

Wright State University

CORE Scholar

Scholarship in Medicine - All Papers

Scholarship in Medicine

2023

Social and Environmental Factors Impact on Reading Performance in Illinois in 2020

Gisella Drouet

Follow this and additional works at: https://corescholar.libraries.wright.edu/scholarship_medicine_all



Part of the [Public Health Commons](#)

Social and Environmental Factors Impact on Reading Performance in Illinois in 2020

Gisella Drouet

Dr. Amber Todd, Department of Medical Education

Population and Public Health Track

Scholarship in Medicine Final Report

By checking this box, I indicate that my mentor has read and reviewed my draft proposal prior to submission (I am in the August/ September 2020 short course with Dr. Todd)

Abstract

Objective: Reading scores, such as average literacy grade level are often used as a variable for academic success. It has been found that third grade students reading at grade level are less likely to drop out of high school. ¹ The objective of the project is to investigate average reading performance and its implications on English fluency, high school graduation and various social factors. **Methods:** Social factors analyzed in this study were single-parent household, residential segregation and severe housing conditions. Illinois data analyzed was from County Health Rankings website

(<https://www.countyhealthrankings.org/app/illinois/2020/measure/outcomes/1/map>). This study analyzed the change in 2020 reading performance in Illinois and Ohio using an unpaired t-test. Stepwise linear regression analysis was used to study how residential segregation, English proficiency, severe housing conditions and high school graduation account for variance in reading performance in Illinois counties in 2020. Finally, a Pearson/ Spearman correlation analysis was utilized to find the correlation between reading performance and single-parent

household in Illinois counties in 2020. **Results:** Illinois had significantly lower reading performance than Ohio. Only severe housing conditions significantly predicated reading performance in Illinois. Lastly, as percentage of single-parent household increased per county, average reading performance decreased.

Key Words: *Illinois, reading grade level, reading scores, English fluency, residential segregation, high school graduation, severe housing conditions, single-parent household*

Introduction

Academic success among children is influenced by their zip code, socioeconomic status (SES), race, educational support and school quality in the United States.¹ Among the Great Lakes States, Ohio invests more in lower income students, has a program to support third grade students not meeting reading standards and performed above the proficiency standardized reading benchmark in 2013.¹ Moreover, these racial disparities account for the varying academic opportunities accessible to students of various backgrounds. Despite several decades of desegregation in education, the combination of race and SES still places Black, Hispanic and Native American children in disadvantaged schools.² Regardless of whether they attend charter schools or not, their schools average lower standardized test grade levels than the schools attended by White and Asian children.²

Previous research has indicated that poor academic performance strongly predicts delayed high school graduation.³ Having proficient literacy skills by the third grade has shown to have a negative correlation with high school dropouts; these skills lay a foundation for success.¹ In the absence of interventions to improve academic performance in specific areas such literacy skills, reading ability will remain stagnant. The more reading and mathematical challenges students face, the higher risk there is of students not only dropping out of high school, but also not pursuing post-secondary education.³ Approximately 43% of students who did not graduate high school in a Finnish city had learning challenges, such as reading difficulties.⁴ Thus, more investigations should focus on additional factors that may influence high school graduation.

As children living in single-parent households are on the rise in the United States, research has indicated that those raised in a single-parent household experience more negative

emotional stress and poorer outcomes in comparison to children raised in two-parent household.^{5,6} However, recent findings show academic achievement was not associated with children living with one parent. Academic achievement was measured based on student trends in math and reading grade levels in fourth and eighth grade on the National Assessment of Education Progress (NAEP).⁷ Furthermore, increased maternal involvement in children's academics improved their test grade levels while controlling for race-ethnicity, parental education and parents' marital status.⁷

Severe housing conditions have been linked to elevated lead levels within the home, contributing to detrimental effects on child development and academic success.⁸ Previous study among third grade children in Chicago found that there was a significant inverse relationship between academic performance and blood lead levels, concluding that early exposure to lead correlates with poor academic reading and math achievement.⁹ They additionally found that levels of lead varied upon race, which may be due to housing conditions.⁹

