Educational Vouchers and Academic Performance

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Abstract

Every time our elected representatives are looking at a budget, or election time rolls around, or a family is considering moving, the topic of education is in the thoughts and on the minds of many. Over the years there have been many different education reforms and proposed ideas. This presentation will go in-depth into one such educational reform idea. Educational vouchers have been studied in various ways over the years; the data for this study comes from Milwaukee, Wisconsin and was gathered over the course of five years. The data gathered allows one to compare students in Milwaukee Public Schools and students that went to various other (mostly private) schools by the means of a voucher and compare their performance on standardized tests. Different grades, ethnicities, and genders seem to respond differently to vouchers. Now the question is: why?

Introduction

Education is a topic that is brought up almost every year by politicians and local governments. There are always problems and potential solutions. Yet why is education such a common and volatile issue? The answer is because it is a commonly known fact that the education we get can and will affect us for the rest of our lives. The following factors and more go into consideration when deciding the quality of the school and the education it can give the students: bullying; how much money the school has for books, desks, school supplies, heating the school in the winter, air conditioning in the spring and sometimes fall, money for well trained staff and teachers, computers, library, and much more; if the school is safe from things like bomb threats, school shootings, and riots; if there are frequent fights; number of students per teacher ratios; teaching style; and how active the parents are. Many people including parents, students, teachers, administrators, and politicians have been concerned about the quality of education in

schools across the nation. In response to this concern there have been many strategies executed and/ or developed to improve schools. Some education reforms have been: Kentucky Education Reform Act, Site-Based Management, Charter Schools, Vouchers, Elementary and Secondary Education Act, Standards Movement, Goals 2000, Privatization, Home Schooling, and No Child Left Behind Act.

Vouchers have been a topic of conversation and a reform idea since the early 1950's. Vouchers are one way of making schools more competitive. Vouchers do this by changing how schools generate their income. Currently in most situations schools gets a certain amount of money from the government, then they have to spend that money, and show how they spent it before the end of their fiscal year. With vouchers the money would be more attached to the student per se. The government would give the money or a voucher, which would be financed by taxes; to the parents then the parents would decide where to send their children to school. The schools that the parents decide on would be essentially getting the tax dollars. The more students a school has enrolled the more money they would have. Thus public schools would have to compete for students against other public schools and private schools.

Literature Review

The competitive aspect of vouchers assumes that parents would strive to find the best school for their children and thus better their child's quality of education. Eysenbach (1974) looked at vouchers from an economic standpoint. Though the eyes of an economist education would no longer be a system but rather would be a "market" with supply and demand. Parents would become the "consumers". Essentially the parents would be shopping for schools similar to how parents shop cereal for their children. The parents would be the consumers and make the

final decisions yet the children's opinion would be weighed. Then schools, just like cereal, would have to advertise and compete. Often when parents look at cereal, even the best cereal, if it is too expensive, they many times do not buy. Eysenbach also looked into what the price of vouchers would have to be in order to work. In 1974 he estimated that price attached to each voucher could be anywhere between $100 for minimal budgets to $600 for larger budgets. Yet much has changed since the 70s and Eysenbach did not attempt to show a correlation between vouchers and academic performance.

One of many hurdles to overcome when studying vouchers and academic performance in the United States is figuring out how to study vouchers because there are no universal voucher systems in place. Milwaukee, Wisconsin, is the most studied voucher system to date. The Milwaukee voucher system started in the early 1990s and is still in place today. It is not universal, rather parents must apply for their children to receive a voucher. Only families below a defined poverty threshold qualify for vouchers. After getting accepted the parents get to pick which one of the "choice" private schools to send their child(ren) to. In comparison a universal voucher system would include every school in the district. It would essentially have all schools have open enrollment, where the parent could pick any school in the district to send their child(ren) to with the government voucher paying for it.

In the hope of showing that vouchers are worth the government money Howell et al. (2000) attempted to find a correlation between vouchers and academic performance. The method used to do so was the following. In Dayton, Ohio; New York City, New York; and Washington, D.C. they had applicants take a pre-test, which was the Iowa Test of Basic Skills. Then had parents and students take a survey, which was followed by a lottery that decided what applicants would get the vouchers. They followed up with both the applicants that did and did not get

vouchers. Thus those who did not get vouchers became the control group and those that did get the vouchers became the experimental group. After the first and second years they followed up with all applicants by having them take the Iowa Test of Basic Skills. They succeeded in finding statistically significant results for African American students that got the vouchers but not for any other ethnic group or variable. Meaning other than for African Americans there was no statistically significant difference between students that received vouchers and those that did not.

