - Follow up Intensive substudy of Cohort II students, one-third new consents; 725 students, their families and teachers.

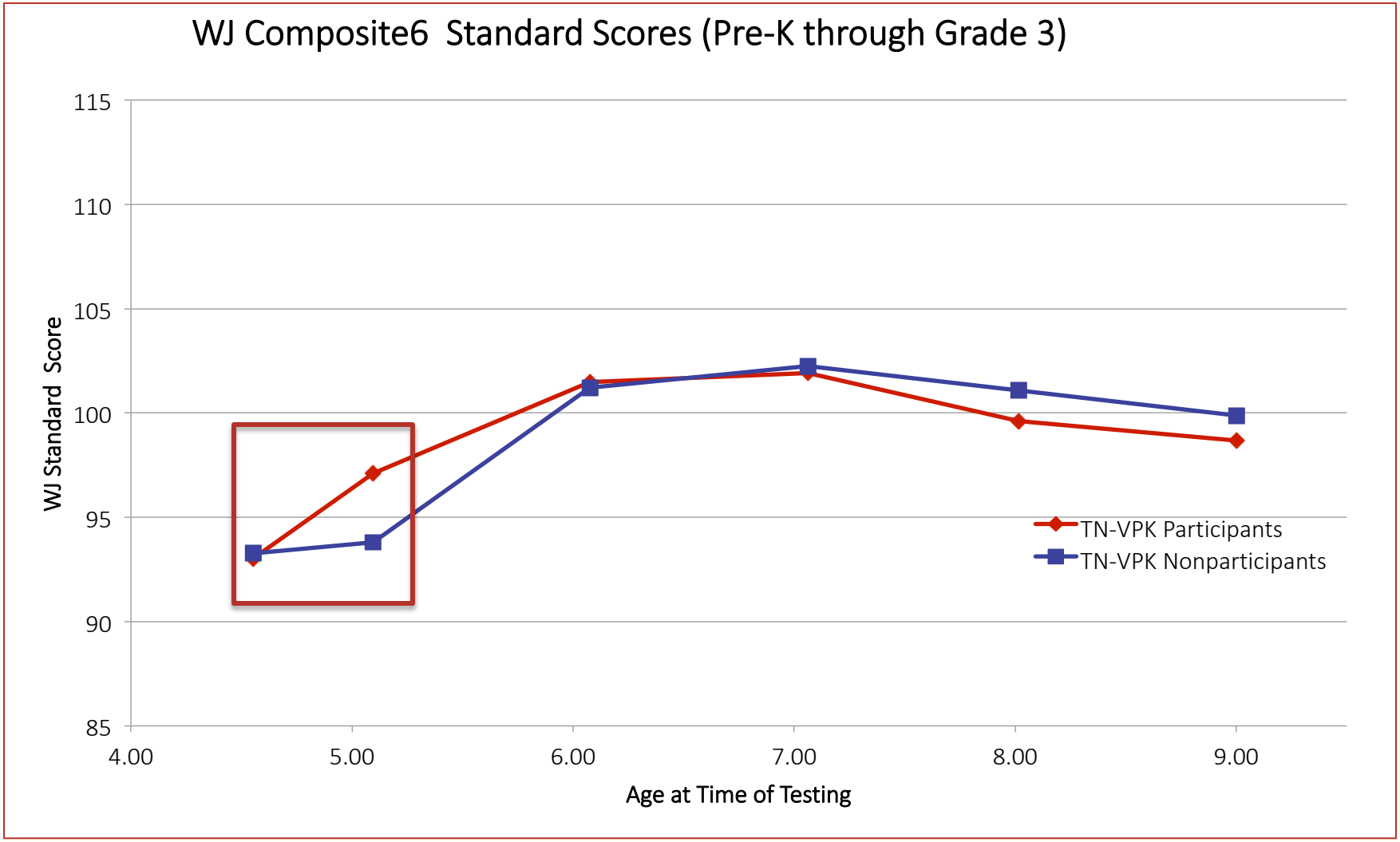
TN-VPK Effects at End of Pre-K on the Overall WJ Achievement Composite Score



