Testing and scaling-up supply- and demand-side interventions to improve kindergarten educational quality in Ghana

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Acknowledgements

Partners
Innovations for Poverty Action

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World Bank Early Learning Partnership
Outline

Part I: Background
- Early childhood education
- The Ghanaian context
- Quality Preschool for Ghana (QP4G)
- Research design and Theory of change

Part II: Impacts of QP4G
- Classroom quality and teacher well-being
- Children’s school readiness
- Differences in public and private schools and child characteristics

Part III: Conclusions & Next Steps
Early childhood education (ECE)

• Early learning and behavioral skills have lasting consequences for later school achievement, and even success as adults (e.g., Jones et al., 2015).

• The potential return on investment of quality ECE is large: as much as $4 to $10 in future benefits per dollar spent (Engle et al., 2011).

• The emotional climate of ECE classrooms is an important part of young children’s adjustment and early learning (Raver et al., 2008).

• Children’s emotion and behavior regulation can facilitate or hinder engagement with the process of learning (Raver, 2002; Blair, 2002).
Domains of School Readiness

- Cognition and general knowledge
- Physical well-being and motor development
- Social and emotional development
- Early numeracy skills
- Language skills and development
- Approaches to Learning

- Cognitive
- Social
- Emotional
- Physical
- Numeracy
- Language
Sustainable Development Goal 4, Target 4.2: “ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education”.
1 in 3 Ghanaian 4 year olds do not meet their cognitive or social-emotional developmental milestones (McCoy et al., 2016).

**Key issue:** KG quality improvement, parental engagement (GES, 2012)
The policy context in Ghana

- In 2007, Ghana’s government became one of the first on the continent to expand basic education to include two years of pre-primary education—Kindergarten (KG).

- The 2012 GES report that the 2004 KG curriculum is sound, but that teacher behavior has not adapted to reflect new pedagogy.

- Top priority: Train 27,000 untrained teachers in KG-specific pedagogy.

- Another priority: engaging parents in schools and raising their awareness of KG-specific pedagogy.

- Private schools must also comply with the national curriculum and standards.
Quality Preschool for Ghana (QP4G)

• In partnership with GES, National Nursery Teacher Training Center (NNTTC), and Innovations for Poverty Action:

• Develop and test a *nationally scalable* model for teachers and parents with the goal of improving KG quality and children’s school readiness.
The programs

• **In-service teacher training**
  - 5 days in September, followed by refresher trainings in January (2 days) and May (1 day) implemented by NNTTC trainers.
  - Classroom visits paired with monitoring / feedback from district coordinators.
  - *Random half of schools*: Weekly text messages with reminders and tips.

5 **areas:**

(1) How children learn—developing a child-friendly environment
(2) Classroom management
(3) Integrating play into language and literacy instruction
(4) Integrating play into early numeracy instruction
(5) Assessment and planning
Example text message

Monday
Child-friendly classrooms helps children learn. U can arrange chairs, benches or mats in a way that allows all children to see each other and feel included; U can put up a daily timetable so children know what’s coming next and feel at ease; U can display children’s work on the walls. These will help them feel at home & ready to contribute. You can get more ideas by referring to some of your training materials to refresh your memory.

Thursday
What have U done this week to make your classroom more child friendly? Remember, there are lots of things U can do to create a calm and friendly atmosphere for children! Like arrange seating so that all children can see each other; display children’s work in your classroom; put up a daily schedule. U choose the ones U think work best!
The programs

• **In-service teacher training**
  • 5 days in September, followed by refresher trainings in January (2 days) and May (1 day) implemented by NNTTC trainers.
  • Classroom visits paired with monitoring / feedback from district coordinators.
  • *Random half of schools*: Weekly text messages with reminders and tips.

