Overview

• IES funded study
• “Academic” vs. Play? Can we combine these synergistically?

How learning of self-regulation is organized in the EMERGE classroom

Teachers scaffold children’s engagement in mature make-believe play
Activities that do not promote self-regulation are eliminated or modified
Teaching of self-regulation is embedded in all content activities.
Activities that do not support self-regulation are minimized

Long large group activities where children answer one at a time.

Small group activities where children respond to the teacher prepared activities where children are teacher regulated.

Teaching of self-regulation is embedded in all content activities

Literacy and math activities are designed in such a way that children could regulate each other.

Children are encouraged to use private speech (self-talk) to regulate themselves.

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Math and Executive Function

- Suggestive relationships
- But unknown causality

Research Design

- Participants
  - 3 urban (1 urban/suburban) school districts in California
  - 84 classrooms before attrition (started with 1 per school; transience of teachers contributed to multiples and 2 not replaced)
  - Classrooms placed into groups (w/in districts, and full- or half-day program)
  - Random assignment conducted within these groups (randomization strata: equal numbers in the 3 groups from the 3 sites)
Groups

- BB — math curriculum
- BBSR — (EMERGE) math + SR
- Cntrl — comparison, “business as usual”

Teachers and Classes

<table>
<thead>
<tr>
<th></th>
<th># Classes</th>
<th>Class Size M*</th>
<th>Assoc.</th>
<th>B.A.</th>
<th>M Yrs Tching</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB</td>
<td>24</td>
<td>24</td>
<td>14%</td>
<td>62%</td>
<td>4.6</td>
</tr>
<tr>
<td>BBSR</td>
<td>29</td>
<td>23</td>
<td>39%</td>
<td>52%</td>
<td>6.1</td>
</tr>
<tr>
<td>Cntrl</td>
<td>29</td>
<td>24</td>
<td>38%</td>
<td>53%</td>
<td>6.1</td>
</tr>
</tbody>
</table>

*plus 1, sometimes 2 assistants for larger classes

Children

<table>
<thead>
<tr>
<th></th>
<th>D1 District 1</th>
<th>D2</th>
<th>D3</th>
<th>Sum/ Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>191</td>
<td>65</td>
<td>712</td>
<td>968</td>
</tr>
<tr>
<td>ELL</td>
<td>10</td>
<td>30</td>
<td>48</td>
<td>27</td>
</tr>
<tr>
<td>FRL</td>
<td>12</td>
<td>62</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Asian</td>
<td>16</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Filipino</td>
<td>7</td>
<td>7</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>11</td>
<td>44</td>
<td>79</td>
<td>39</td>
</tr>
<tr>
<td>AA</td>
<td>3</td>
<td>14</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>White</td>
<td>57</td>
<td>25</td>
<td>9</td>
<td>31</td>
</tr>
</tbody>
</table>

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Children

<table>
<thead>
<tr>
<th></th>
<th>BB</th>
<th>BBSR</th>
<th>Cntrl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at testing</td>
<td>4.05</td>
<td>4.03</td>
<td>4.02</td>
</tr>
<tr>
<td>% Girls</td>
<td>55</td>
<td>53</td>
<td>51</td>
</tr>
</tbody>
</table>

Base Curricula

- Across sites: Creative Curriculum, with strong PD in ECE and
- Math: Kathy Richardson curriculum + PD

Measures of Executive Function

- Pencil Tapping (aka Peg Tapping) — Measure of executive function, specifically inhibitory control [Luria (1966), then Diamond and Barrett (1998)]
- HTKS — Structured observation requiring children to perform the opposite of a response to four different oral commands (listening, following directions and remembering instructions)
- Backward and forward digit span* — Verbal working memory capacity and cognitive flexibility

*Administered in spring only

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Assessment Procedures

- TQ and observation collected beginning of “gentle introduction” 1st year PD
- Other assessments after 1 year PD
- Fall assessments: District demands delayed; from Aug. to Dec. (teachers asked to delay implementation; but only to Oct.)
- 1 fidelity observation (MPOT)
- Spring assessments in late April to May

Results

Fidelity to SR

- MPOT—Mature Play Observation Tool
- 3 Parts
  - Play Routine Checklist (10 elements)
  - Dimension 1: Child Actions
  - Dimension 2: Teacher Actions
Fidelity Effect Sizes (summary)

- MPOT—3 parts
- BBSR group higher ($p < .001$); effect sizes:

<table>
<thead>
<tr>
<th></th>
<th>BBSR vs. Control</th>
<th>BBSR vs. BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play Routine</td>
<td>1.57</td>
<td>1.58</td>
</tr>
<tr>
<td>Student Actions</td>
<td>1.21</td>
<td>1.13</td>
</tr>
<tr>
<td>Teacher Actions</td>
<td>1.17</td>
<td>1.28</td>
</tr>
</tbody>
</table>

- BB and Control did not differ significantly

MPOT—Part I

Play Routines (dichotomous, summed):

- Planning
  1. Children choose new center.
  2. Plans from previous day present.
  3. Children review previous day’s plan.
  5. Children represent their plans
  6. Children write their name.
  7. Children take plans to the center.

- Play
  8. Play happens in more than one center.

- End
  9. Plans are collected after play.
  10. Clean up song.