Average Cognitive Impact at End of Pre-K

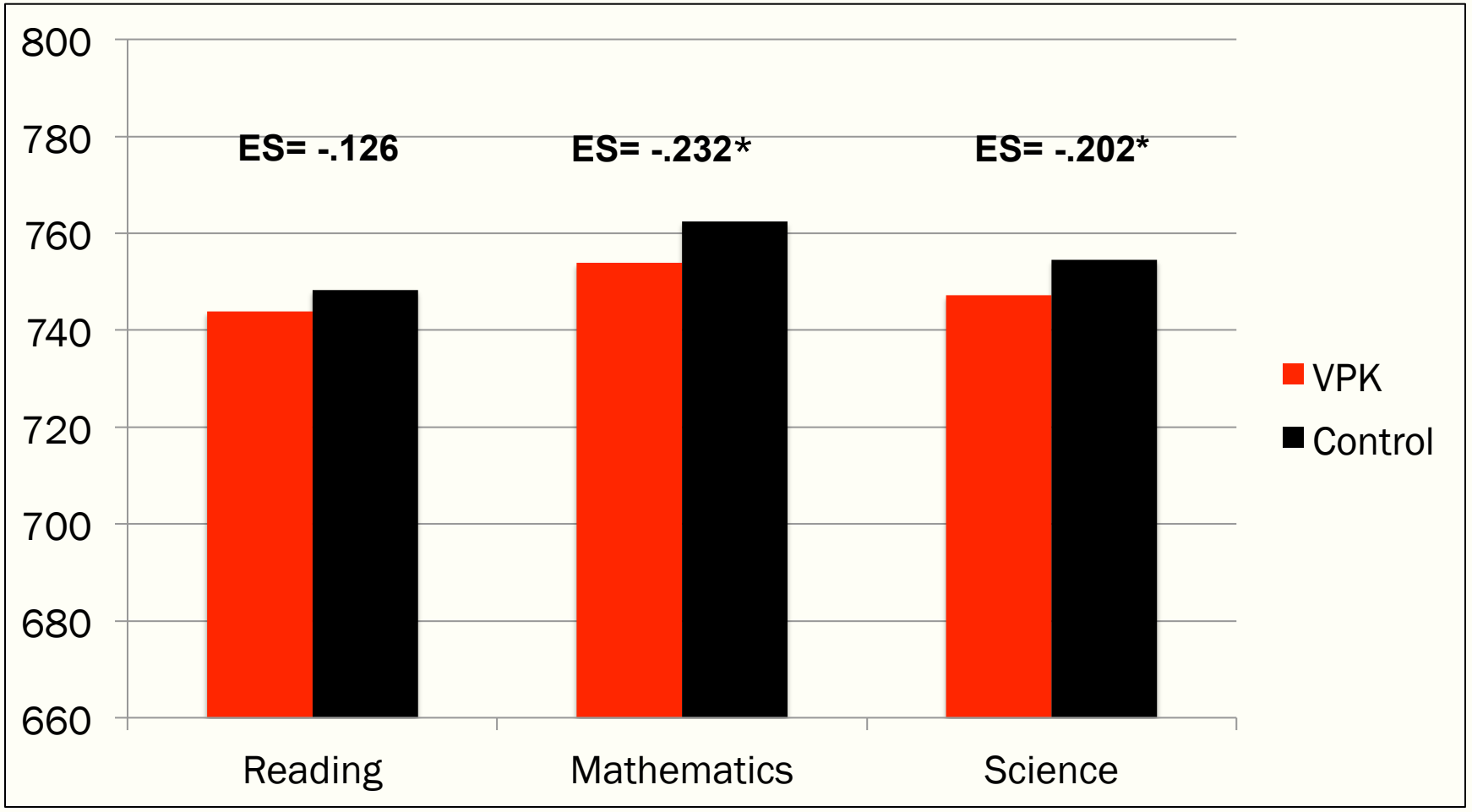


Overall Achievement Advantage Fades



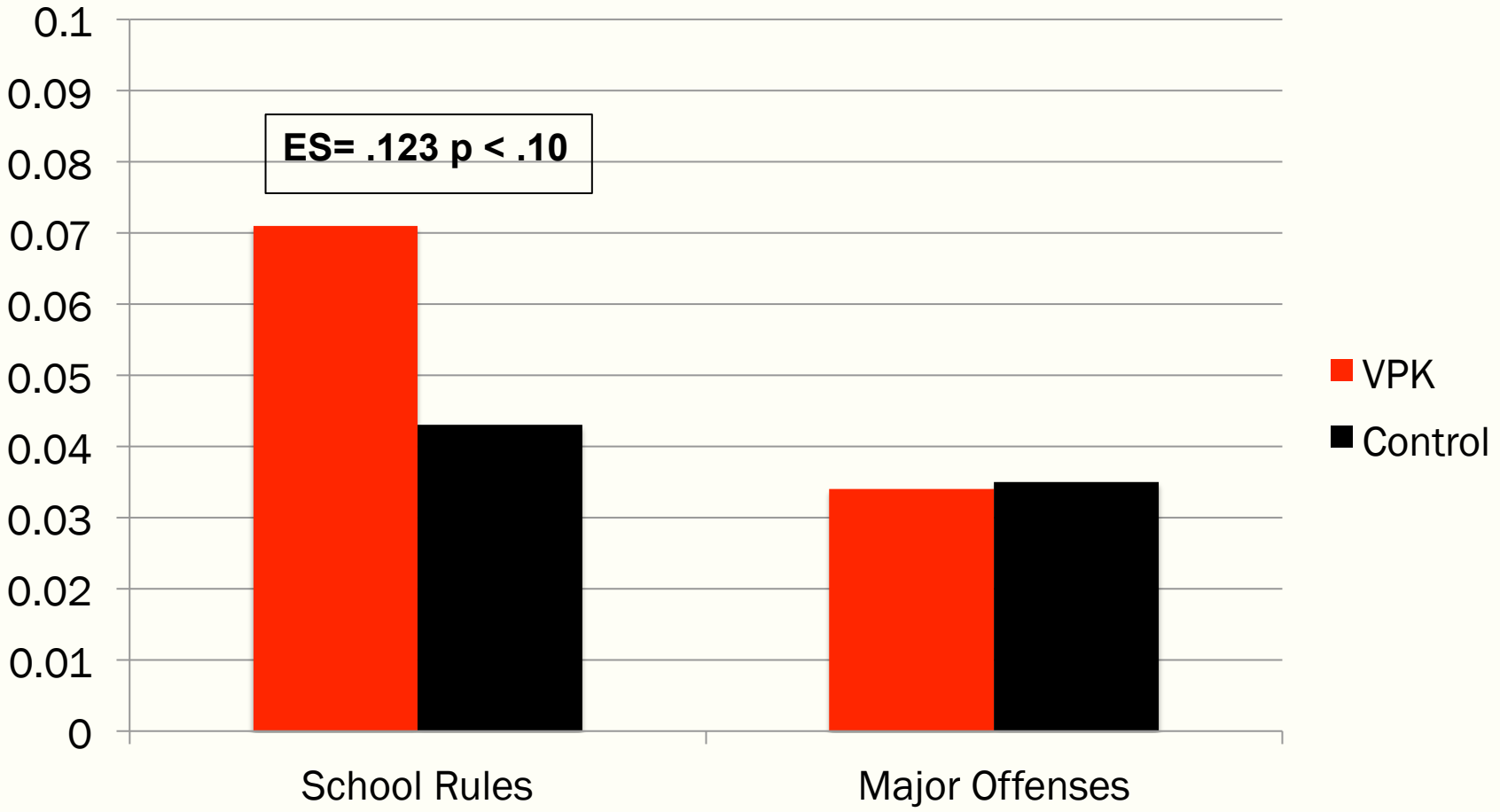
Third Grade TCAP Scores: Full Sample

(Treatment on Treated)



*$p < .01$

Disciplinary Offenses by Third Grade Full Sample (Treatment on Treated)



Possible Explanations

1. Kindergarten teachers work with those children with low school entry skills enabling them to catch up.
2. Kindergarten grades (and beyond) are not building on the skills the VPK children come to school with. Momentum is not sustained.
3. Pre-K has become a junior kindergarten experience. By the end of 1st grade, children are burned out.
   - Increasing numbers of pre-k programs operated by the public schools
   - 93% of TN-VPK classrooms are housed in elementary schools
   - Very hard to protect those classrooms from elementary like pressures

There does not appear to be a consistent vision for Pre-K.

"High Quality" Prekindergarten Programs

- The terms "High Quality" are routinely used in all legislation funding prekindergarten programs.
- Advocates talk about only supporting "high quality" programs.
- The definition of high quality, however, is vague
- Most use structural features, which are easy to regulate
  - Group size
  - Teacher child ratio
  - Licensed teacher
  - Use of a curriculum
- None of these features individually or collectively are associated with children's achievement gains

Measuring Quality in ECE Classrooms

- Current classic measures (CLASS, ECERS)
  - Based on ratings
  - Concepts derived conceptually
- Reliability difficult (within 1 point typical)
- Training is expensive and must be repeated
  - Observers need to adopt and maintain the scale's *perspective*
  - Hard to prevent observer drift
- Account for very little variance in child gain

