Starting Strong:

A Randomized Controlled Trial of the Building Assets, Reducing Risks Model in Ninth Grade

Background
Background

• Compared with students who graduate from high school, ninth-grade students who do not graduate tend to have:
  – Greater stress factors in their lives (Zaff, et al., 2016)
  – Less interest in school (Rumberger & Rotermund, 2012)
  – Lower levels of self-perceived academic competence (Davis, et al., 2014)
  – Lower self-esteem (Neild, Stoner-Eby, & Furstenberg, 2008)
  – More disruptive behavior problems (Neild, Balfanz, & Herzog, 2007)
  – More disciplinary referrals (Bruce, et al., 2011)
  – Lower rates of attendance (Bruce, et al., 2011)
  – Lower grades (Allensworth & Easton, 2007; Bruce, et al., 2011)
  – Fewer credits earned (Kemple, Segeritz, & Stephenson, 2013)
Background

• Isolation and emotional stress can cause teachers to experience depression, exhaustion, reduced empathy, and a lack of feelings of personal accomplishment (Halbesleben, 2006; Mahan et al., 2010).

• Strong student–teacher relationships can yield increases in student attendance, academic performance, and decreases in student behavior problems (Allen, Pianta, Gregory, Mikami, & Lun, 2011).

  – The researchers conducted a randomized controlled trial (RCT) in which secondary school teachers were given a year of coaching on effective teaching and student–teacher interactions. After a year, students with teachers in the experimental group scored significantly higher on year-end achievement tests than students in the control group. The quality of student–teacher interaction was a significant mediator of student achievement.
Background

• Few professional resources are designed to promote positive peer relations and interpersonal problem solving among teachers (Zins et al., 2004).

• With core components derived from research, the Building Assets, Reducing Risks (BARR) model, developed approximately 15 years ago, supports teachers and students in ways that address issues of teacher burnout and student failure.
BARR Model

- BARR builds positive, intentional, relationships among and between students and teachers.
- Ninth grade is restructured into teacher teams of shared students composed of three or four core academic teachers as well as one or more school counselors.
- BARR teachers use real-time student data to drive instructional change and identify nonacademic supports when needed.
BARR Model

BARR consists of eight core strategies

• Strategy 1: Relationship-Building Professional Development for Teachers, Counselors, and Administrators
• Strategy 2: Restructuring the High School Course Schedule
• Strategy 3: Whole Student Emphasis in Instructional Reform
• Strategy 4: Block Meetings, Collaborative Problem Solving
• Strategy 5: Developmental Assets Curriculum (I-Time)
• Strategy 6: Risk Review for Persistently Failing Students
• Strategy 7: Contextual Support (Focus on Leadership)
• Strategy 8: Parent Involvement to Support High School Reform
Prior Research on BARR

- In 2011–12, a randomized controlled trial (RCT) in one large urban school district yielded positive impacts on students and teachers (Corsello, Sharma, & Jerabek, 2015).
Prior Research on BARR

- Compared with students not assigned to BARR:
  - BARR students earned more credits.
  - BARR students scored higher on both reading and mathematics standardized tests.
  - BARR students had fewer course failures (21%) than those not assigned to BARR (32%).
  - BARR teachers felt more connected to students, other teachers, and their schools, and they reported higher levels of teacher effectiveness than those not implementing BARR.

Source: Corsello, Sharma, & Jerabek, 2015.
Study Design
Study Overview

- Three cohorts of schools
  - Eleven schools total
- Participants in this study
  - All eligible ninth-grade students
  - Core academic teachers
  - School counselors, administrators, BARR coordinator
- Study includes measures of
  - Implementation
  - Student academic outcomes (e.g., performance on standardized tests and credits earned)
  - Student and teacher perceptions
Research Questions

• What is the impact of BARR on ninth-grade students’ academic achievement as measured by NWEA mathematics and reading tests?

• What is the impact of BARR on ninth-grade students’ educational attainment as measured by the percentage of credits earned in core subjects?

• To what extent do ratings of proximal measures of student achievement (e.g., teacher self-efficacy and use of data) differ between BARR and non-BARR teachers?

• To what extent do students’ self-ratings of proximal measures of student achievement (e.g., engagement, sense of belonging, and grit) differ between BARR and non-BARR students?
Data Sources

- Administrative student demographic records
- Administrative student academic, attendance, and discipline records
- NWEA MAP reading and mathematics scores
- Survey administered to students in Grade 9
- Survey administered to core academic teachers of Grade 9 students
- Interview data from 35 core academic teachers
- Interview data from three BARR coordinators
- Observation data from spring site visits to each school
Results: Cohort 1 (2014–15)
Cohort 1 Sample

• Three schools were included: one in rural Maine and two in suburban California.

