

Class Size in Relation to Student Achievement and Behavioral Issues

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Abstract

The purpose of this action research study was to determine whether class size was related to student achievement and behavioral issues. Data reflecting students' behavior issues and quarterly grades were gathered. In addition, teacher and student participants were surveyed regarding their perceptions of class size and its relationship to instruction, learning, and behavior. Results indicated that the overall correlation between class size and grades ($r = .109$) was positive and statistically significant at the $p < .01$ level and the overall correlation between class size and number of BIRs ($r = .065$) was not statistically significant.

Based on results from this study, there appears to be some relationships between class size and achievement and behavior, and awareness of these relationships could be important for educators to establish effective and cost effective programs. Further research controlling for sample characteristics such as age and ability and for course content and difficulty levels appears warranted to clarify the relationships between class size, student achievement, and behaviors in varied subject areas.

CHAPTER I

INTRODUCTION

Educators strive to enable students to achieve well across all subject areas. Research such as that conducted by Schanzenbach (2014) suggests that smaller class sizes support this outcome. Schanzenbach concluded that small class sizes lead to higher student achievement. Although student achievement is a priority for educators, student achievement and student behaviors influence one another. Results of research reported by Brandts (2011) indicate that when more time is spent on instruction rather than on classroom or behavior management, a higher level of student achievement results.

Overview

The number of students enrolling in schools each year continues to grow and consequently, class sizes have been increasing steadily (George, 2016.) The increase in class size is widespread, affecting classrooms across the nation. For many teachers, reaching all students academically is a challenge, particularly while trying to manage classroom behaviors of increasing numbers of students and more diverse students.

The researcher is a classroom teacher at the middle school level. At the researcher's school, administrators identified an increase in classroom behavior issues, especially in classes with larger numbers of students. In addition, teachers' concerns regarding class sizes were expressed more frequently as the school enrollment increased while the number of teachers remained the same. The school leadership asked this researcher to investigate the relationship between class size and student achievement and behavior issues based upon these findings.

Statement of Problem

The purpose of this action research study was to determine whether class size was related to student achievement and behavior issues.

Hypothesis

It was hypothesized that quarterly grades and behavioral incident referrals per student would not correlate significantly with class size in each of the four core class areas (reading, math, social studies and science).

ho1: r (quarterly assessment grade, class size) = 0 (for each core class)

ho2: r (behavioral incident referrals per student per quarter, class size) = 0 (for each core class)

Operational Definitions

Behavioral Incident Referrals are defined as minor incident reports and major incident reports.

Minor Incident Reports are defined as classroom managed behaviors as outlined in the Student Handbook and school Positive Behavioral Intervention and Supports (PBIS) program documents developed by Anne Arundel County Public Schools, MD (June 2015 & July 1999).

Major Incident Reports are defined as office managed behaviors as outlined in the Student Handbook and school PBIS program documents developed by Anne Arundel County Public Schools, MD (June 2015 & July 1999).

Grades are defined as the percentage earned on each core class's required quarterly assessment.

CHAPTER II

A REVIEW OF THE LITERATURE

This literature review examines the effects of class size on student achievement and student behavior as well as exploring factors such as age and income and how they are related to class size. Section one describes how student achievement is influenced by class size. Section two explains the relationship between student behavior and class size. Finally, section three examines the influence of class size on students of various ages, socio-economic status, and on minorities.

Student Achievement

The goal of educators is to enable students to achieve well across all subject areas. The factors linking small class size to higher achievement included: greater student engagement, increased time on task and opportunities for teachers to adapt their instruction to the students in the class more easily (Strauss, 2014.)

Student learning behaviors are key factors related to student achievement. Additionally, 11 studies analyzed by Achilles, Finn and, Pannozzo (2003) revealed a positive impact of smaller class sizes on students' learning behavior. These results appear to be consistent across different methods and measures of various studies (Finn et al, 2003.) Finally, a study on significant life experiences conducted by Stevenson, Peterson, Renee, Strand, Bondell, Kirby-Hathaway and Moore (2014) indicated that small class sizes resulted in an increase in student achievement in math, science, reading, and social studies.

When interactions between students and teachers are focused on learning activities, it is more likely that students will experience an increased levels of achievement. Results from the Success Starts Small study reported by Finn et al. (2003, p. 329) suggested that “the interactions

of teachers and students in small classes were more often related to academic or learning activities than were the interactions of teachers and students in large classes.” Krieger (2002) cited Molnar’s (1998) findings which indicated that interactions between students and teachers in smaller classes supported student achievement. According to Molnar’s research, students in appropriate class sizes received more individualized instruction and were more actively engaged in learning than students in larger classes. Teachers were able to identify students with learning difficulties more quickly and easily and were able to address these issues within the smaller classroom setting rather than referring students to special education classes (as cited in Krieger, 2002.) In addition, Anderson (as cited in Krieger 2002,) stated that “smaller class sizes give teachers the opportunity to teach better.”