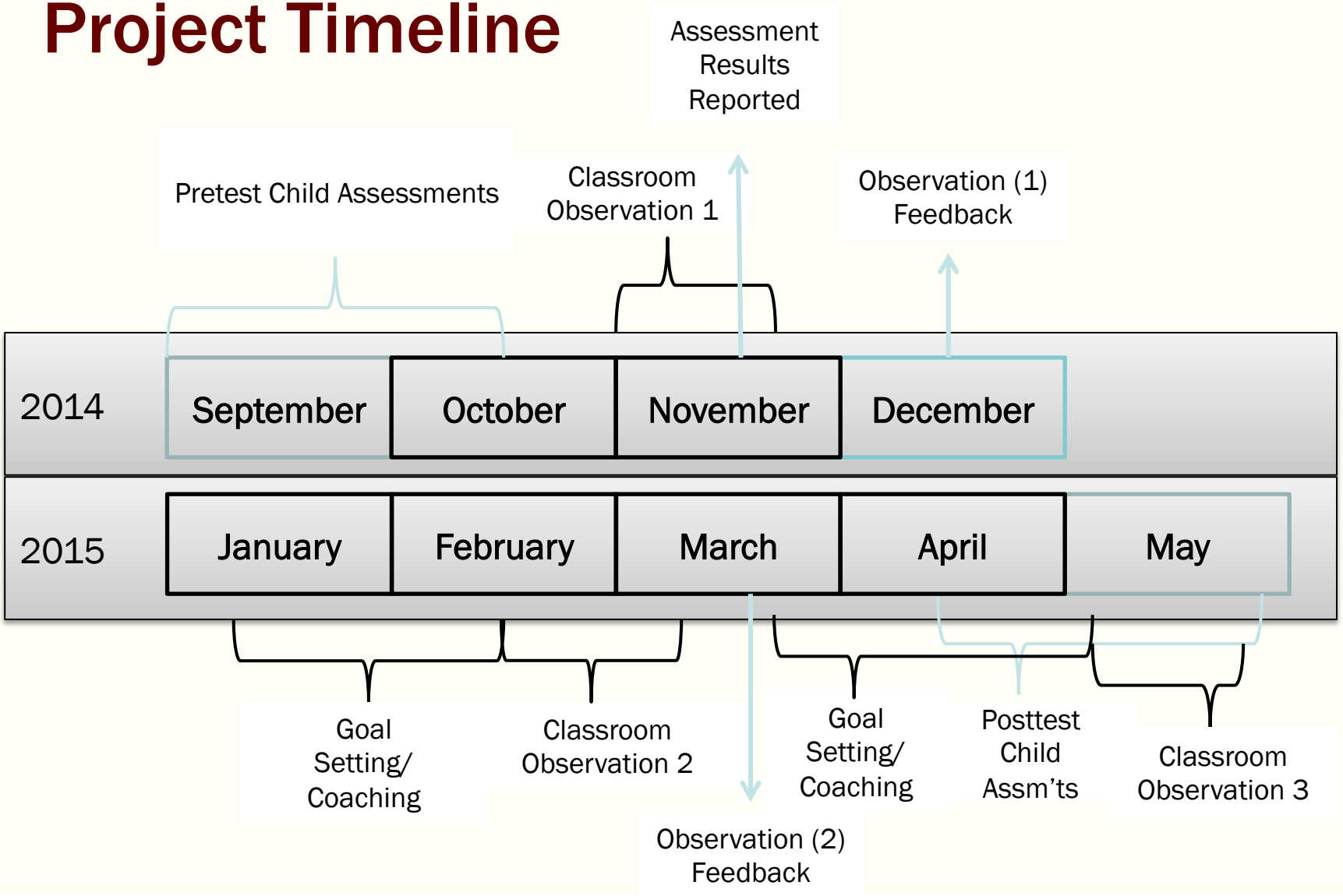
Actual Behavioral Counts: Alternatives

- Time Use
  - Very appealing to policy makers
  - Easier to regulate
  - Prediction for child gains not known
- Interaction counts
  - More difficult to collect
  - May be more predictive of child gains
  - More amenable to coaching
- Measures of both time use and interactions collected in several large scale studies
  - All data collection digital (iPads or surface tablets)
  - Applied to iterative continuous improvement project

Three "Model" Pre-K Hubs Opened in Metro Nashville Public Schools, August 2014

- Partnership formed with Vanderbilt (PRI)
- Goals of the partnership
  1. The creation of a data-driven change process by which markers of classroom quality related to improved child outcomes are identified; and
  2. The partnership will lead to development of a model that can be disseminated and implemented by all pre-k teachers district-wide