• **Parental awareness training about KG learning**
  • 3 sessions (1/term) held at school PTA meeting, open to all parents with KG children.
  • Video screening followed by discussion, led by district coordinators, focused on (1) play-based learning, (2) parents’ role in child learning, and (3) encouraging parent-teacher and parent-school communication.
  • *Random half of schools*: 3 flyers sent home in term 3 with pictures describing similar messages as the videos.
Parents are an important part of helping children learn.
QP4G: Research design

6 disadvantaged districts in the Greater Accra Region

240 KG schools
(108 public and 132 private)

Stratification

Randomization

79
(35 public, 44 private)
Control group

82
(36 public, 46 private)
T1

Teacher training and coaching program

Text messages

No text messages

79
(37 public, 42 private)
T2

Teacher training and coaching program

Parental awareness about KG learning

Texts + Flyers

No flyers

Summer of 2015
QP4G: Research design

6 disadvantaged districts in the Greater Accra Region

Baseline equivalency

<table>
<thead>
<tr>
<th>Domain</th>
<th>F-statistic</th>
<th>Degrees of freedom</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>School characteristics</td>
<td>0.97</td>
<td>2</td>
<td>0.520</td>
</tr>
<tr>
<td>Instructional quality</td>
<td>1.17</td>
<td>2</td>
<td>0.234</td>
</tr>
<tr>
<td>Teacher characteristics</td>
<td>1.06</td>
<td>2</td>
<td>0.380</td>
</tr>
<tr>
<td>Child characteristics</td>
<td>0.99</td>
<td>2</td>
<td>0.429</td>
</tr>
</tbody>
</table>
QP4G Theory of Change

Intervention

Classroom-level mediators

Child outcomes

Classroom Quality

School readiness

Teacher training + Monitoring/support

Parental intervention

Teacher professional well-being

2015-16 academic year

September 2015 (baseline), June 2016 (follow up 1), June 2017 (follow up 2)
Part II: Impacts of QP4G
# Fidelity: Teacher training attendance and coaching visits, M(SD)

<table>
<thead>
<tr>
<th></th>
<th>Total training days attended (out of 8)</th>
<th>Main Training (out of 5)</th>
<th>First refresher training (out of 2)</th>
<th>Second refresher training (out of 1)</th>
<th>Coaching visits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TT</strong></td>
<td>6.4 (2.1)</td>
<td>4.6 (1.4)</td>
<td>1.2 (1.0)</td>
<td>0.7 (0.5)</td>
<td>3.7 (2.2)</td>
</tr>
<tr>
<td><strong>TTPA</strong></td>
<td>6.4 (2.4)</td>
<td>4.3 (1.6)</td>
<td>1.4 (0.9)</td>
<td>0.8 (0.4)</td>
<td>4.0 (2.1)</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>0.1 (0.7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Sample attrition across three waves

<table>
<thead>
<tr>
<th></th>
<th>Children</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>FU1</td>
</tr>
<tr>
<td><strong>Sample size</strong></td>
<td>Control</td>
<td>1,180</td>
</tr>
<tr>
<td></td>
<td>TT</td>
<td>1,167</td>
</tr>
<tr>
<td></td>
<td>TTPA</td>
<td>1,088</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>3,435</td>
</tr>
</tbody>
</table>

*p < .05; +p < .07, indicating significant differences from control group attrition.

TT = Teacher training; TTPA = Teacher training + Parental awareness training
Measures

1. Classroom quality – implementation and quality
2. Teacher professional well-being
3. Teacher attrition
4. Child school readiness

Impacts are assessed:
• End of implementation year
• One year later
Analytic strategy: Impact analysis

Level 1 (Child) Model:

\[ Y_{ijk} = B_{0jk} + B_{1jk}'X_{ijk} + e_{ijk} \]

Where \( X_{ijk} \) is the vector of child covariates, including respective baseline score.

Level 2 (Teacher) Model:

\[ B_{0jk} = \gamma_{00k} + u_{0jk} \]

Where \( B_{0jk} \) is the teacher-level random intercept.

Level 3 (School) Model:

\[ \gamma_{00k} = \pi_{000} + \pi_{001}'T_k + \pi_{002}'Z_k + v_{00k} \]

Where \( \gamma_{00k} \) is the school-level random intercept; \( Z_k \) is the vector of school-level covariates; and \( T_k \) is the treatment status assigned to the school.