Due to these unique results Krueger and Zhu (2004) wanted to take another look at the Howell et al. (2000) study. They were able to get the data for the New York City study. By focusing on only the New York City portion they hoped to find more significant results. Though they would be working with a smaller sample size they thought that some of the cases that were excluded before because of some missing data could be added back in and maybe they would find more statistically significant results. They did find slightly more significant results but not enough to actually prove anything more than the previous study by Howell et al. (2000).

Rouse (1998) also tried to discover significant evidence to prove or disprove the hypothesis that vouchers positively affect academic performance specifically in the Milwaukee. There were two control groups one of non-selected applicants and the other were students randomly selected from Milwaukee public schools. The experimental group was the whole population of students given and using vouchers. The findings concluded that students in private schools and those given vouchers preformed better in math than those that were randomly selected from Milwaukee public schools. The test results for reading were not consistent enough to infer anything.

Because there has been no large amount of evidence that vouchers actually help or hinder students there was a call for more study on the voucher system in place in Milwaukee. To answer

that call there is a study currently going on. It is longitudinal. It is in the first of five years, thus there is not much to report yet. The methodology is to have three sample groups where one group is made up of students using the vouchers in private schools this group is matched with students of similar background and ethnicity from the public schools. Then the last group consists of just a random sample of students from public schools. This study will be helpful when it is complete. Yet when it is complete due to confidentiality the names of the students or the schools cannot be released. Thus it will be harder if not impossible to see differences based on schools.

Campbell (2005) took a different approach to vouchers and tried to find evidence on those who were most likely to use vouchers. Campbell had the support and cooperation of the Children's Scholarship Fund. The Children's Scholarship Fund was the organization that was selecting, providing, and funding the vouchers. The method Campbell used was defined by using three different subject groupings; those that were eligible non-applicants, applicants, and voucher users. All of the subjects were given similar surveys in order to find out the demographics, backgrounds and ethnicities. They found that families with lower incomes and families that are either Catholic or Evangelical Protestants are more likely to apply for and to use vouchers. Findings also showed that ethnic minorities are more likely to apply for vouchers but less likely to use them. The results of this study then sprouted other questions.

One question: would enacting a universal voucher system be just like giving public money to religious organizations? In a way, yes, it could be seen as giving government money to religious organizations, but it can also be looked at as offering more freedom of choice for those who cannot afford the education they want for their children. This freedom leads to another question: would a universal voucher system make schools less diverse and more segregated by ethnicity? Is it a trade off between choice and equality? Ladd (2002) looked at the idea of

diversity or lack of diversity in public schools as they are now and then how that could change with a universal voucher system. Ladd found that with the voucher system there would be less diversity in schools because of how parents decide where to send their children to school. Many times parents judge a school by the students that attend the school. Thus low- income students may end up in one school more than others more than if the current system stays in place.

All in all is a universal voucher system better or worse than our public school system? Whitte (2001) tried to evaluate this. He believed that the voucher system has its place and its benefits. He reasoned that a national voucher system set up like the Milwaukee system is probably best for all. It maintains diversity while giving those beneath the poverty level an opportunity to have the same quality education as those that could afford private schools.

There is still no answer to the main question of this project: do vouchers have an effect (positive or negative) on academic performance or achievement? In hopes of finding other potential intervening variables, other possible explanations for the results, and other possible ways of studying this phenomenon, I look more deeply into the study done by Witte and Sterr in 1995.

Methods and Analysis

Data Source

The data used was from the study of *Milwaukee Parental Choice Program* done by John F. Witte, Troy D. Steer, and Christopher A. Thorn. They did a study of the vouchers being used in Milwaukee, Wisconsin in 1990 though 1995. The program gave vouchers for Milwaukee Public School children in poor families, or families just barely above the poverty line, to apply, receive, and choose out of some Choice (Private) Schools to attend with the voucher. The study took the population of students who received and used the voucher and tested them with

standardized tests. They also recorded other descriptive data from these students. Then they also had students in the Milwaukee Public Schools (MPS) take the same standardized tests. Thus allowing the voucher students to be compared to the MPS students.