Project Timeline

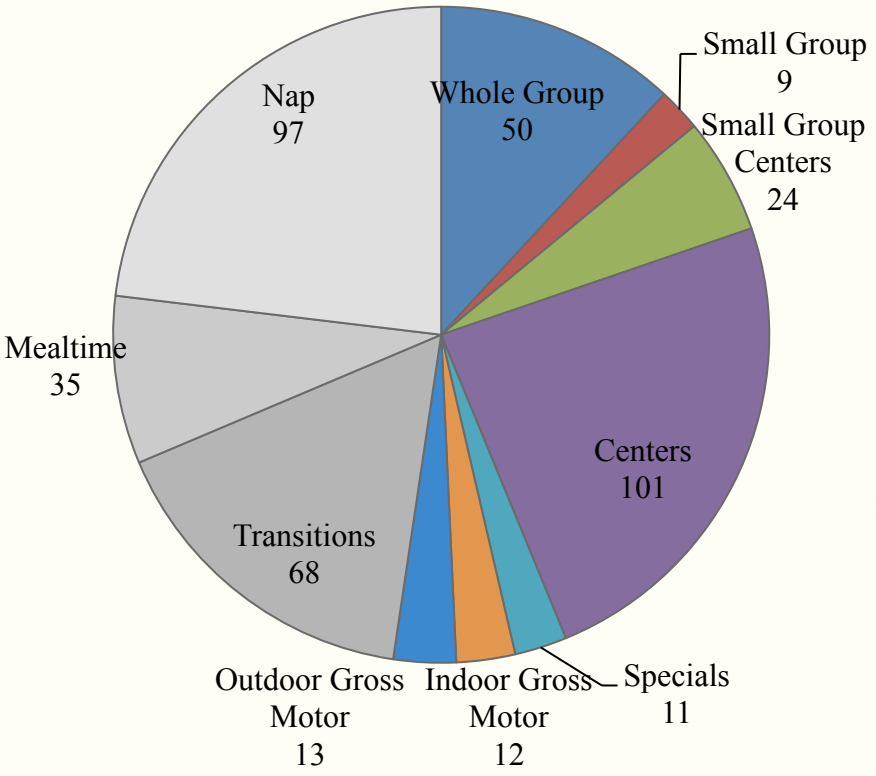


How Time Was Spent in the Classrooms

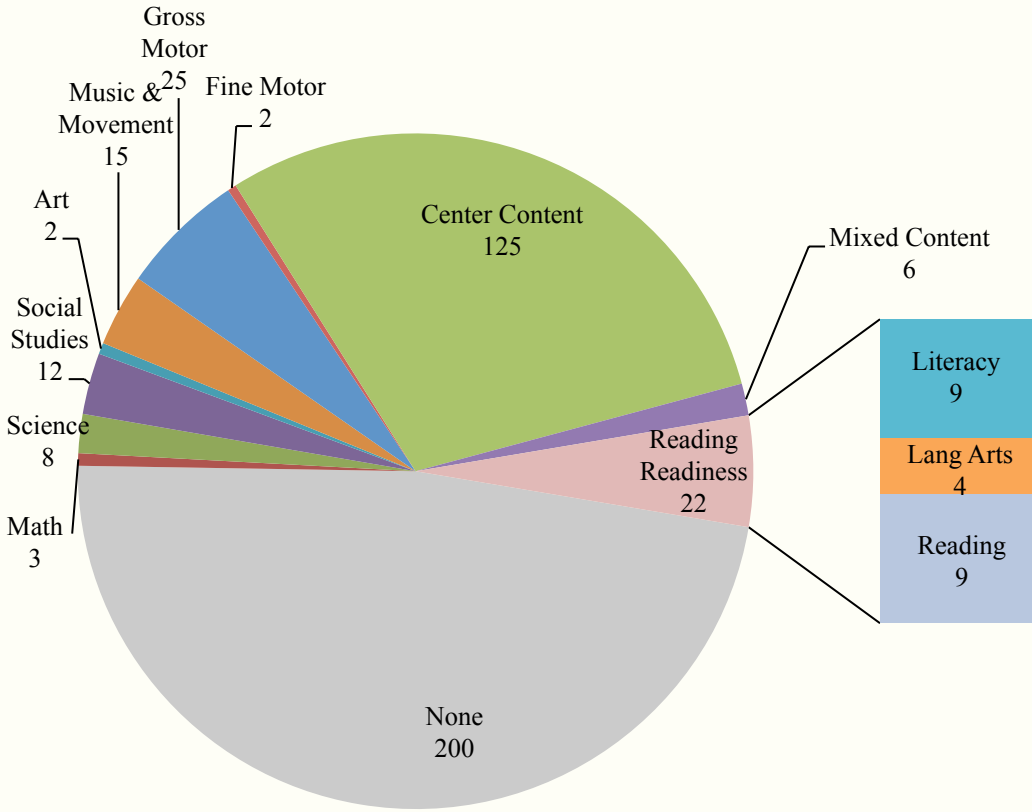
NARRATIVE RECORD

Sample Narrative Record Charts

Time Spent by Activity Type



Time Spent by Content Type



Preschool Activities Provided to the Whole Class:

Average Time in Minutes (Observations 1-3)

	N	Mean	Min	Max
Whole Group	26	61	18	98
Small Group	15	12	0	57
Small Group Centers	13	15	0	66
Centers	26	101	27	206
Specials	18	24	0	87
Indoor Gross Motor	11	9	0	53
Outdoor Gross Motor	10	12	0	61
Transitions w/ Instruct	15	3	0	21
Transitions w/o Instruct	26	64	15	130
Mealtime w/ Instruct	3	1	0	20
Mealtime w/o Instruct	26	34	13	67
Nap	26	84	54	136

Specific content provided in 1st year:

Average time in minutes (observations 1–3)

	N	Mean	Min	Max
None	26	181	116	255
Math	2	7	0	24
Reading readiness	26	34	4	77
Science	21	12	0	71
Social studies	19	8	0	48
Art	6	5	0	46
Music and movement	24	14	0	50
Gross motor	22	25	0	80
Fine motor	4	2	0	25
Center content	26	116	28	206