MPOT Across Classrooms

Play Routines

Bimodal in SR, some very high, others very low

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MPOT—Part 2

Child Actions (1-4 Likert scale, summed, 0-20)
1. Child-Created Props: extent to which props created
2. Child Meta-play: talk about “how and what” of play
3. Play Interactions: how much children interact
4. Children’s Role Playing: extent to which maintain their roles and associated rules during mature play
5. Child Role Speech and Communication

MPOT Across Classrooms

Child Actions: Distributed across the range for BBSR

MPOT—Part 3

Teacher Actions (1-4 Likert scale, summed, 0-12)
1. Center Management: extent to which the teacher uses a management system and play planning strategies to support children’s self-regulated play.
2. Planned Play Time: amount of time for uninterrupted play
3. Teacher Intervention: extent to which the teacher or teacher aide intervenes during play.

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**MPOT Across Classrooms**

Teacher Actions: Again variation, large number of classrooms at the low levels, even in SR

![Graph showing MPOT: Teacher Actions](image)

**Fall EF Means**

<table>
<thead>
<tr>
<th></th>
<th>BB</th>
<th>BBSR</th>
<th>Cntrl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>7.16</td>
<td>6.08</td>
<td>6.25</td>
</tr>
<tr>
<td>HTKS</td>
<td>12.47</td>
<td>8.27</td>
<td>9.45</td>
</tr>
</tbody>
</table>

Group means. Adjusted for BB & BBSR; e.g., adding estimated BB/BBSR vs. Cntrl baseline differences to unadjusted Cntrl group means w/ 2-level HLM. Indicator variables for randomization blocks, gender, age, time elapsed-start of school and testing.

**Fall EF Effect Sizes**

<table>
<thead>
<tr>
<th></th>
<th>BB vs. Cntrl.</th>
<th>BBSR vs. Cntrl.</th>
<th>BB vs. BBSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>0.14</td>
<td>-0.03</td>
<td>0.17</td>
</tr>
<tr>
<td>HTKS</td>
<td>0.24</td>
<td>-0.09</td>
<td>0.34</td>
</tr>
</tbody>
</table>

All ns.
Fall EF Measures

- Although model included indicator variables for randomization blocks, gender, age, and especially time elapsed between start of school and baseline,
- differences are problematic, and we are pursuing other analytical approaches

Spring EF Means

<table>
<thead>
<tr>
<th></th>
<th>BB (adjusted)</th>
<th>BBSR (adjusted)</th>
<th>Cntrl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>9.94</td>
<td>9.88</td>
<td>9.97</td>
</tr>
<tr>
<td>KTKS</td>
<td>12.26</td>
<td>15.73</td>
<td>14.71</td>
</tr>
<tr>
<td>Fwd. Digit</td>
<td>3.39</td>
<td>3.75</td>
<td>3.74</td>
</tr>
<tr>
<td>Back Digit</td>
<td>0.64</td>
<td>0.43</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Same indicator variables, including pretest where available

Spring EF Effect Sizes

<table>
<thead>
<tr>
<th></th>
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<th>BB vs. BBSR</th>
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</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>KTKS</td>
<td>0.04</td>
<td>0.07</td>
<td>-0.03</td>
</tr>
<tr>
<td>Fwd. Digit</td>
<td>0.15</td>
<td>0.01</td>
<td>0.13</td>
</tr>
<tr>
<td>Back Digit</td>
<td>0.19</td>
<td>-0.02</td>
<td>.21*</td>
</tr>
</tbody>
</table>

* p < .05
Pretest as covariate + all other indicators

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Spring EF Effect Sizes*

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>0.09</td>
<td>0.01</td>
<td>0.09</td>
</tr>
<tr>
<td>KTKS</td>
<td>0.19</td>
<td>0.03</td>
<td>0.15</td>
</tr>
</tbody>
</table>

*without pretest as covariate, so less power; not preferred approach—again, we are pursuing others

BB > Control (but only $p < .10$);
BBSR vs. Cntrl. same; not effective through year

MPOT Explorations

- Highest vs. lowest 8
- Not experimental

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencil</td>
<td>11.53</td>
<td>9.04</td>
</tr>
<tr>
<td>KTKS</td>
<td>19.5</td>
<td>13.47</td>
</tr>
<tr>
<td>Fwd. Digit</td>
<td>3.91</td>
<td>3.61</td>
</tr>
<tr>
<td>Back Digit</td>
<td>0.75</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Conclusions

- Only one significant result on these measures
- Backwards digit span, BB > BBSR group
Fidelity in SR

- MPOT fidelity results show clear differences between the SR and non-SR classrooms
- However, this was not consistent across SR classrooms, potentially limiting impact
- Challenges of implementing the SR curriculum may have exceeded some classroom’s resources

What Limiting Factors?

- Coaching/mentoring model, using district employees may not have been effective, due to:
  - Knowledge, skill underdeveloped
  - Lack of sufficient time to commit to this (half day programs are not sufficient)
  - May be adequate for teachers with resources and commitment, but not others

Efficacy

- Still, there was a 1 to 1.5 SD difference on the MPOT
- This did not cause any measurement differences on outcome measures
- Thus, evidence for SR-PD —> Mature Play
- But none for… —> SR
- Trend that implementing just BB had greater impact on SR measure

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