Method

The data was divided into many different files: descriptive and test data was in separate files based on year of testing and MPS student or voucher student. In order to compare the MPS and voucher students one SPSS file was created by merging descriptive and test data for 1994. After matching the students' descriptive and test data there were some interesting revelations. Such as why there were students over the age of 16 all the way to the age of 25 that were still in grade school and were test subjects. In hope of controlling the age range only students that were 16 and under were used for the following results. Data management is illustrated graphically in Appendix A (Figure 1).

Analysis

Due to varying results based on grade and the significance of vouchers other variables were analyzed in hope of finding the reason for the varying results.

Gender Differences

Reading scores for males only tended to overall lean towards MPS students doing better with an average mean difference of 5.075 (See Table 1). Second grade and fifth grade MPS students did significantly better in reading than voucher students. Yet in eighth grade voucher students did slightly better than MPS students on reading scores.

(Table 1 about here)

Reading scores for females only again tended to overall do slightly better in MPS schools with an average mean difference of 1.16 (See Table 2). In second grade MPS students preformed

significantly better than voucher school students though in third, fourth, and eighth grade voucher students did perform better it just was not significantly better. Yet the mean difference for the eighth graders is rather high at -10.06765.

(Table 2 about here)

Math scores for males only tended to do better in MPS schools with an average mean difference of 2.9 (See Table 3). Only in fifth grade did MPS students do significantly better on math tests. Where as voucher students did slightly yet not significantly better in first and sixth grades.

(Table 3 about here)

Math scores for females only, is the first time that test outcomes lean towards voucher students with an average mean difference of -.2125 (See Table 4). The only significant results were in favor of voucher students in eighth grade. For math scores grades fourth, sixth, and seventh voucher students tended to do better than MPS students. Thus overall females showed better academic performance in math when they were in voucher schools.

(Table 4 about here)

As shown when it comes to gender differences fifth grade males tend to perform better in MPS and eighth grade females tend to perform better in voucher schools.

Ethnicity Differences

Reading scores for Caucasian students only had very low sample sizes the highest sample size for Caucasian students in voucher schools were two students in any given grade (See Table 5). Yet, in fourth and sixth grades voucher students did tend to do better on reading scores than MPS students. Also there could not be any comparison made between Caucasian students in eighth grade in voucher schools or MPS because there were no Caucasian voucher students 16

years of age or under in which to get test scores from. Thus showing that Caucasians were less likely to apply for and use the voucher in 1994.

(Table 5 about here)

Math scores for Caucasians students had very low sample sizes just like the reading scores for Caucasians (See Table 6). Sample sizes got so low that there are actually once again no Caucasian students in voucher schools in eighth grade. Though still in first, fourth, and sixth grades Caucasians tended to do better in math in voucher schools. Still, due to low sample sizes for Caucasions it is difficult to conclude and real results.

(Table 6 about here)

Reading scores for African Americans only shows that overall African Americans did better in voucher schools with an average mean difference of -1.39 (See Table 7). African American students did significantly better in voucher schools in eighth grade. Which is very similar to the results for females in eighth grade. Also African American students did slightly better in voucher schools in first and third grades.

(Table 7 about here)

Math scores for African Americans only showed the largest tendency for students to do better in voucher schools with an average mean difference of -2.56 (See Table 8). Again in eighth grade African American students had significantly better results when in voucher schools. All other grades besides second and fifth African American students tended to do slightly better in voucher schools as well.

(Table 8 about here)

Reading scores for Spanish Surnamed students only showed that overall they did better in MPS schools with an average mean difference of 7.9697 (See Table 9). This average mean

difference is the highest difference of this analysis. The two grades that helped create this large difference are second grade and fifth grade where Spanish Surnamed students did significantly better in MPS. Yet, in first and fourth grades Spanish Surnamed students showed a tendency to do well in voucher schools.

(Table 9 about here)

Math scores for Spanish Surnamed students only again showed that overall they did slightly better in MPS with an average mean difference of 1.6666 (See Table 10). For Spanish Surnamed students on math scores there were no significant results yet in first and fourth grades they tended to do slightly better in voucher schools.