Student Behavior as Related to Class Size

Although student achievement is a priority for educators, student achievement and student behaviors influence one another. Results of research such as that reported by Brandts (2010) indicates that when more time is spent on instruction rather than classroom or behavior management, a higher level of student achievement results. In the qualitative study conducted by Brandts the theory of Lazear (1999) supported the relationship between class size, behavior, and achievement. Lazear stated that “when a student is disruptive in class, learning is reduced for all the other students” (as cited in Brandts, p. 24)

The number of students in a class can affect classroom behaviors and therefore influence student achievement. Smith and Glass (1979) conducted a meta-analysis of class size and the relationship of class size to student attitudes and behaviors. Their findings indicated that “the smaller the class is the greater is the effect on the instructional process, on pupil affect, and on achievement” (p.7.) Furthermore, Finn et al. (2003) reported that “teachers of small classes

spend more time on instruction and less on classroom management or matters of discipline.” In addition, through their research review, Finn et al. (2003) explained that students in smaller classes fooled around less, had less inappropriate behavior, did not disrupt the work of other students, and had fewer discipline referrals. Furthermore, research completed in by California Public School researchers indicated that smaller class sizes allowed teachers to resolve behavior issues before they escalated. A research analysis conducted in Indiana supported the results of the California study. It was reported that smaller class sizes reduced disruptions (People for the American Way, 2002.) In a report by Krieger (2002) a study of the interactions in small and regular sized classes was described. The interactions recorded in the study indicated that teachers with smaller classes spent less time responding to negative behaviors than the teachers with larger classes. Additionally, in classes of smaller size, more time was spent on meeting instructional objectives than on classroom management issues (Krieger, 2002.)

Research on the effects of class size indicates that age, socio-economic status, and minority status are important factors influencing the relationship among class size, student achievement, and student behavior issues.

Students’ Ethnicity

The Educational Research Service (1987) found that minority students achieve more successfully when enrolled in classes with smaller class size (Educational Service District (1987). These findings suggest that it may be especially beneficial for schools with a high percentage of minority students to create smaller classes. In addition, the results of a class size reduction program implemented in Wisconsin in 1996 indicated that the achievement gap between African American and white students was reduced in schools participating in the

program. However, the achievement gap increased in comparison schools with larger class sizes (People for the American Way, 2002.)

Students' Age

The effects of smaller class sizes appear to differ according to the age or grade level of students. In a research brief prepared by The Educational Research Service (1987) it was indicated that the positive effects of smaller class sizes are more evident in the lower grades. Two of the most notable studies on class size included in this brief involved students in Kindergarten through Grade three. Tennessee's Student Teacher Achievement Ratio (STAR) and Wisconsin's Student Achievement Guarantee in Education (SAGE) studies both had results that indicated that students enrolled in classes of smaller size had higher levels of achievement (People for the American Way, 2002). Furthermore, the STAR program and the Lasting Benefits study found that elementary students in smaller classes had higher achievement, were more resilient, had a higher graduation rate, and were more likely to pursue higher education (Krieger, 2002).

While many studies on class size have focused on students in the primary grades, evidence suggests that students in the upper grades also may benefit from smaller class sizes. For example, "Harold Wenglinsky of the Educational Testing Service found that smaller classes at the eighth grade level improved the learning environment, which led, in turn, to higher student achievement" (People for the American Way, 2002 p.10). In addition, the Washington Post published an article that described the findings of officials in Seattle who found that ninth graders in smaller classes had improved attendance, fewer discipline issues, and higher academic achievement (People for the American Way, 2002). Finally, in a meta-analysis. Glass and Smith (1979) found that class size made the most beneficial impact on students ages 12 and under and

benefits were less obvious for students over age 18. These findings suggest that smaller classes would have a positive impact on students in grades K-12. However, in their position statement on class size, The National Council of Teachers of English (2014) stated that smaller class size did not make a significant difference in the achievement of high school students.

Students' Socio-economic Status

In many studies related to class size it is evident that socio-economic status influenced the effectiveness of students' being enrolled in smaller classes. Diane Whitmore Schanzenbach's 2014 study, concluded that the benefit from students being enrolled in smaller classes is greater for low-income students. According to the results of the STAR study she also noted that increases in class size likely would be most harmful to these populations. Supporting this, an Educational Testing Service study in 1986 found that disadvantaged students achieve more in small classes and similarly a study performed in Los Angeles reported that "class-size reduction helps, and it helps low-income students the most" (People for the American Way, 2002).