• A total of 1,209 students were randomly assigned to experimental condition prior to entering ninth grade.
  – BARR students = 605
  – Control students = 604

• Student sample demographics include the following:
  – Minority students (72%), Students eligible for free or reduced-price lunch (74%), English language learners (9%), Special education students (7%)

• Thirty-five teachers (19 BARR and 16 control) were included in analysis.
Implementation Fidelity (Cohort 1)

<table>
<thead>
<tr>
<th>BARR Key Component</th>
<th>Percentage of Schools at Adequate or High Levels of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development</td>
<td>67%</td>
</tr>
<tr>
<td>Restructuring Ninth Grade</td>
<td>100%</td>
</tr>
<tr>
<td>Whole Student Emphasis</td>
<td>100%</td>
</tr>
<tr>
<td>Block/Team Meetings</td>
<td>100%</td>
</tr>
<tr>
<td>Developmental Assets Curriculum (I-Time)</td>
<td>67%</td>
</tr>
<tr>
<td>Risk Review</td>
<td>100%</td>
</tr>
<tr>
<td>Contextual Support</td>
<td>100%</td>
</tr>
<tr>
<td>Parent Involvement</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Sources:* Based on BARR coordinator structural reviews and observations of BARR practices during spring site visits at three schools.
Student Outcomes

- NWEA MAP Reading scores
- NWEA MAP Mathematics scores
- Core credits earned
- Passing all core courses
- Student survey measures
  - Expectations and rigor
  - Engagement
  - Supportive relationships
  - Social and emotional learning
  - Sense of belonging
  - Grit
## Student Outcomes—Assessments

### NWEA MAP Reading and Mathematics scores

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>Trt</th>
<th>Ctrl</th>
<th>Diff</th>
<th>p Value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Raw score</td>
<td>221.17</td>
<td>219.55</td>
<td>1.62*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Standardized score</td>
<td>0.06</td>
<td>-0.06</td>
<td>0.12*</td>
<td>.03</td>
<td>0.12</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Raw score</td>
<td>227.43</td>
<td>227.01</td>
<td>0.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Standardized score</td>
<td>0.01</td>
<td>-0.01</td>
<td>0.03</td>
<td>.59</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Sample size</strong></td>
<td>449</td>
<td>458</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The full OLS model included school-level variables and student-level factors as covariates: pretest scale scores in Reading and Mathematics; gender; ethnicity; and English language learner, special education, and free or reduced-price lunch status.
# Student Outcomes—Credits Earned

<table>
<thead>
<tr>
<th>Outcome Measures (%)</th>
<th>Trt</th>
<th>Ctrl</th>
<th>Diff</th>
<th>( p ) Value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total core credits earned</td>
<td>81.9</td>
<td>73.8</td>
<td>8.0**</td>
<td>&lt;.001</td>
<td>0.08</td>
</tr>
<tr>
<td>- ELA credits earned</td>
<td>83.3</td>
<td>69.8</td>
<td>13.5**</td>
<td>&lt;.001</td>
<td>0.14</td>
</tr>
<tr>
<td>- Science credits earned</td>
<td>85.4</td>
<td>70.9</td>
<td>14.5**</td>
<td>&lt;.001</td>
<td>0.15</td>
</tr>
<tr>
<td>- Math credits earned</td>
<td>77.1</td>
<td>80.9</td>
<td>−3.8</td>
<td>.07</td>
<td>−0.04</td>
</tr>
<tr>
<td>Passing all core courses</td>
<td>64.0</td>
<td>47.0</td>
<td>0.17**</td>
<td>&lt;.001</td>
<td>0.17</td>
</tr>
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</table>

Sample size: 533, 520
## Student Outcomes—Survey

<table>
<thead>
<tr>
<th>Construct</th>
<th>Scale Scores</th>
<th></th>
<th>p Value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trt</td>
<td>Ctrl</td>
<td>Diff</td>
<td></td>
</tr>
<tr>
<td>Expectations and rigor</td>
<td>51.6</td>
<td>50.5</td>
<td>1.1</td>
<td>.10</td>
</tr>
<tr>
<td>Engagement</td>
<td>50.4</td>
<td>49.7</td>
<td>0.7</td>
<td>.32</td>
</tr>
<tr>
<td>Supportive relationships</td>
<td>51.7</td>
<td>48.5</td>
<td>3.2**</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social and emotional learning</td>
<td>51.8</td>
<td>52.0</td>
<td>−0.2</td>
<td>.80</td>
</tr>
<tr>
<td>Sense of belonging</td>
<td>51.6</td>
<td>51.2</td>
<td>0.4</td>
<td>.56</td>
</tr>
<tr>
<td>Grit</td>
<td>52.3</td>
<td>52.8</td>
<td>−0.5</td>
<td>.43</td>
</tr>
<tr>
<td><strong>Sample size</strong></td>
<td>456</td>
<td>423</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Teacher Outcomes