Covariates: within sample mobility dummies; district dummies; baseline scores; child gender, child age, grade (KG1 vs. KG2), public/private sector.
Implementation: Are teachers integrating practices from the training in their classroom?

Checklist with 15 teaching practices that were in the training. For example:

- **Teacher praises children for positive behavior**
- **Teacher threatens children with or uses a cane on children at least once**
- **Teacher explicitly reminds children of the class rules**
- **Teacher asks students at least two open-ended questions during the class**
- **Teacher uses one or multiple songs to facilitate learning**
- **The lesson consists of a game that facilitated the lesson objectives**
- **Teacher incorporates found items as Learning Materials (e.g., bottle caps, milk cartons)**
Teachers integrate training practices in their classrooms

Teachers were videotaped teaching for 30-45 minutes.

On average, teachers in both treatment conditions implemented 1.5 additional “developmentally appropriate” activities during the observed period of teaching practice.

**Table:**

<table>
<thead>
<tr>
<th>Number of activities observed</th>
<th>Control</th>
<th>TT</th>
<th>TTPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>3.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TT= Teacher training; TTPA = Teacher training + Parental awareness training
Classroom quality: Does QP4G improve the quality of teacher-child interactions?

- **Teacher Instructional Practices and Processes System (TIPPS)** (Seidman et al., 2013; Wolf et al., 2017)

- Observation tool that aims to understand the nature and quality of the classroom environment.

- 19 items assessing the nature of interactions in the classroom.
Classroom quality: Does QP4G improve the quality of teacher-child interactions?

Developed based exploratory and confirmatory factor analysis, we assess impacts on three dimensions of classroom quality.

- **Facilitating deeper learning**
  - Scaffolding (concept development)
  - Quality of feedback
  - Objectives explicit

- **Emotional support & behavior management**
  - Positive climate
  - Negative climate
  - Teacher sensitivity/tone
  - Behavior management
  - Consistent Routine

- **Supporting student expression**
  - Student ideas considered
  - Reasoning/problem solve
  - Connections to life
  - Language modeling
QP4G improves the quality of some teacher-child interactions

Developed based on exploratory and confirmatory factor analysis, we assess impacts on three dimensions of classroom quality.

QP4G improves the quality of some teacher-child interactions by

- Facilitating deeper learning
  - 0.03 (TT)
  - -0.08 (TTPA)

- Emotional support/behavior management
  - 0.52*** (TT)
  - 0.46** (TTPA)

- Supporting student expression
  - 0.50** (TT)
  - 0.14 (TTPA)

Effect Size (d wom)
Teacher professional well-being: Does QP4G improve teacher well-being?

Developed based on both new and previously validated survey measures, and analyzed using factor analysis:

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measures</th>
<th>Sample items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivation</strong></td>
<td>Adapted from Bennell &amp; Akyeampong (2007)</td>
<td>I’m highly motivated to:</td>
</tr>
<tr>
<td>(5 items, $\alpha = .64$)</td>
<td></td>
<td>• ...help children learn to read and write</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ...help children develop well socially.</td>
</tr>
<tr>
<td><strong>Burnout</strong></td>
<td>Maschlach Burnout Inventory (Maschlach et al., 1996)</td>
<td>• How often have felt mentally drained from your work.</td>
</tr>
<tr>
<td>(11 items, $\alpha = .85$)</td>
<td></td>
<td>• How often do you feel fatigued when you wake up in the morning.</td>
</tr>
<tr>
<td><strong>Job satisfaction</strong></td>
<td>Adapted from Bennell &amp; Akyeampong (2007)</td>
<td>• I don’t want to transfer to another school</td>
</tr>
<tr>
<td>(4 items, $\alpha = .72$)</td>
<td></td>
<td>• I don’t want to leave the teaching profession</td>
</tr>
</tbody>
</table>
Teacher professional well-being: Does QP4G improve teacher well-being?