Summary

In conclusion, the research, studies and literature related to the effects of class size all indicate that smaller classes are advantageous, particularly to younger students and those of lower socioeconomic status. Larger class sizes have been found to negatively impact student achievement and behavior. This review of literature revealed that smaller class sizes increase student achievement and decreases behavior issues. In addition, it suggested that the positive impact of small classes is evident in the elementary and upper grades, although the effects on high schoolers has not consistently been found to be significant. Finally, minority students and students from low income homes are likely to benefit the most from being in smaller classes.

CHAPTER III

METHODS

The purpose of this action research study was to determine whether class size was related to student achievement and behavior issues. It was hypothesized that quarterly grades and behavioral incident referrals per student would not correlate significantly with class size in each of the four core class areas (reading, math, social studies and science).

Design

This study used a correlational design in which the researcher gathered data pertaining to students' behavior issues as reflected in referrals and students' grades as reported in quarterly assessment scores. The researcher correlated these data with class sizes to determine whether there was a significant relationship between class sizes, behavioral issues, and grades. Survey data also were collected to assess teacher and student perceptions about the implications of class sizes for learning, behavior, and some classroom climate issues that could affect learning. The independent variable in this study was the number of students per class. The dependent variables were the number of discipline referrals per class and the students' quarterly assessment scores for each of their classes. Descriptive statistics were calculated on the student and teacher survey data to identify trends and compare their views. Results are presented in Chapter Four and discussed in Chapter Five.

Participants

The participants in this study attended a public middle school in Annapolis, Maryland. The students in this study were between the ages of 11 and 12 and were in the sixth grade. The student population in sixth grade was 50% male and 50% female. The population consisted of a mix of African American, Hispanic, and White students. In addition, about 40% of sixth graders

received free and reduced price meals, 21% had 504 plans, 30% were English Language Learners, and 38% received Special Education services.

Instruments

Data regarding the frequency of minor and major discipline referrals were collected with the administration's consent from the middle school's office records. Quarterly Assessment data, used to represent grades, were collected with administrative approval from the school's Performance Matters program, used system-wide in Anne Arundel County Public Schools, MD, to track students' performance in all subject areas.

A teacher survey also was administered to the nine sixth grade teachers of core subjects to assess teacher perceptions of the effect of class size on student behavior, achievement, and classroom climate variables. Ratings were collected using a five-point Likert-type scale. This survey was developed by the researcher based on her review of related literature and her interest in the effect of class size on learning and behavior. No technical data were available because the instrument was custom-designed for this project. The teacher survey gathered information about how much influence class size has on teaching curricular content, teaching social skills, managing student behavior, increasing student achievement, and developing relationships with students.

A similar student survey with several items parallel to the teacher survey also was administered to sixth grade students enrolled in each core class to assess their perceptions of student behavior, achievement, and classroom climate variables in their existing classes, the sizes of which were known to the researcher. Ratings on this survey also were collected using a five-point Likert-type scale. The student survey also was developed by the researcher based on her review of related literature and her interest in the effect of class size on learning and behavior.

No technical data were available because the instrument was custom-designed for this project. The student survey gathered information with the intention of determining whether responses varied across classes of different sizes and whether teacher and student views were similar. Copies of the teacher and student surveys are included in Appendices C and D, respectively.

Procedures

Initially, the researcher consulted the school principal to determine what type of research would be most useful for the school. The researcher learned that the school administration desired to have her investigate the relationship between class size and student achievement and behavior issues. Subsequently, the first step in the research was to determine the group of teachers and students from whom to collect data. The groups chosen were grade six core content teachers and their students in the areas of reading, math, social studies, and science. A survey then was given to the teachers and students to determine their attitudes about content, social skills, behavior, achievement, and relationships.

After completion of the survey, data were collected for the total number of student behavioral incident referrals for each student for the quarter by content area class and teacher. After each content area teachers and students completed the quarterly assessment, the percentage score for each content area for each student also was recorded and these scores and the referral incidents (major, minor and total) were correlated with class sizes across subjects and overall. Survey responses then were summarized and related to the findings. Results are presented in Chapter Four and discussion follows in Chapter Five.

CHAPTER IV

RESULTS

The purpose of this action research study was to determine whether class size was related to student achievement and behavior issues. It was hypothesized that quarterly grades and behavioral incident referrals per student would not correlate significantly with class size in each of four core academic areas (reading, math, social studies and science).