(Table 10 about here)

Discussion

The results above show no clear pattern. The results for African Americans were very similar to the results found for females. With further analysis, it was discovered that majority of African Americans in this study were female. Though it is uncertain which has a greater affect on test results, ethnicity or gender. If there were a larger sample sizes it would be nice to compare the affects of ethnicity and gender to see which one is stronger. One weakness of this study is the small sample size. When analyzing Caucasians in eighth grade there were no students in the voucher group that fit the requirements to be compared to the MPS students. Yet to keep in mind, a large strength is that this study has the entire population of students that received vouchers in Milwaukee, WI from 1990 though 1995. Though the fact that this is the entire population of voucher recipients can be a problem when wanting to generalize these results to other areas and other voucher systems.

Many things are also specific to this study such as the guidelines that determined which families and students were eligible for the vouchers. In Milwaukee the only students eligible were those in families that were below the poverty level. Also in Milwaukee there were guidelines for what schools the parents could choose from to send the students to with the vouchers. Those schools were called “choice schools”. These requirements were unique to this study where as in many other studies like Campbell (2005) the vouchers were given out by an outside organization, not the government, and thus did not tend to have as many limitations on the schools or limits on what schools the parents could choose to send the student to with the voucher money.

Conclusion

Like many other previous studies done on the effects of vouchers, there are mixed and nowhere near solid results. The longitudinal study currently being done in Milwaukee will hopefully shed more light on the impact of vouchers on academic performance. Milwaukee in a voucher program has been in place, funded by the government, for over fifteen years. That within itself is reason enough to encourage more study and analysis of the impact of vouchers. Another possible impact of vouchers may be found by comparing districts that do not have a voucher system in place to one that does and see if the academic performance is higher in districts that have more of a competition because of vouchers than those that do not. Though this is just one of many ways that more research should be done on the topic of educational vouchers and their impacts. The educational reform idea of vouchers is old, the importance is current. Just recently the voucher system that has been in place in Washington D.C. is in the process of being reconsidered (Dillon, 2009). The legislature may choose to discontinue this program.

Appendix

Table 1: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Reading Scores Males Only

Grade	MPS Sample	Voucher sample	MPS Reading Standard Score Mean	Voucher Reading Standard Score Mean	Reading Standard Score Mean Difference	MPS Reading National Percentile Rank	Voucher Reading National Percentile Rank	Reading National Percentile Rank Mean Difference
1	85	16	70.8471	70.7500	.09706	35.5059	33.6875	1.81838
2	183	20	87.1148	75.7500	11.36475**	37.7486	18.4500	19.2986**
3	99	14	97.1818	90.8571	6.32468	31.2424	22.0714	9.17100
4	70	20	105.4857	101.9500	3.53571	26.5000	21.8000	4.70000
5	271	18	128.8339	118.0556	10.77839**	44.8081	28.9444	15.86367**
6	136	16	128.9559	123.7500	5.20588	29.5985	24.0625	5.53604
7	275	20	147.2000	143.6000	3.60000	40.1855	34.9500	5.23545
8	135	9	151.5185	151.7778	-.25926	33.4519	32.0000	1.45185

Significance: .05 *
.01 **
.001 ***

Table 2: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Reading Scores Females Only

Grade	MPS Sample	Voucher sample	MPS Reading Standard Score Mean	Voucher Reading Standard Score Mean	Reading Standard Score Mean Difference	MPS Reading National Percentile Rank	Voucher Reading National Percentile Rank	Reading National Percentile Rank Mean Difference
1	74	31	72.3784	70.1613	2.21709	38.9459	32.7742	6.17175
2	147	28	91.8299	84.3571	7.47279*	46.3741	32.2500	14.12415**
3	87	20	100.8276	102.8500	-2.02241	37.5632	41.4000	-3.83678
4	92	26	109.8043	111.0000	-1.19565	33.9348	33.6538	.28094
5	261	7	129.3678	123.7143	5.65353	45.0536	39.0000	6.05364
6	141	8	135.1489	134.0000	1.14894	36.8936	34.1250	2.76862
7	285	13	148.8632	142.6923	6.17085	41.8252	34.7692	7.05594
8	136	15	154.1324	164.2000	-10.06765	36.5899	48.6000	-12.01007*

Significance: .05 *
.01 **
.001 ***

Table 3: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Math Scores Males Only