**Construct Measures**

**Sample items**

**Motivation** (5 items, $\alpha = 0.64$)
- Adapted from Bennell & Akyeampong (2007)
  - I’m highly motivated to:
    - help children learn to read and write
    - help children develop well socially

**Burnout** (11 items, $\alpha = 0.85$)
- Maschlach Burnout Inventory (Maschlach et al., 1996)
  - How often have felt mentally drained from your work.
  - How often do you feel fatigued when you wake up in the morning.

**Job dissatisfaction** (4 items, $\alpha = 0.72$)
- Adapted from Bennell & Akyeampong (2007)
  - I want to transfer to another school
  - I want to leave the teaching profession

Developed based on both new and previously validated survey measures, and analyzed using factor analysis:

- Effect size ($d_{wel}$) for Motivation: 0.18
- Effect size ($d_{wel}$) for Burnout: -0.32**
- Effect size ($d_{wel}$) for Job Satisfaction: -0.51***

TTPA
Teacher attrition: Does QP4G reduce the likelihood that teachers’ leave the school mid-year?

**YES**

The probability of a teacher leaving the school was reduced by 43.5%.

Notably, this occurred entirely in the private sector.
### Table. Impacts on teacher professional well-being and classroom quality

<table>
<thead>
<tr>
<th>Teacher professional well-being</th>
<th>b</th>
<th>SE</th>
<th>p-value</th>
<th>effect size ($d_w$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>0.078</td>
<td>0.068</td>
<td>0.256</td>
<td>0.180</td>
</tr>
<tr>
<td>TTPA</td>
<td>-0.031</td>
<td>0.071</td>
<td>0.660</td>
<td>-0.071</td>
</tr>
<tr>
<td><strong>Burnout</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>-0.286</td>
<td>0.125</td>
<td>0.022</td>
<td>* 0.321</td>
</tr>
<tr>
<td>TTPA</td>
<td>-0.452</td>
<td>0.130</td>
<td>0.000</td>
<td>*** 0.507</td>
</tr>
<tr>
<td><strong>Job Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>0.089</td>
<td>0.100</td>
<td>0.375</td>
<td>0.131</td>
</tr>
<tr>
<td>TTPA</td>
<td>0.000</td>
<td>0.100</td>
<td>0.999</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Teacher turnover</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>-1.203</td>
<td>0.487</td>
<td>0.013</td>
<td>*</td>
</tr>
<tr>
<td>TTPA</td>
<td>-0.745</td>
<td>0.458</td>
<td>0.104</td>
<td></td>
</tr>
<tr>
<td><strong>Classroom outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fidelity checklist (# of activities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>1.495</td>
<td>0.258</td>
<td>0.000</td>
<td>*** 0.937</td>
</tr>
<tr>
<td>TTPA</td>
<td>1.494</td>
<td>0.265</td>
<td>0.000</td>
<td>*** 0.936</td>
</tr>
<tr>
<td>Facilitating deeper learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>0.016</td>
<td>0.107</td>
<td>0.880</td>
<td>0.025</td>
</tr>
<tr>
<td>TTPA</td>
<td>-0.052</td>
<td>0.109</td>
<td>0.663</td>
<td>-0.081</td>
</tr>
<tr>
<td>Emotional support &amp; behavior management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>0.196</td>
<td>0.057</td>
<td>0.001</td>
<td>*** 0.520</td>
</tr>
<tr>
<td>TTPA</td>
<td>0.173</td>
<td>0.059</td>
<td>0.003</td>
<td>** 0.459</td>
</tr>
<tr>
<td>Supporting student expression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>0.321</td>
<td>0.106</td>
<td>0.002</td>
<td>** 0.499</td>
</tr>
<tr>
<td>TTPA</td>
<td>0.092</td>
<td>0.109</td>
<td>0.398</td>
<td>0.143</td>
</tr>
</tbody>
</table>

Sample size = 347 teachers/classrooms

Notes. Estimates are computed using observed scores, in two level models: teachers nested in schools. Effect sizes calculated accounting for the 2-level model structure (Hedges, 2009). Sample includes teachers present at baseline and follow-up. *$p < .05$, **$p < .01$, ***$p < .001$

TT = Teacher training condition; TTPA = Teacher training plus parent awareness training condition.