Relationship between Class Size, Grades and Behavior

The main hypotheses of the study were tested by correlating class sizes with grades and Behavioral Incident Referrals (BIRs) for each of the four core courses. Null Hypothesis 1 was that grades would not correlate significantly with class sizes and Null Hypothesis 2 was that the number of BIRs earned for the quarter would not correlate significantly with class sizes.

Descriptive statistics follow in Table 1 and the results of the correlations computed to test both hypotheses follow in Table 2.

Results indicated that the overall correlation between class size and grades ($r = .109$) was positive and statistically significant at the $p < .01$ level and the overall correlation between class size and number of BIRs ($r = .065$) was not statistically significant. Thus, overall, hypothesis 1 was rejected and hypothesis 2 was retained.

Correlations between the variables also were computed for each of the four core classes. The correlation between grades and class size was significant and positive for language and literature ($r = .545$) and significant and negative for math ($r = -.393$), both at the $p < .01$ level. The correlation between BIRs and class size was significant and negative at the $p < .01$ level only for one class, language and literature ($r = -.283$). Thus, null hypothesis 1 was rejected for language and literature and math classes and retained for science and individuals and societies

classes. It was notable that the relationship between grades and class size was positive for language and literature, meaning larger class sizes were associated with better grades, and negative for math, meaning larger class sizes were associated with lower grades. Null hypothesis 2 was rejected only for language and literature. That relationship also was negative, suggesting the trend was for classes with more students to have fewer BIRs.

Table 1

Descriptive Statistics regarding Grades and BIRs

Class		N	Mean	Standard Deviation
Language and Literature	Class Size	188	21.50	3.13
	Grades	188	65.62	21.10
	BIR	188	.059	.26
Math	Class Size	187	23.05	3.54
	Grades	185	55.65	25.47
	BIR	188	.059	.26
Science	Class Size	188	27.98	3.73
	Grades	169	71.17	22.75
	BIR	188	.032	.18
Individuals and Societies	Class Size	188	27.91	2.96
	Grades	179	71.34	18.51
	BIR	188	.048	.30

Table 2

Correlations between Class Sizes, Grades and BIRs for Entire Sample and Core Courses

Classes	All Classes	N	Language and Literature	n	Math	N	Science	N	Individuals and Societies	N
Correlations										
Grades	.109**	720	.545**	188	-.393*	184	-.121	169	-.006	179
BIRs	-.065	751	-.283**	188	.014	187	.025	188	.017	188

**= significant at the .01 level

Perceptions Regarding Class Size

Students and teachers in the classes from which Quarterly assessment grades and BIR data were collected also were surveyed to learn more about their perceptions of the impact of class size on learning, behavior and achievement. Results of the surveys follow.

Student Data

Students' responses to the seven survey items are summarized below in Table 3. The items assessed their views about their perceptions of student behavior, achievement and classroom climate variables in their existing classes and possible ratings ranged from 1= highly disagree to 5= highly agree.

Table 3

Descriptive statistics for Student Survey Items 1-7 Broken Down by Core Classes

	n	Mean	Standard Deviation	Range
Item 1 Content is presented in a way that is easy to understand.				
Language and Literature	187	3.96	.95	1-5
Math	187	3.90	.99	1-5
Science	188	3.60	1.34	1-5
Individuals and Societies	188	4.23	1.00	1-5
Item 2 Students in this class treat others, including adults, respectfully.				
Language and Literature	188	3.07	1.21	1-5
Math	186	3.43	1.12	1-5
Science	188	2.82	1.29	1-5
Individuals and Societies	188	3.71	1.11	1-5
Item 3 Students in this class have good behavior.				
Language and Literature	188	3.02	1.14	1-5
Math	187	3.27	1.02	1-5
Science	188	2.80	1.30	1-5
Individuals and Societies	188	3.78	1.14	1-5
Item 4 The teacher focuses on students social skills (getting along/working together well.)				
Language and Literature	188	3.87	1.04	1-5
Math	187	4.02	.97	1-5
Science	188	3.38	1.29	1-5
Individuals and Societies	8	4.22	.98	1-5
Item 5 The teacher and I have a good working relationship.				
Language and Literature	188	3.95	1.13	1-5
Math	187	4.08	1.04	1-5
Science	188	3.59	1.40	1-5
Individuals and Societies	188	4.27	1.03	1-5
Item 6 I get adequate feedback on my work.				
Language and Literature	188	3.95	1.09	1-5
Math	187	4.01	1.13	1-5
Science	188	3.63	1.37	1-5
Individuals and Societies	188	4.19	1.02	1-5

	n	Mean	Standard Deviation	Range
Item 7 I think this class has a good number of students.				
Language and Literature	188	3.67	1.34	1-5
Math	187	3.91	1.23	1-5
Science	188	2.94	1.44	1-5
Individuals and Societies	188	3.78	1.38	1-5

Student survey ratings (items 1-7) then were totaled to compute a total rating reflecting their feelings about their four particular class. These scores then were correlated with their class sizes for each core area to see if the actual class sizes related to how students felt about the instruction and learning and behavior in those classes. Results follow in Table 4 and indicated that the correlations were statistically significant and negative for math and science classes, suggesting perceptions regarding the effectiveness of instruction and ease of learning in these classes were inversely related to the actual size of the respondents' classes.