- Teacher surveys
  - View of students’ actual behavior, commitment, and attitudes
  - Perception of potential student behavior, commitment, and attitudes
  - View of the school’s supports
  - Interaction with parents
  - Teacher self-efficacy
  - View of student accountability
  - Collaboration with and view of colleagues
  - Use of data

- Teacher interviews
  - Professional development
  - Ninth-grade structure
  - Block or team meetings
  - Whole student approach
  - I-Time or other social-emotional learning (SEL) activities
  - Risk review or student referrals
  - Parent involvement
  - Contextual support
## Teacher Outcomes—Survey ($n = 32$)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Scale Scores</th>
<th>Diff</th>
<th>$p$ Value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>View of students’ actual behavior</td>
<td>54.1</td>
<td>45.8</td>
<td>8.3*</td>
<td>0.02</td>
</tr>
<tr>
<td>Perception of student behavior</td>
<td>52.3</td>
<td>47.6</td>
<td>4.7</td>
<td>0.20</td>
</tr>
<tr>
<td>View of the school’s supports</td>
<td>52.2</td>
<td>47.7</td>
<td>4.5</td>
<td>0.21</td>
</tr>
<tr>
<td>Interaction with parents</td>
<td>49.7</td>
<td>50.3</td>
<td>-0.6</td>
<td>0.87</td>
</tr>
<tr>
<td>Teacher self-efficacy</td>
<td>52.6</td>
<td>47.4</td>
<td>5.2</td>
<td>0.14</td>
</tr>
<tr>
<td>View of student accountability</td>
<td>50.5</td>
<td>49.5</td>
<td>1.0</td>
<td>0.80</td>
</tr>
<tr>
<td>Collaboration with colleagues</td>
<td>54.3</td>
<td>45.7</td>
<td>8.6*</td>
<td>0.01</td>
</tr>
<tr>
<td>Use of data</td>
<td>53.8</td>
<td>46.2</td>
<td>7.6*</td>
<td>0.03</td>
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</table>
## Teacher Outcomes—Interviews ($n = 33$)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Ratings</th>
<th>Diff</th>
<th>$p$ Value</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trt</td>
<td>Ctrl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional development</td>
<td>3.7</td>
<td>3.1</td>
<td>0.5</td>
<td>.14</td>
</tr>
<tr>
<td>Ninth-grade structure</td>
<td>4.0</td>
<td>2.6</td>
<td>1.4*</td>
<td>.01</td>
</tr>
<tr>
<td>Block/team meetings</td>
<td>4.5</td>
<td>3.8</td>
<td>0.7</td>
<td>.06</td>
</tr>
<tr>
<td>Whole student approach</td>
<td>4.0</td>
<td>3.4</td>
<td>0.6</td>
<td>.08</td>
</tr>
<tr>
<td>I-Time/other SEL activities</td>
<td>4.2</td>
<td>3.6</td>
<td>0.6</td>
<td>.14</td>
</tr>
<tr>
<td>Risk review/student referrals</td>
<td>3.2</td>
<td>2.4</td>
<td>0.9</td>
<td>.09</td>
</tr>
<tr>
<td>Parent involvement</td>
<td>3.2</td>
<td>2.6</td>
<td>0.6</td>
<td>.20</td>
</tr>
<tr>
<td>Contextual support</td>
<td>4.5</td>
<td>2.6</td>
<td>1.9*</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Caveats

• These are early findings from an ongoing three-cohort study, so they are somewhat underpowered and the story may change.

• Teachers were not randomly assigned to BARR: The effects of the program cannot be disentangled from those resulting from systematic differences in teacher effectiveness.

• Grades and related outcomes (e.g., failure rates) are not independent measures of student achievement: Effects on student learning may be confounded by effects on teacher attitudes and grading practices.
Conclusions

• The BARR model is a promising way to improve student achievement in Grade 9.

• Teacher-to-teacher relationships in high school appear to be a promising malleable factor to explore further.

• Large, multisite RCTs that use within-school random assignment offer built-in opportunities to replicate findings.

• Future RCTs on BARR or similar programs should randomize both students and teachers to avoid the attribution problems that are our most important caveat.
Next Steps

• Replication studies (Cohort 2 and Cohort 3)
• Student subgroup analyses
• Differences for various locales
• Examination of the relationship between levels of implementation and outcomes
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References


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