Models include the following control variables: private (vs. public) sector status of the school, six district dummies, a dummy variable for if the school was assigned to receive teacher text messages, a dummy for if the school was assigned to receive parent flyers, a series of five dummy variables accounting for within-sample mobility, teacher gender, age, level of education, years of teaching experience. Models for teacher professional well-being outcomes also include the baseline score for each respective outcome.

*Impacts on turnover (a binary variable) were assessed using a multi-level logistic regression and included the full sample of teachers from baseline ($N = 444$). Missing from refs.
**School Readiness: Does QP4G improve children’s school readiness outcomes?**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measures</th>
<th>Constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall school readiness</strong></td>
<td>International Development and Early Learning Assessment (IDELA); Save the Children, 2015.</td>
<td>Early literacy, Early numeracy, Social-emotional, and Executive Function skills</td>
</tr>
<tr>
<td>(composite score)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Early literacy</strong></td>
<td>IDELA</td>
<td>Oral comprehension, Phonological awareness</td>
</tr>
<tr>
<td>(6 item sets, α = .73)</td>
<td>Print awareness, Letter identification</td>
<td></td>
</tr>
<tr>
<td><strong>Early numeracy</strong></td>
<td>IDELA</td>
<td>One to one correspondence, Size / length differentiation</td>
</tr>
<tr>
<td>(6 item sets, α = .71)</td>
<td>Shape identification, Number identification</td>
<td></td>
</tr>
<tr>
<td><strong>Social-emotional</strong></td>
<td>IDELA</td>
<td>Conflict resolution, Personal awareness</td>
</tr>
<tr>
<td>(5 item sets, α = .69)</td>
<td>Emotion identification, Empathy</td>
<td></td>
</tr>
<tr>
<td><strong>Executive function</strong></td>
<td>IDELA</td>
<td>Working memory, Inhibitory control</td>
</tr>
<tr>
<td>(2 item sets, α = .82)</td>
<td>Working memory, Inhibitory control</td>
<td></td>
</tr>
</tbody>
</table>
QP4G improves children’s school readiness, primarily social-emotional development

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sample Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall school readiness (composite score)</td>
<td>-</td>
</tr>
<tr>
<td>Early literacy</td>
<td>-</td>
</tr>
<tr>
<td>Early numeracy</td>
<td>-</td>
</tr>
<tr>
<td>Social-emotional</td>
<td>-</td>
</tr>
<tr>
<td>Executive function</td>
<td>-</td>
</tr>
</tbody>
</table>

**Construct Measures**

**Sample items**

- **Overall school readiness (composite score)**
  - **IDELA**; Save the Children, 2015.

<table>
<thead>
<tr>
<th>Early literacy (6 item sets, ( \alpha = .73 ))</th>
<th>IDELA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early literacy</td>
<td>-</td>
</tr>
<tr>
<td>Early Numeracy</td>
<td>-</td>
</tr>
<tr>
<td>Social-emotional</td>
<td>-</td>
</tr>
<tr>
<td>Executive function</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effect size (d)</th>
<th>TT</th>
<th>TTPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>School readiness</td>
<td>0.14*</td>
<td>0.01</td>
</tr>
<tr>
<td>Early literacy</td>
<td>0.09</td>
<td>0.05</td>
</tr>
<tr>
<td>Early numeracy</td>
<td>0.07+</td>
<td>0.07</td>
</tr>
<tr>
<td>Social-emotional</td>
<td>0.17**</td>
<td>0.07</td>
</tr>
<tr>
<td>Executive function</td>
<td>0.09</td>
<td>0.04</td>
</tr>
</tbody>
</table>
### Table. Impacts on children’s school readiness

<table>
<thead>
<tr>
<th>School readiness composite</th>
<th>b</th>
<th>SE</th>
<th>p-value</th>
<th>effect size (d_w)</th>
</tr>
</thead>
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Sample size = 2,975

Notes. Estimates are computed using observed scores, in three level models: children nested in classrooms nested in schools. Effect sizes calculated accounting for the 3-level model structure (Hedges, 2009). Sample includes children present at baseline and follow-up. TT = Teacher training condition; TTPA = teacher training plus parent awareness training condition. Models include the following control variables: private (vs. public) sector status of the school, six district dummies, a dummy variable for if the school was assigned to receive teacher text messages, a dummy for if the school was assigned to receive parent flyers, a series of five dummy variables accounting for within-sample mobility, child gender, age, KG level (1, 2, or 3 if KG1 and KG2 were combined in one classroom, as a categorical variable), and baseline score for each respective outcome.
Was there an added impact of the text messages and flyer reinforcements?