Table 4

Correlations between Students' Overall Perceptions and Actual Class Sizes

Class	Mean total perception score (Sum of ratings for survey items 1-7)	s.d.	n	Correlation with Actual Class Size (Pearson Product Moment)
Language and Literature	25.48	5.14	187	.143
Math	26.62	5.14	186	-.193**
Science	22.77	7.27	188	-.227**

Individuals and Societies	28.16	5.26	188	.133
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**= significant at $p < .01$ level

Teacher data

Teachers were administered a similar survey to the one students completed on which they rated their perceptions of the effect of their actual and three ranges of hypothetical class sizes on teaching, learning, classroom behaviors and relationships and communication with students

Descriptive statistics follow in Table 5 for the responses to the six teacher survey items, could range from 1 = it would impact this teaching variable very negatively to 5 = it would affect this teaching variable in a positive manner. The statistics presented describe the 12 teacher respondents' ratings which applied to each of the three hypothetical class sizes, which were 0-10, 10-20 and 20-30. These were selected for analysis and discussion so that the researcher was able to compare "apples to apples" rather than comparing responses about the actual varied sizes of their classes.

Table 5

Descriptive Statistics for Teacher Ratings on Survey Items 1-6 for Hypothetical Class Sizes

Teacher Item 1			
Teaching curricular content			
n=12 for all	Mean	s.d.	Range
Class size 1-10	4.67	.49	4-5
Class size 10-20	4.75	.62	3-5
Class size 20-30	2.00	.60	1-3
Teacher Item 2			
Teaching social skills			
Class size 1-10	4.50	.90	2-5

Class size 10-20	4.75	.62	3-5
Class size 20-30	1.67	.49	1-2
Teacher Item 3			
Managing behaviors			
Class size 1-10	4.83	.39	4-5
Class size 10-20	4.08	1.16	2-5
Class size 20-30	1.50	.52	1-2
Teacher Item 4			
Increasing student achievement			
Class size 1-10	4.92	.29	4-5
Class size 10-20	4.17	1.19	2-5
Class size 20-30	1.58	.51	1-2
Teacher Item 5			
Developing relationships with students			
Class size 1-10	4.92	.29	4-5
Class size 10-20	4.33	.98	2-5
Class size 20-30	1.50	.52	1-2
Teacher Item 6			
Providing adequate instructional feedback to individual students			
Class size 1-10	4.92	.29	4-5
Class size 10-20	4.17	1.19	2-5
Class size 20-30	1.42	.51	1-2

An analysis of variance was computed to determine whether there were statistically significant differences between any of the pairs among the three mean ratings assigned by teachers to the three hypothetical class sizes for each of the six survey items. Results, presented in Table 6 below, indicated at least one pair differed significantly for each of the six items.

Table 6 <i>Results of ANOVA Comparing teacher responses to six survey items across 3 hypothetical class sizes</i>		Sum of Squares	df	Mean square	F	Sig
Teaching curricular content	Between groups	58.72	2	29.36	88.76	.000
	Within groups	10.92	33	.33		
	Total	69.64	35			
Teaching social skills	Between groups	70.39	2	35.19	72.92	.000
	Within groups	15.92	33	.48		
	Total	86.31	35			
Managing behaviors	Between groups	73.39	2	36.69	61.83	.000
	Within groups	19.58	33	.59		
	Total	92.97	35			
Increasing student achievement	Between groups	73.39	2	36.69	62.10	.000
	Within groups	19.5	33	.59		
	Total	92.89	35			
Developing relationships with students	Between groups	80.17	2	40.08	90.70	.000
	Within groups	14.59	33	.44		
	Total	94.75	35			
Providing adequate instructional feedback to individual students	Between groups	81.50	2	40.75	68.96	.000
	Within groups	19.50	33	.59		
	Total	101.00	35			

Follow-up tests (Scheffe) were run to determine which particular pairs of means differed for each item. Results indicated that there was not a significant difference in the teachers' mean ratings for classes with 1-10 or 10-20 students for any of the items. However, their mean ratings for hypothetical classes with sizes of 20-30 differed significantly from those for both smaller sized options (1-10 and 10-20 students) for all six items. The significance levels of those post-hoc comparisons follow in Table 7.

