School Discipline and Student Achievement: An Overview of Results in Response to Act 1329

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University of Arkansas

Presentation for the Arkansas State Board of Education
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• AR Education Reports
• Policy Briefs
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• Newsletters
• Data Resources

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Agenda

1. Introduction and Motivation
2. Four Questions and Results
3. Conclusion and Next Steps
Introduction and Motivation
Background on School Discipline - US

• US Department of Education’s Office for Civil Rights Database (2014)
  – African-American students without disabilities are more than three times as likely as their white peers without disabilities to be expelled or suspended

  – Over 50% of students involved in school-related arrests or referred to law enforcement are Hispanic or African-American
Introduction to Arkansas Act 1329

- **OEP** presented on this topic in July, 2014 in response to **Act 1329**: An Act to Evaluate the Impact of School Discipline on Student Achievement; And For Other Purposes
  - Annual report to include
    - District enrollment, subgroup enrollment, disciplinary rates, achievement, and disciplinary disparity between subgroups
    - Possible disciplinary strategies and resources Arkansas school districts can access
Challenges of Interpreting Data

• Unclear how to interpret any potential disparities
  – Act 1329: “Disparity in discipline rates does not necessarily indicate discrimination; it can result from an ineffective school climate or from cultural strategies that are not successful in engaging the academic efforts of all students.”

• This year, we can improve upon prior presentations with new data ...

• Next year, we will examine even further
Questions and Results
Questions to Answer Today

I. How often do students get cited for behavior & which types of schools write up students most often?

II. Which types of schools give stricter (more days) punishments, for the same infractions?

III. Which types of students (on average) receive stricter punishments for the same infractions?

IV. Finally, within school, do specific types of students receive stricter punishments for the same infractions?
Q1: Which types of schools write up students most often?

- Infractions per 100 students per year by type of school
- Grouped by severity of infraction: “Severe 6” infractions lead to ISS, OSS, or Expulsion in at least 90% of the cases:
  - Fighting, gang-related activity, drugs, alcohol, knives, guns

- **Overview of Results:**
  - SW and SE regions had the most infractions
  - Surprisingly, the smallest and largest schools had the most infractions
  - Jr. High Schools and HS had highest rates
  - The more African-American students, the more infractions per student
  - The poorer the school (by % FRL), the more infractions per student
  - Lower performing schools had more infractions per student
Q1: SW and SE are Trouble Spots

Number of Infractions Per 100 Students Per Year (2010-11 to 2012-13)

Total Infractions

"Severe 6" Infractions

Southeast  Southwest  Central  Northeast  Northwest

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Q1: Junior High Schools, High Schools Cite Students More Frequently

Number of Infractions Per 100 Students Per Year by School Type (2010-11 to 2012-13)

- **Total Infractions**
  - Elementary: 41.1
  - Middle: 48.3
  - Junior High: 59.1
  - Senior High: 63.9
  - Comprehensive K-12/Other: 89.6

- **Other Infractions**
  - Elementary: 37.8
  - Middle: 59.1
  - Junior High: 63.9
  - Senior High: 82.3
  - Comprehensive K-12/Other: 89.6

- **"Severe 6" Infractions**
  - Elementary: 4.8
  - Middle: 7.3
  - Junior High: 7.4
  - Senior High: 4.6
  - Comprehensive K-12/Other: 4.6
Q1: Smallest and Largest Schools Cite Students More Frequently

Number of Infractions Per 100 Students Per Year by School Size (2010-11 to 2012-13)

- **Total Infractions**
  - Quintile 1 (Smallest): 35.8
  - Quintile 2: 36.7
  - Quintile 3: 35.5
  - Quintile 4: 55.7
  - Quintile 5 (Largest): 60.0

- **"Severe 6" Infractions**
  - Quintile 1 (Smallest): 4.9
  - Quintile 2: 3.6
  - Quintile 3: 3.7
  - Quintile 4: 4.2
  - Quintile 5 (Largest): 5.0
Q1: Predominantly African-American Schools Cite Students More Frequently