Heavy emphasis on Literacy

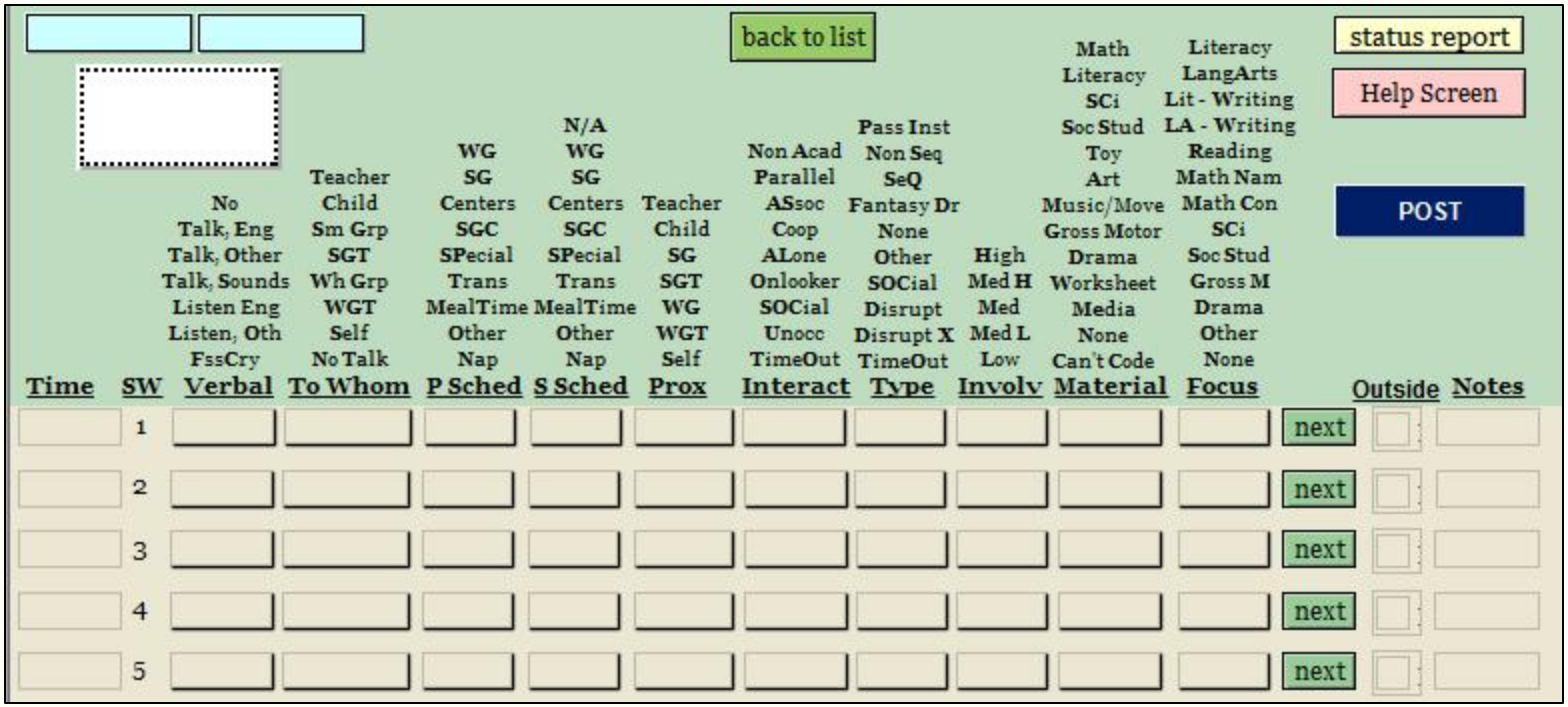
Behavioral Observations of Teacher and Child Interactions

TEACHER OBSERVATIONS IN PRESCHOOL (TOP)
CHILD OBSERVATIONS IN PRESCHOOL (COP)