Table 7

Significance Levels of Post-hoc Scheffe Comparisons between Teachers' Mean Survey Item Ratings for Three Hypothetical Class Sizes

Comparison	Class size	Class size	Class size
	1-10 vs. 10-20	1-10 vs. 10-30	10-20 vs. 20-30
Item 1 Teaching curricular content	.939	.000	.000
Item 2 Teaching social skills	.681	.000	.000
Item 3 Managing behaviors	.073	.000	.000
Item 4 Increasing student achievement	.072	.000	.000
Item 5 Developing relationships with students	.115	.000	.000
Item 6 Providing adequate instructional feedback to individual students	.072	.000	.000

Finally, teachers were asked to state the ideal class size for their content and school population and describe why they felt that way. Their responses are listed in Table 8 below.

Table 8

Teacher Estimation of Ideal Class Sizes (Item 7) and Rationale (item 8)

Ideal Class Size	Why
18	easy to manage and give individual help
15-18	less for co-taught, more for advanced
15-16	small groups and behavior more manageable
16-18	more opportunity for differentiation, small groups, relationships, re-teaching
18-20	more individual attention
15-20	cooperative learning and feedback
10 to 20	behavior and low level do best in small class

20-25	smaller for ESOL or SPED
20 or less	behavior and giving help easier
15-20	SPED
15-20	better relationships and feedback
15-20	standard level need more support

CHAPTER V

DISCUSSION

The purpose of this action research study was to determine whether class size was related to student achievement and behavior issues. It was hypothesized that quarterly grades and behavioral incident referrals per student would not correlate significantly with class size in each of four core academic areas (reading, math, social studies and science).

Results from the study indicated that overall, the correlation between class size and grades ($r=.109$) was positive and statistically significant at the $p < .01$ level and the correlation between class size and number of Behavioral Incident Referrals (BIRs) ($r= .065$) was not significant. Thus, overall, null hypothesis 1 was rejected and null hypothesis 2 was retained. In other words, class size was found to be significantly related to grades but not to behavioral incidents warranting documentation with BIRs. In addition, when reviewing data from particular core classes, null hypothesis 1 was rejected for language and literature and math and retained for science and individuals and societies. This result indicated that grades were not significantly related to class size for science and individuals and societies. However, for math, larger classes had lower grades while in language and literature larger class sizes had higher grades. Lastly, Null hypothesis 2 was rejected only for language and literature which interestingly showed that larger classes had fewer behavior issues, but behaviors were not significantly related to class sizes for math, science, or individuals and societies.

Implications

While no causal determinations can be made due to the correlational versus experimental design used, the results of this research imply that future class sizes for language and literature, science, and individuals and societies could remain the same in terms of the effect on students'

grades, while class sizes for math might be reduced to possibly increase students' achievement as reflected in their grades. In the case of language and literature, the results indicated that students enrolled in classes with larger numbers actually had better behavior and grades. These data may be a result of larger class sizes of the advanced level language and literature classes that typically have more students enrolled than the standard level classes. School data confirm that the advanced level classes have fewer behavior issues and higher levels of achievement than classes in which their standard level peers are enrolled. Lastly, smaller class sizes for math could benefit students as the smaller classes were found to have better behavior (fewer BIRs) and smaller math classes were associated with higher grades.

Theoretical Consequences

Overall, the findings of this research study are consistent with related literature concerning the effects of class size. However, some of the data collected were not consistent with what is known about the effect of class size on student behavior and achievement. For example, many studies have indicated that smaller class sizes lead to better achievement and behavior. However, the current finding suggested that was true only for math and the opposite was true for language and literature in terms of students' grades. In terms of behavior, the only significant relationship with class size was found for language and literature, and, interestingly, that relationship was in the opposite direction from what one might expect as larger classes tended to have fewer BIRs. A research brief prepared by The Educational Research Service (ERS) (1987) indicated that the positive effects of smaller class sizes are more evident in the lower grades. Perhaps developmental levels affected the results of this research. If so, results may have been consistent with those reported by the ERS, as this sample contained only sixth graders.

Threats to Validity

There were a few threats to the validity in this study. First, the survey was not administered by the same person to each group of students. Differences in directions or explanations of the items may have affected how students responded to the items. In addition, student responses may have been influenced more by their like or dislike of the teacher than their opinions regarding class size. Another threat to validity was the limited diversity of the sample. Because the survey was given only to grade six students, the results may not apply to other age groups. Furthermore, due to different levels of tolerance for students' behaviors, teachers' behavior incident reports may not have been written for the same reasons or with the same frequency. Finally, because teachers grade their own assessments, scoring may not be consistent between and among teachers of the same content area. Such lack of consistency would affect the reliability of students' grades and the validity of conclusions based on them.