Number of Infractions Per 100 Students Per Year by % African-American (10-11 to 12-13)

More than 3x mostly white schools
Q1: Low-Income Schools Cite Students More Frequently

Number of Infractions Per 100 Students Per Year by % FRL-Eligible (10-11 to 12-13)

- Quintile 1 ( Least FRL)
- Quintile 2
- Quintile 3
- Quintile 4
- Quintile 5 (Most FRL)

- "Severe 6" Infractions
- Other Infractions
- Total Infractions

More than 2x richest schools
Q1: Results By Benchmark Scores

Number of Infractions Per 100 Students Per Year by Benchmark "GPA" (10-11 to 12-13)

Almost 8x difference between highest performing and lowest performing schools

And 11x difference in rate of “Severe 6" infractions.
Yes, certain types of schools are writing students up for misbehavior more often ... 

So ... how about the consequences?
Q2: Which types of schools give stricter (more days) punishments, for the same infractions?

Overview of Analytic Strategy:

• For every infraction, we observe punishment, and compute an average punishment (number of days) for each infraction
• “Strictness” = punishment longer or shorter than average
• The “residual” for each infraction is the number of days punished above (positive) or below (negative) average
• Then, we can see what types of schools tend to assign longer (more strict) punishments based on school averages
Q2: Which types of schools give stricter (more days) punishments, for the same infractions?

Step 1: Using multivariate regression analysis, create residuals (measure of severity of punishment above or below average) at infraction level:

\[ \text{days}_\text{pun}_{it} = \beta_0 + \beta_1 \text{grade}_\text{it} + \beta_2 \text{infraction}_\text{type}_\text{it} + \beta_3 \text{infraction}_\text{order}_\text{it} + \beta_4 \text{site}_\text{use}_\text{it} + u_{it} \]

Our statistical model controls for:

- \( \text{grade}_\text{it} \) = a vector of grade dummies (with 8th grade as baseline)
- \( \text{infraction}_\text{type}_\text{it} \) = a vector of infraction dummies (disorderly conduct as baseline)
- \( \text{infraction}_\text{order}_\text{it} \) = a vector of dummies for first, second, third, fourth, fifth, sixth, seventh, or more infraction (student by school by year) plus last infraction (student by school by year)
- \( \text{site}_\text{use}_\text{it} \) = a vector of dummies for school site-use (Pre-K/Kindergarten, Elementary, Middle, Junior High, High school, Comprehensive K-12)
Q2: Which types of schools give stricter (more days) punishments, for the same infractions?

Step 2: Using multivariate regression analysis, predict average residuals at school level using school characteristics

\[\text{average\_residual}_{st} = \beta_0 + \beta_1 \ln(\text{enrollment}_{st}) + \beta_2 \text{site\_use}_{st} + \beta_3 \text{perc\_FRL}_{st} + \beta_4 \text{perc\_AA}_{st} + \beta_5 \text{overall\_test\_GPA}_{st} + \beta_6 \text{region}_{st} + u_{it}\]

Our statistical model controls for:

\(\ln(\text{enrollment}_{st})\) = natural log of school enrollment

\(\text{site\_use}_{st}\) = a vector of dummies for school site-use (Elementary, Middle/Junior High, High school, Comprehensive K-12, with Elementary as the baseline)

\(\text{perc\_FRL}_{st}\) = school % free-and reduced-lunch eligible

\(\text{perc\_AA}_{st}\) = school % African American

\(\text{overall\_test\_GPA}_{st}\) = average “GPA” of benchmark and EOC scores where 1 = Below Basic and 4 = Advanced

\(\text{region}_{st}\) = Geographical Region (baseline = Northwest)
Q2: Which **Schools** are Stricter?