Reading success in English often defines academic success, thus, English fluency is required. This fluency milestone can be challenging to achieve among bilingual students. According to the 2010 census, approximately 20% of children less than 5 speak another language at home in addition to English.¹⁰ Cross-linguistic interference, such as cognates, that bilingual speakers face have been shown to hinder reading grade levels.¹⁰ Previous research has shown that the presence of cognates in the reading has shown to activate the native language, negatively influencing English reading performance.¹⁰ When the reading did not have cognates, reading performance was faster among bilingual children.¹⁰

For this research, I will analyze Illinois and Ohio data to determine impact of social and environmental factors on reading performance and if there is a difference in reading performance

between the two states. I expect the average reading performance in Illinois is significantly than Ohio. Additionally, I will analyze how residential segregation, English proficiency, severe housing conditions and high school graduation account for variance in reading grade levels in Illinois 2020, building upon previous studies. I expect to find all the variables contribute to the model to predict reading performance in Illinois. Since previous research has differing results on child's academic outcomes in single-parent households, I will build upon previous research and examine how reading performance correlates with single-parent households. I expect that as percentage of single-parent households increase, reading grade levels decrease. This research will demonstrate whether investing more on students improves reading. It is also essential to analyze educational inequities, potentially address them to tailor instruction and policies to set up students for academic success.

Research Questions

RQ1: How does reading performance differ between Illinois and Ohio in 2020?

RQ2: How can residential segregation, English proficiency, severe housing conditions and high school graduation account for variance in reading performance in Illinois counties in 2020?

RQ3: How does reading performance correlate with single-parent household in Illinois counties in 2020?

Methods

Context/Protocol

In this study, the reading performance is an average literacy performance among third graders in English standardized tests for each state. Residential segregation is defined as segregation in residence between Black and White Illinois residents. Severe housing conditions is defined percentage of household with at least one of the following issues: lack of access to plumbing,

facilities, cost and overcrowding. The variable English fluency is defined as the percentage of population not fluent in English, while high school graduation is defined as the rate of ninth grade students that graduate in four years. Single-parent household was defined as percentage of children headed by a single parent. I will obtain the data for reading performance, residential segregation, severe housing conditions, single-parent households and English fluency in Illinois from the public data set, County Health Rankings for the year 2020.¹¹ For more information on how these variables were gathered visit County Health Rankings website (<https://www.countyhealthrankings.org/app/illinois/2020/measure/outcomes/1/map>).

Data Collection

Illinois has a total of 102 counties, while Ohio has a total of 88 counties, however, not all counties were included for each variable. Ten of 102 Illinois counties for average reading grade levels and 3 of 88 Ohio counties were excluded due to missing data in that category. As for the residential segregation, 44 of 102 Illinois counties that had a Black population less than 100 were omitted. Although many of the Illinois counties had 0% not proficient in English, all 102 counties were accounted for in this variable. All of the Illinois counties had data for severe housing conditions, high school graduation rate, and percentage of children in single-parent household; all 102 counties were included for each variable.

Data Analysis

For my first research question, I used an unpaired t-test to determine how reading performance change in 2020 in Illinois and Ohio. I used Stepwise linear regression to determine how residential segregation, English proficiency, severe housing conditions and high school graduation account for variance in reading performance in Illinois counties in 2020 (RQ2).

Finally, I used a Pearson/Spearman correlation to determine correlation between single-parent households and reading performance in Illinois counties in 2020 (RQ3).

Results

This study aimed to further analyze the social factors that may contribute to average reading performance. Using an unpaired t-test, average reading performance (RQ1) was significantly lower between Illinois (3.01) and Ohio (3.24) counties in 2020 ($t = -6.33, p = .002$) (Table 1).