Connections to Previous Studies/ Existing Literature

Previous studies and existing literature do not coincide with the findings of this research. For example, a study on significant life experiences conducted by Stevenson et al. (2014) indicated that smaller class sizes were associated with increased student achievement in math, science, reading, and social studies. However, the results of this study indicated that class size had no significant relationship to achievement in science or social studies and suggested that larger class sizes were associated with better grades and behavior in language and literature and lower grades in math.

Another example of a discrepancy between the findings of this and prior studies is seen in comparing the findings of this study to those of a study conducted in Los Angeles in 2002 which

reported that “class-size reduction helps, and it helps low-income students the most” (People for the American Way, 2002). Considering that approximately 40% of the current sample received free and reduced price meals, the results of this study were not consistent with those of the Los Angeles study.

Implications for Future Research

Future research on the effect of class size on behavior and achievement is warranted to improve teaching, instructional outcomes, and cost-effectiveness of public schools. Results would be more informative if researchers were able to include multiple age groups in the study. Much of the current literature focuses on primary grades; therefore, extending research to include middle and upper grades would be beneficial for future studies. Also, research that includes additional schools in different areas of a school district would be beneficial. This diversity would allow researchers to consider implications of age and other variables such as socio-economic status when interpreting the results.

Conclusions

This study attempted to determine whether class size was significantly related to student achievement and behavior issues at the researcher’s school. Contrary to most of the current literature and results from previous studies, results from the research did not reveal significant relationships between class size and achievement or behaviors in every class in the directions expected. Overall there was a positive and significant-correlation between class size and grades but not BIRs. Results from the study indicated that higher math grades might be associated with smaller class sizes, as expected. However, student performance and behaviors were actually more positive in larger language & literature classes. Further research using a larger and more

diverse samples is needed to clarify the relationships between class size and student achievement and/or behavior in varied subject areas.

APPENDIX A

Dear 6th Grade Core Course Teachers,

I am currently pursuing my Master's Degree in Reading at Goucher University. One of the requirements is to complete an action research project. The Annapolis Middle Administration suggested I focus my research on the impact of class size on learning and behavior.

I have developed a brief survey to assess these issues, which is attached. I would greatly appreciate it if you would be willing to complete and return it to me by 4/29.

I will also be asking 6th grade students to complete a similar survey during their Language & Literature classes about their perceptions related to class size in their core classes. A copy of that information and instructions for the Language & Literature teachers to share with the students is below for you to review.

Please be assured that all data will be confidential and presented in anonymous and aggregated form.

I will take your completion of the survey as indication of your willingness to participate in this voluntary exercise and will gladly share my research paper with you when it is completed. Please feel free to let me know if you are interested by contacting me at hhirschfeld@aacps.org.

Thank you for time and assistance with this action research. If you have any questions please let me know.

Mrs. Hirschfeld

Instructions for 6th Grade Language & Literature Teachers:

As I complete action research, students will be asked to complete a short survey on class sizes regarding each of their core classes. Thank you very much for allowing me to take some of your class time and for introducing and asking students to complete the survey regarding each of their core classes.

In order to keep the data organized, students will receive 4 copies of the survey, one for each core class. Please make sure students include their name, the class they are describing, its teacher, and the period number for which they are in the class on EACH survey. To make this easier, all students should complete the Language & Literature, Math, Science, and Individuals & Societies surveys at the same time and in that order. The number of students in each class will be added to the data by me later. If you have any questions please let me know.

APPENDIX B
Parent Letter

Dear Parents,

I am currently pursuing my Master's Degree in Reading at Goucher University. One of the requirements is to complete an action research project. The focus of my action research is the relationships between class size, learning and behavior and I will be gathering teachers' and students' perspectives to learn more about this.

To help me learn more about this and complete this project, all 6th grade students will be asked to complete a brief survey during their Language & Literature classes about class sizes in all of their four core classes. The survey will ask for information regarding class sizes only and no personal or identifiable information will be shared or reported in any way.

I anticipate administering the surveys on 4/22/16 and 4/25/16. If you have any questions or are interested in learning about my findings, please email me at: hhirschfeld@aacps.org or call 410-267-8658. Thank you (and your student) very much for your help with this endeavor.