<table>
<thead>
<tr>
<th>School Average Residual</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(enrollment)</td>
<td>0.111</td>
</tr>
<tr>
<td></td>
<td>(0.0769)</td>
</tr>
<tr>
<td>% FRL-Eligible</td>
<td>-0.123</td>
</tr>
<tr>
<td></td>
<td>(0.228)</td>
</tr>
<tr>
<td>% African American</td>
<td>1.567 ***</td>
</tr>
<tr>
<td></td>
<td>(0.189)</td>
</tr>
<tr>
<td>Overall Test Score GPA</td>
<td>-0.219</td>
</tr>
<tr>
<td></td>
<td>(0.183)</td>
</tr>
<tr>
<td>Northeast Region</td>
<td>-0.246 ***</td>
</tr>
<tr>
<td></td>
<td>(0.0908)</td>
</tr>
<tr>
<td>Central Region</td>
<td>-0.242 **</td>
</tr>
<tr>
<td></td>
<td>(0.101)</td>
</tr>
<tr>
<td>Southwest Region</td>
<td>-0.135</td>
</tr>
<tr>
<td></td>
<td>(0.103)</td>
</tr>
<tr>
<td>Southeast Region</td>
<td>0.388</td>
</tr>
<tr>
<td></td>
<td>(0.271)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.0960</td>
</tr>
<tr>
<td></td>
<td>(1.012)</td>
</tr>
</tbody>
</table>

Using a statistical strategy to consider all of these variables at once, we tend to see ...

**Longer Punishments**
- Schools with more African-American students

**Shorter Punishments**
- Northeast and Central (relative to Northwest, Southwest, Southeast)

Observations 2,780
R-squared 0.064

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Q3: Which types of students (on average) receive stricter punishments for the same infractions?

Process:

• Step 1: Create residuals at infraction level (same as in Q2)
• Step 2: Average residuals by demographic characteristics (gender, race, FRL-status, etc.)

Overall Results (next slides will illustrate):

• Minority students, FRL-students, and males receive longer punishments for the same infraction
• Special Education Students and LEP students receive shorter punishments for the same infraction
• For example, minority students receive about ½ a day more than their white peers for the same infraction
Q3: Which **Students** are Punished More Strictly Across State?

<table>
<thead>
<tr>
<th>Disparities in Residual (as a proxy for severity above or below average punishment)</th>
<th>Minority</th>
<th>White</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infractions</td>
<td>333,112</td>
<td>257,638</td>
<td>0.458 ***</td>
</tr>
<tr>
<td>Average Residual</td>
<td>0.1996</td>
<td>-0.26</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infractions</td>
<td>418,509</td>
<td>172,241</td>
<td>0.05 ***</td>
</tr>
<tr>
<td>Average Residual</td>
<td>0.01</td>
<td>-0.03</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>FRL</th>
<th>Non-FRL</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infractions</td>
<td>426,891</td>
<td>163,859</td>
<td>0.11 ***</td>
</tr>
<tr>
<td>Average Residual</td>
<td>0.03</td>
<td>-0.08</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SpEd</th>
<th>Non-SpEd</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infractions</td>
<td>106,800</td>
<td>483,950</td>
<td>-0.18 ***</td>
</tr>
<tr>
<td>Average Residual</td>
<td>-0.14</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>LEP</th>
<th>Non-LEP</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infractions</td>
<td>33,822</td>
<td>556,928</td>
<td>-0.44 ***</td>
</tr>
<tr>
<td>Average Residual</td>
<td>-0.42</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

* Differences represent additional days of punishment received per infraction, relative to the other group.
* For example, on average, white students receive almost ½ a day less punishment than their minority peers.