Table 1: Average Reading Performance Among Two States

State	n	Mean	SD
Illinois	92	3.01 ^a	0.25
Ohio	85	3.24	0.17

Abbreviation: SD, Standard Deviation

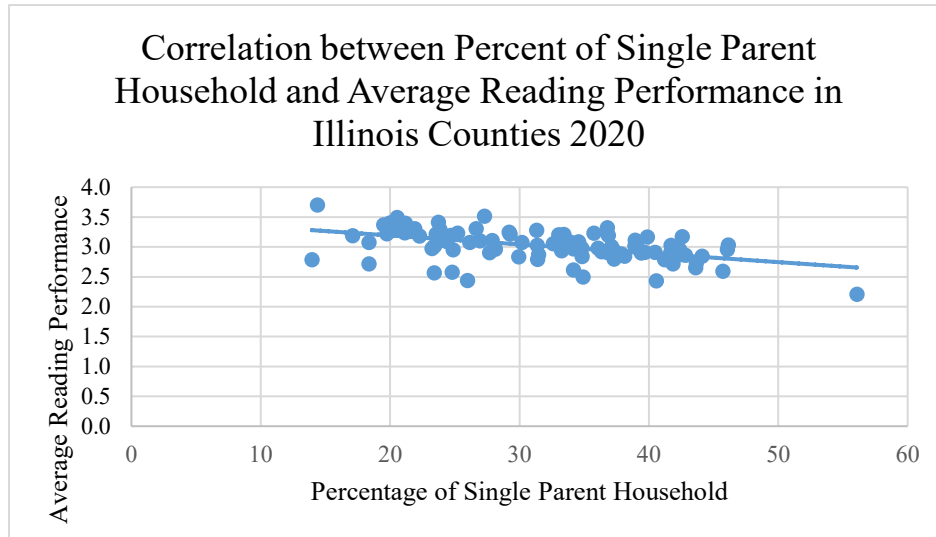
^astatistically significantly lower than Ohio in 2020 ($p < .05$)

The second research question (RQ2) investigated how residential segregation, English proficiency, severe housing conditions and high school graduation by Illinois county in 2020 could account for reading performance. A step wise linear regression demonstrated the best fitting model was significant ($F_{1,90} = 4.87, p = 0.03$), accounting for 5.1% of the variance in average reading performance. Severe housing problems was the only variable that significantly contributed to the model ($B = -0.19, t = -2.21, p < .05$). Residential segregation, English proficiency and high school graduation did not significantly add to the model.

When investigating how reading performance correlates with single-parent household in Illinois in 2020 (RQ3), a Pearson correlation indicated a significant moderate correlation ($r = -$

.50, $p < .001$) where, as single-parent household parent increases, the average reading performance decreases (Figure 1).

Figure 1: Correlation Between Single-parent Household and Average Reading Performance in Illinois 2020.



A Pearson correlation indicates a moderate but significant correlation ($r = -.50$, $p < .001$) where, as single-parent household parent increases, the average reading performance decreases.

Discussion

This study aimed to analyze the factors that may impact education defined by average reading performance among third graders in Illinois counties in 2020. Furthermore, it compared average reading performance between Illinois and Ohio counties in 2020. Through unpaired t-test, Illinois had a significantly lower reading performance than Ohio in 2020. Out of the variables analyzed for RQ2, that only severe housing conditions significantly predicted reading performance in Illinois by 5.1%, while the other factors did not significantly contribute to the model. Through a correlation analysis, there was a moderate significant negative correlation between single-parent household and reading performance.

The expected outcomes for this study were based on previous research findings. I expected Illinois to have lower reading performance than Ohio because Illinois spends less on their students. Ohio spends more on lower income students to help students that are not meeting academic milestones by third grade.¹ Since 2012, Ohio introduced the Third Grade Reading Guarantee program, however, research has indicated no significant change in Ohio fourth graders' NAEP scores since its implementation.¹² This research suggests that how states are investing in their schools rather than reading programs may contribute to reading scores.

Previous research has indicated inverse relationship between academic achievement and blood lead levels among third graders. Thus, it was expected for severe housing conditions to significantly contribute to reading performance. Although the severe housing conditions was not defined by blood lead levels in this study, the results further supports how severe housing conditions negatively impacts academic success.^{8,9} Additionally, while severe housing conditions significantly predicted reading performance, it is not meaningful because it predicted a small amount. More variables need to be analyzed to find what significantly and meaningfully contributes to reading performance. Finally, I expected that as single-parent households increase, reading grade levels decrease. This would be consistent with the literature indicating that children living in single-parent households experience more emotional stress than their counterparts that live with two parents, which contribute to poor academic success.^{5,6}

In summary, social and environmental factors, contribute to educational success in Illinois. This study highlights how greater percentage of single-parent-households, the poorer the reading performance. It also demonstrates how severe housing conditions negatively impacts academic success.