• All teachers (100%) reported the text message feedback was useful. Specifically:
  • The detailed information (75%)
  • The timing (49%)
  • The frequency (37%)

• However, there was no consistent impact of either form of reinforcement.
Differences by public and private sectors

• In the 9 outcomes assessed, we find two significant difference in public and private sector schools.
  • Impacts on reduced teacher burnout are larger in private schools.
  • Impacts on reduced teacher attrition occur in private schools only.

• We conclude that there are no major differences in how QP4G impacted classroom quality and children’s outcomes in public or private schools.
Differences by child gender, baseline ability, and KG level

• No differences based on child gender or baseline ability.

• Statistically different impacts on school readiness for KG1 and KG2 children, with larger for KG1 children, and the negative impacts of the parental-awareness training are driven by KG2 children.
One year later: Teachers are still using some of the training practices, but other impacts have faded out or become negative.
One year later: Impacts on social-emotional outcomes sustained

- School readiness: 0.091+
- Early numeracy: 0.058
- Early literacy: 0.075
- Social-emotional: 0.126*
- Executive function: 0.106+

*Significant at the 0.05 level
One year later: Impacts on social-emotional outcomes sustained

Impacts of teacher training on school readiness still larger for KG1 children ($p<.10$); negative effects of parent-awareness training still driven by KG2 children ($p<.05$).
Sensitivity of Results to Attrition: Method

• Analysis focused on “stayers” (75% of teachers, 87% of children).

• Multiple imputation, using data from all three waves to impute outcomes for “leavers”
  • 20 datasets for teachers
  • Random sample of 10 teacher datasets; impute 10 child datasets per teacher dataset (100 total)

• Re-run impact models using Rubin’s combining rules across the datasets (Rubin, 1996)
Sensitivity of Results to Attrition: Results

• **Follow up 1:**
  - Patterns of impacts for all teacher and classroom outcomes are the same, with slightly smaller coefficients and standard errors.
  - Significance of impacts on child school readiness (and social-emotional) are the same with slightly larger coefficients. Impacts on early literacy and numeracy are significant ($p < .05$).

• **Follow up 2:**
  - Reductions in teacher burnout are sustained; impacts on checklist sustained but smaller; reductions in SSE significant across both groups (not just TTPA).
  - Coefficients and patterns of significance for child impacts are the same.
Conclusions

• QP4G is one of the **first impact evaluations in sub-Saharan Africa** to show an in-service teacher training can improve KG quality and school readiness.

• Findings are **consistent with research on ECE in-service teacher training in the United States and a number of LMICs**, which find medium-sized effects on classroom process quality and a small-sized effects on child outcomes.

• It would be important to assess **if these effects persist** to support children’s transition to primary school.

• QP4G took place in the peri-urban communities. It is critical to consider if and how **different contexts** would require adaptations to ensure program success.
Next steps

• Continue to evaluate the bias caused by attrition / missing data.

• Follow children for one more year as they transition into primary school (ongoing this academic year).

• Understand the counteracting effects of the parent-awareness intervention.

• Complete a cost analysis of the program and assess its implications for policy.

• Consider needs of and adaptations for rural areas in Ghana, where teaching quality and learning is generally lower than peri-urban and urban areas.
Thank you

• Ghana Education Service
• District Coordinators
• National Nursery Teacher Training Center (NNTTC)
• UBS Optimus Foundation and World Bank SIEF

• Thank you to all of the KG teachers and Head Teachers, and KG children and their caregivers that participated in this study. None of this would be possible without you!