***p<0.01, **p<0.05, *p<0.1
Q3: How does student achievement relate to punishments across the state?

By Prior Year Benchmark Math Proficiency Level

<table>
<thead>
<tr>
<th></th>
<th>Advanced</th>
<th>Proficient</th>
<th>Basic</th>
<th>Below Basic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Infractions</td>
<td>27,283</td>
<td>51,288</td>
<td>37,510</td>
<td>40,634</td>
</tr>
<tr>
<td>Average Residual</td>
<td>-0.34</td>
<td>-0.15</td>
<td>-0.07</td>
<td>0.04</td>
</tr>
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By Prior Year Benchmark Literacy Proficiency Level

<table>
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<tr>
<td>Number of Infractions</td>
<td>19,597</td>
<td>58,600</td>
<td>59,344</td>
<td>19,272</td>
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<tr>
<td>Average Residual</td>
<td>-0.33</td>
<td>-0.17</td>
<td>-0.05</td>
<td>0.08</td>
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</table>

- Students who scored **Advanced & Proficient** on their benchmark exams in the prior year tended to receive **shorter** punishments than the state average.

- Students who scored **Below Basic** received **longer** punishments than the state average in the following year for the same infraction.
What Do We Know Thus Far?

• Students are cited more often in disadvantaged districts

• For these infractions, there are differences in strictness of punishment:
  – Schools with high minority enrollments are more strict
  – Across the state, certain types of students receive more days of punishment (minority, FRL, low-achieving)

• *Do these disparities occur within school? Or do they occur because different schools have different practices?*
Q4: Within a school, do certain subgroups receive stricter punishments for the same infraction?

Process:

- Step 1: Create residuals at infraction level *(holding school fixed)*
- Step 2: Average residuals by demographic characteristics (gender, race, FRL-status, etc.)

Overall Results *(next slides will illustrate)*:

- Disparities within school are smaller or insignificant – thus, the disparities are largely due to differences between schools
- *For example, minority students receive about .05 more days per infraction than their white peers (within the same schools)*
- Also small disparities between males and females (about .06 days in favor of female students); this is consistent with statewide result.
Q4: Which Students are Punished More **Within A School**?

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Male | Female | Difference
Number of Infractions | 418,509 | 172,241 |
Average Residual | 0.02 | -0.04 | **0.06 ***** |

FRL | Non-FRL | Difference
Number of Infractions | 163,859 | 426,891 |
Average Residual | 0.01 | -0.02 | **0.03*** |

SpEd | Non-SpEd | Difference
Number of Infractions | 106,800 | 483,950 |
Average Residual | -0.11 | **0.03*** |

LEP | Non-LEP | Difference
Number of Infractions | 33,822 | 556,928 |
Average Residual | -0.02 | **0.00*** |

***p<0.01, **p<0.05, *p<0.1

Within school disparities are much smaller or statistically insignificant when analyzed within-school.

White-Minority disparity diminishes to about 1/20 of a day, indicating that most of the state-wide disparities are between schools/areas.

LEP disparity disappears (due to concentrations in certain areas).
Q4: How does student achievement relate to punishments within school?

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Especially high scoring students still appear to received slightly shorter punishments in the following year for the same infraction, even when controlling for school.
Conclusions and Next Steps
In Conclusion, What Do We Know?

As stated previously...

• Students are cited more often in disadvantaged districts

• For these infractions, there are differences in strictness of punishment:
  – Schools with high minority enrollments are more strict
  – Across the state, certain types of students receive more days of punishment (minority, FRL, low-achieving)

But now we see...

• Most of these disparities occur not within school, but across different schools in the state.

• Therefore, the real story is that schools with greater proportions of disadvantaged students are punishing those students more often and more strictly.
Next Steps

• Opportunities for Data Improvements
  – Uncertainty due to self-reporting (what accountability is in place?)
  – Some categories unstandardized due to rolling-up to state level
    • Including undefined “other” category (e.g. six districts had “other” rates of over 20%)

– Missing data
  • Including “referrals to law enforcement authorities” requested in Act 1329
Next Steps, Con’t…

• Identify Additional Questions
  – What is the State Board of Education interested in knowing in relation to discipline and student achievement?
  – Opportunities to expand analysis with expanded data sets
  – OEP willing to discuss future reporting requirements in response to original request in Act 1329
Questions?
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