Sincerely,

Mrs. Hirschfeld

APPENDIX C
Teacher Survey

Teacher name: _____

Class/Subject taught: _____

Number of sections taught: _____

Directions:

Assuming you were assigned your usual or a typical mix of students for your school, please use the scale below to indicate how much you feel being assigned each of the class sizes listed would impact the 6 following teaching-related variables.

- 1 = it would impact this teaching variable very negatively
- 2 = it would impact this teaching variable somewhat negatively
- 3 = it would not impact this teaching variable
- 4 = it would impact this teaching variable somewhat positively
- 5 = it would impact this teaching variable very positively

	My actual section 1	My actual section 2	My actual section 3	My actual section 4	Hypothetical Class sizes		
	Period____	Period____	Period____	Period____			
	Class sizes to consider						
	Number of Students	Number of Students	Number of Students	Number of Students	1-10	10-20	20-30
1. Teaching curricular content	_____	_____	_____	_____			
2. Teaching social skills							
3. Managing behaviors							
4. Increasing student achievement							
5. Developing relationships with students							
6. Providing adequate instructional feedback to individual students							
7. What is the ideal class size for your content and this school population?							
8. Please explain your choice for item 7:							

APPENDIX D
Student Survey

Student: _____
Class: _____
Teacher: _____
Period: _____

Directions:

Please give a score from 1-5 for each statement using the following scale.

- 1 = I strongly disagree with this statement
- 2 = I disagree with this statement
- 3 = I neither agree nor disagree with this statement
- 4 = I agree with this statement
- 5 = I strongly agree with this statement

	Response
1. Content is presented in a way that is easy to understand.	
2. Students in this class treat others, including adults, respectfully.	
3. Students in this class have good behavior.	
4. The teacher focuses on students social skills (getting along/working together well.)	
5. The teacher and I have a good working relationship.	
6. I get adequate feedback on my work.	
7. I think this class has a good number of students.	
8. Please explain your choice for item 7:	

REFERENCES

Achilles, C.M.; Finn, J.D.; Pannozzo, G.M. (2003). The why's of class size: student behavior in small classes. Retrieved from:

<http://www.sfu.ca/~jcnabit/EDUC220/ThinkPaper/FinnPannozzo2003.pdf>

Anne Arundel County Public Schools (2015). Student handbook. Retrieved from:

<http://www.aacps.org/>

Anne Arundel County Public Schools (1999). Positive behavioral interventions and supports.

Retrieved from: <http://www.aacps.org/student-services/pbis.asp>

Brandts, L. M. (2011). Teacher perception on how the elimination of california class size reduction program impacted teacher practices (Order No. 3479697). ProQuest Education Journals. (896960562). Retrieved from:

<http://search.proquest.com/goucher.idm.oclc.org/docview/896960562?accountid=11164>

Educational Research Service (1987). Class size: what's the story? A research brief. Retrieved from: <http://eric.ed.gov/?id=ED304762>

George, D. (2016). Record year for public school enrollment in Maryland. Retrieved from

https://www.washingtonpost.com/local/education/record-year-for-public-school-enrollment-in-maryland/2016/01/20/8b8d8768-bec4-11e5-83d4-42e3bceea902_story.html

Krieger, J.D. (2002). Teacher/student interactions in public elementary schools when class size is a factor. Retrieved from: <http://eric.ed.gov/?id=ED479874>

National Council of Teachers of English (2014). Why class size matters today. Retrieved from:

<http://www.ncte.org/positions/statements/why-class-size-matters>

- People For the American Way (2002). An urgent crisis, an effective and affordable remedy. amendment 9: the campaign to reduce class size and put florida's children first. Retrieved from: <http://eric.ed.gov/?id=ED498134>
- Schanzenbach, D.W. (2014). Does Class Size Matter? Boulder, CO: National Education PolicyCenter. Retrieved from <http://nepc.colorado.edu/publication/does-class-size-matter>.
- Smith, M.; Glass, G. (1979). Relationship of class-size to classroom processes, teacher satisfaction and pupil affect: a meta-analysis. Retrieved from: <http://eric.ed.gov/?id=ED190698>
- Stevenson K.T., Peterson M.N., Carrier S.J., Strand R.L., Bondell H.D., Hathaway K.T., Moore S.E. (2014). Role of significant life experiences in building environmental knowledge and behavior among middle school students. *The Journal of Environmental Education* 45(3). Retrieved from: <http://dx.doi.org.goucher.idm.oclc.org/10.1080/00958964.2014.901935>
- Strauss, V. (2014). Class size matters a lot, research shows. The Washington Post. Retrieved from: <https://www.washingtonpost.com/news/answer-sheet/wp/2014/02/24/class-size-matters-a-lot-research-shows/>