Despite the significant results, there are limitations to this study given the use of an aggregate and publicly available data set for this study. The data set from County Health Rankings does not specify the different groups within a variable, which may influence the results. Per County Health Rankings, severe housing problems is defined as lack of facilities, access to plumbing, overcrowding and cost; it does not specify lead content in water. Some counties had to be excluded from analyses because they had no data. Reading performance was also limited to third graders. Perhaps data from different grade levels may lead to different results. Furthermore, data from previous years were used to represent 2020 data; the reading grade levels was modeled using Stanford Education Data Archive program and 2016 data for this measure; data from 2014-2018 for residential segregation data, data from 2012-2016 were utilized for severe housing problems, data from years 2014 to 2018 were used to measure children in single-parent household, and years 2014 to 2018 were used to measure English proficiency.

Studies in the future should dissect the state funds that go the schools in Illinois versus Ohio. This data may help decipher what school investments demonstrate benefit in reading performance. Further research should analyze if single-parent household significantly and better predicts reading performance in Illinois since a significant negative correlation was found. Additionally, design a study to analyze percentage of students that complete post-secondary that drop out of high school. This study will give insight to the correlation between high school drop-out and post-secondary education completion, as well as how high school drop-out can be used to predict completion of post-secondary education. ⁴

In conclusion, this study further supports that investing in lower income students and those that are not reading at third grade level, such as Ohio, greatly benefits students; Illinois

should invest more in their lower income students. Investing in lower income students may improve academic success defined by reading performance.

References

1. Hahn H, Gallagher M, Chingos MM. *BUILDING LADDERS OF OPPORTUNITY FOR YOUNG PEOPLE IN THE GREAT LAKES STATES, BRIEF 2 Strategies for Supporting Early Reading Proficiency to Close Achievement Gaps*. Urban Institute. 2017
2. Logan JR, Burdick-Will J. School Segregation, Charter Schools, and Access To Quality Education. *J Urban Aff*. 2016;38(3):323-343. doi:10.1111/juaf.12246
3. Hakkarainen AM, Holopainen LK, Savolainen HK. A Five-Year Follow-Up on the Role of Educational Support in Preventing Dropout From Upper Secondary Education in Finland. *J Learn Disabil*. 2015;48(4):408-421. doi:10.1177/0022219413507603
4. Holopainen L, Hakkarainen A. Longitudinal Effects of Reading and/or Mathematical Difficulties: The Role of Special Education in Graduation From Upper Secondary Education. *J Learn Disabil*. 2019;52(6):456-467. doi:10.1177/0022219419865485
5. Amato PR. The impact of family formation change on the cognitive, social, and emotional well-being of the next generation. *Future of Children*. 2005;15(2):75-96. doi:10.1353/foc.2005.0012
6. Brown SL. Marriage and child well-being: Research and policy perspectives. *Journal of Marriage and Family*. 2010;72(5):1059-1077. doi:10.1111/j.1741-3737.2010.00750.x
7. Amato PR, Patterson S, Beattie B. Single-parent households and children's educational achievement: A state-level analysis. *Soc Sci Res*. 2015;53:191-202. doi:10.1016/j.ssresearch.2015.05.012
8. Coulton CJ, Richter F, Kim SJ, Fischer R, Cho Y. Temporal effects of distressed housing on early childhood risk factors and kindergarten readiness. *Child Youth Serv Rev*. 2016;68:59-72. doi:10.1016/j.chilyouth.2016.06.017
9. Evens A, Hryhorczuk D, Lanphear BP, et al. The impact of low-level lead toxicity on school performance among children in the Chicago Public Schools: A population-based retrospective cohort study. *Environ Health*. 2015;14(1):1-10. doi:10.1186/s12940-015-0008-9
10. Davis AK, Bowman N, Kaushanskaya M. Bilingualism, cognates and reading fluency in children. *J Res Read*. 2018;41:S12-S29. doi:10.1111/1467-9817.12263
11. % not proficient in English in Illinois | County Health Rankings & Roadmaps. Accessed September 27, 2020. <https://www.countyhealthrankings.org/app/illinois/2020/measure/factors/59/data>
12. Logan J, Justice L, Davies O'leary J, Purtell K. *Has Ohio's Third-Grade Reading Guarantee Led to Reading Improvements?* Crane Center for Early Childhood Research and Policy & The Ohio State University. 2019