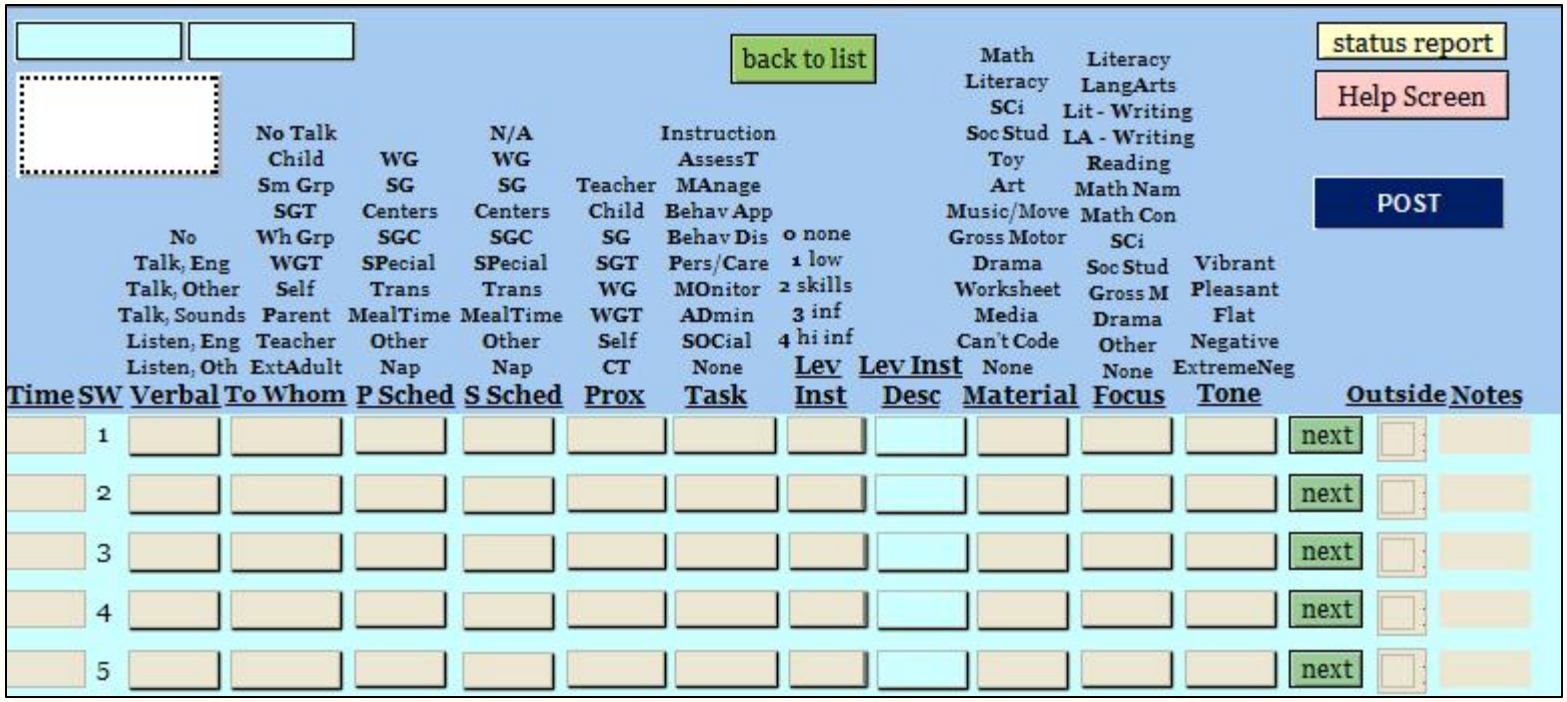
COP & TOP

- A protocol that describes the pre-k classroom environment in terms of individual children's (COP) and teachers' (TOP) behaviors.
- Snapshot coding scheme that begins with observers first coding the teacher, and then the assistant(s), followed by each individual child in the classroom before starting the process anew.
- 20-24 "sweeps" of all class members completed in one observation

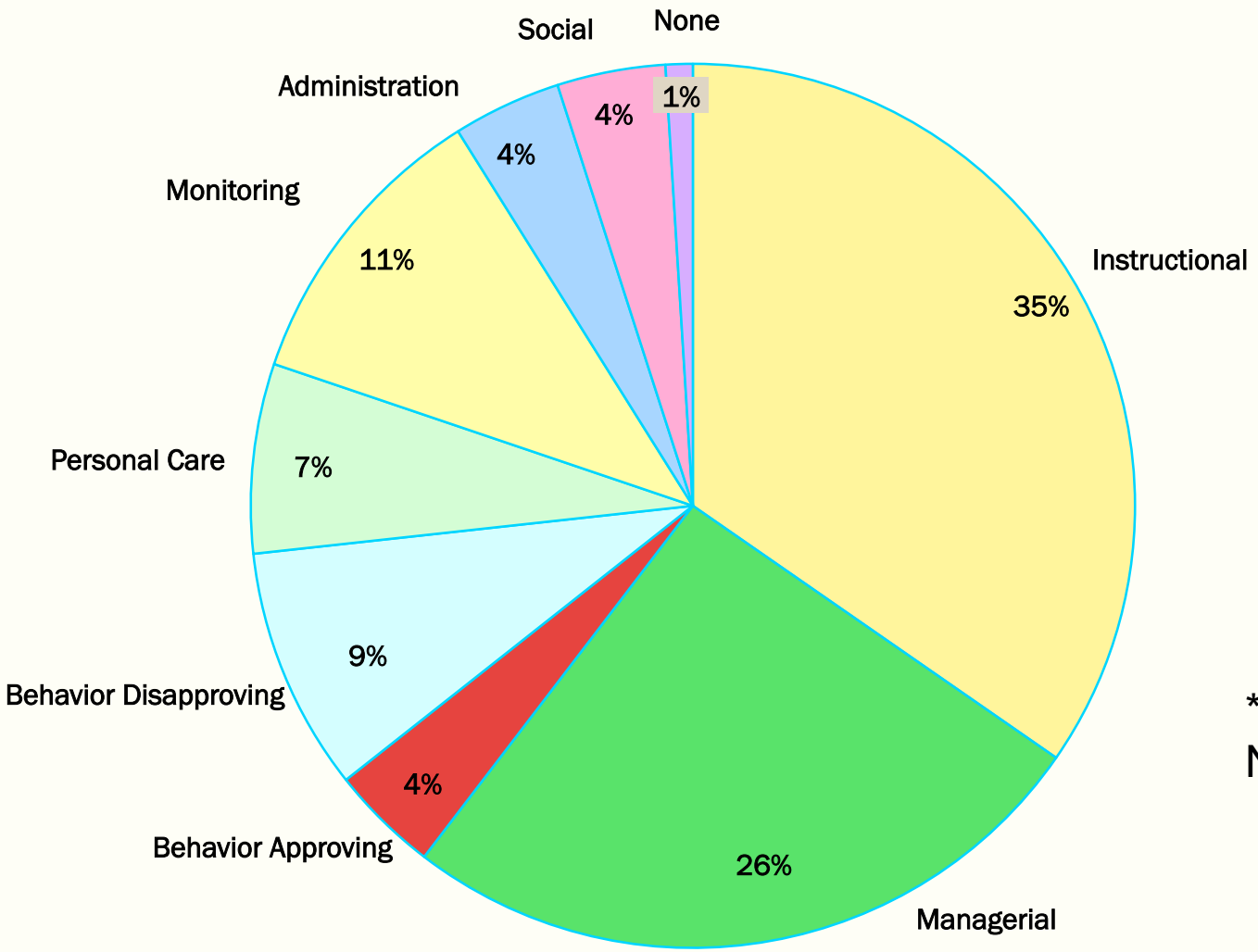
COP (Child Observation in Preschool)



TOP (Teacher Observation in Preschool)



Teachers' task divisions* in 1st year



*Excluding Nap

Associations between achievement gains and classroom practices

- Variability among the classrooms in gains for children across the year in different domains
- Variability among the classrooms in time spent and interactions observed
- Goal: To examine relationships between gains and observed classroom practices

Practices Related to Child Gains in Multiple Domains with Effect Sizes between 0.20 and 0.40

1. Less time in Transitions
2. Higher Quality of Instruction
3. More Positive Emotional Climate
4. Teachers More Often Listening to Children
5. Greater Time in Sequential Activities during Centers
6. More Time in Associative/Cooperative Interactions
7. Higher Levels of Involvement by Children
8. More Math Opportunities

Time Use

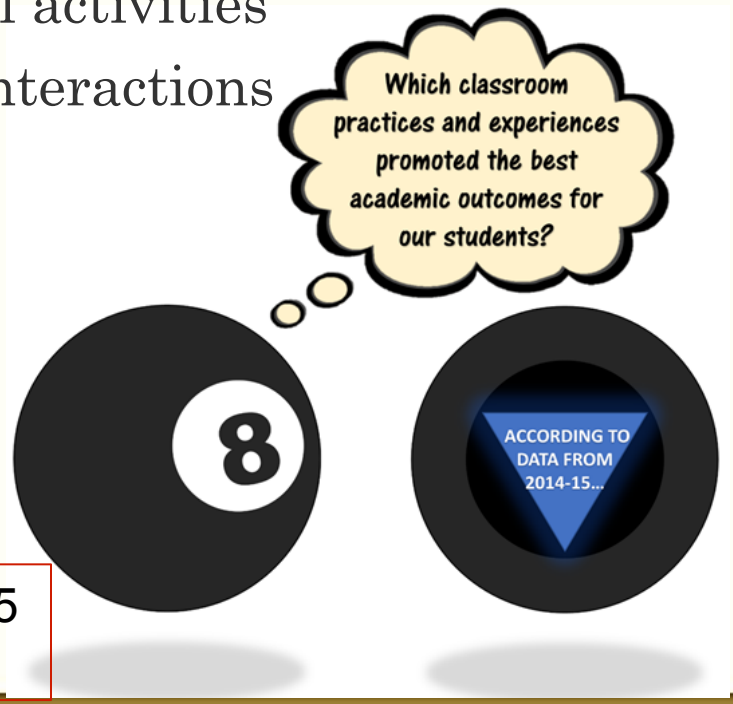
Only one of the 8 was a time use measure.

The "Magic Eight"

1. Reduce transitions
2. Increase quality of instruction
3. More positive environment
4. Increase teacher listening to children
5. Increase opportunities for sequential activities
6. Foster associative and cooperative interactions
7. Foster higher levels of involvement
8. Create more math opportunities
9. More in-depth literacy instruction

These characteristics predicted gains in academic skills in Years 2 - 4 as well!

Changes after 1st round of data collection, Fall 2015



Next Steps

1. Creating a practical tool for coaches and principals
   - Based on "Magic 8" (now 9)
   - Web based mobile portal
   - Linked for coaches to recommendations for practice
   - National Science Foundation funding 2018
2. Replicated predictive power of Magic "9" in study of 100 MNPS kindergarten classrooms in which former pre-k children were enrolled (25% of the class).

Thank you!

Dale C. Farran

Dale.Farran@Vanderbilt.edu

In the meantime, for more information on "Magic 8"
https://my.vanderbilt.edu/mnpspartnership/

For more information on the TNVPK study effects:

Lipsey, M., Farran, D., & Durkin, K. (2018). Effects of the Tennessee prekindergarten program on children's achievement and behavior through third grade. *Early Childhood Research Quarterly*.*45,* 155-176. https://doi.org/10.1016/j.ecresq.2018.03.005