Grade	MPS Sample	Voucher sample	MPS Math Composite Standard Score Mean	Voucher Math Composite Standard Score Mean	Math Composite Standard Score Mean Difference	MPS Math National Percentile Rank	Voucher Math National Percentile Rank	Math National Percentile Rank Mean Difference
1	73	16	73.0548	73.9375	-.88271	34.6575	3.45000	.15753
2	129	19	96.5659	92.7368	3.82905	53.3566	41.2105	12.14606
3	25	14	99.4000	96.7857	2.61429	30.9200	23.4286	7.49143
4	20	20	113.8500	108.7500	5.10000	35.4500	25.1500	10.30000
5	264	18	131.6364	123.2222	8.41414**	48.0379	29.3889	18.64899**
6	53	16	131.0943	133.2500	-2.15566	26.8333	31.5000	-4.66667
7	163	20	151.7607	148.4000	3.36074	44.4724	35.9500	8.52239
8	72	9	160.4167	157.4444	2.97222	42.0972	35.8889	6.20833

Significance: .05 *
.01 **
.001 ***

Table 4: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Math Scores Females Only

Grade	MPS Sample	Voucher sample	MPS Math Composite Standard Score Mean	Voucher Math Composite Standard Score Mean	Math Composite Standard Score Mean Difference	MPS Math National Percentile Rank	Voucher Math National Percentile Rank	Math National Percentile Rank Mean Difference
1	60	31	75.9500	73.9677	1.98226	41.3833	33.2903	8.09301
2	113	27	97.5841	93.7037	3.88037	56.6637	46.4444	10.21927
3	20	20	101.8500	101.1500	.70000	38.5000	34.2500	4.25000
4	26	26	114.3462	115.3077	-.96154	37.4615	37.9615	-.50000
5	261	7	132.2720	129.1429	3.12917	50.3218	43.2857	7.03612
6	27	8	138.1852	138.5000	-.31481	36.7407	37.0000	-.25926
7	191	12	151.9529	153.0000	-1.04712	43.9219	47.1667	-3.24479
8	77	15	156.4545	165.6000	-9.14545*	35.3797	48.6000	-13.22025*

Significance: .05 *
.01 **
.001 ***

Table 5: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Reading Scores Caucasians Only

Grade	MPS Sample	Voucher sample	MPS Reading Standard Score Mean	Voucher Reading Standard Score Mean	Reading Standard Score Mean Difference	MPS Reading National Percentile Rank	Voucher Reading National Percentile Rank	Reading National Percentile Rank Mean Difference
1	36	2	79.9722	74.0000	5.97222	53.1111	40.5000	12.61111
2	98	2	97.9592	81.0000	16.95918	55.7551	26.5000	29.25510
3	30	1	106.7667	94.0000	12.76667	48.4667	21.0000	27.46667
4	30	1	113.4333	132.0000	-18.56667	39.5667	72.0000	-32.43333
5	169	2	138.6805	128.0000	10.68047	59.4615	43.0000	16.46154
6	62	1	142.1774	143.0000	-.82258	47.2581	48.0000	-.74194
7	149	2	157.4631	148.0000	9.46309	53.3356	44.5000	8.83557
8	55	0	167.0000	--	--	51.7455	--	--

Significance: .05 *
.01 **
.001 ***

Table 6: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Math Scores Caucasians Only

Grade	MPS Sample	Voucher sample	MPS Math Composite Standard Score Mean	Voucher Math Composite Standard Score Mean	Math Composite Standard Score Mean Difference	MPS Math National Percentile Rank	Voucher Math National Percentile Rank	Math National Percentile Rank Mean Difference
1	30	2	80.0000	80.5000	-.50000	52.2333	52.5000	-.26667
2	89	2	100.5843	89.5000	11.08427	63.0000	33.5000	29.50000
3	10	1	109.1000	102.0000	7.10000	55.7000	34.0000	21.70000
4	15	1	118.6000	120.0000	-1.40000	45.8000	50.0000	-4.20000
5	169	2	138.9586	133.0000	5.95858	62.8107	52.0000	10.81065
6	17	1	143.7647	150.0000	-6.23529	48.1176	65.0000	-16.88235
7	102	2	158.2451	156.0000	2.24510	55.2353	51.0000	4.23529
8	29	0	171.6897	--	--	59.1034	--	--

Significance: .05 *
.01 **
.001 ***

Table 7: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Reading Scores African Americans Only

Grade	MPS Sample	Voucher sample	MPS Reading Standard Score Mean	Voucher Reading Standard Score Mean	Reading Standard Score Mean Difference	MPS Reading National Percentile Rank	Voucher Reading National Percentile Rank	Reading National Percentile Rank Mean Difference
1	97	37	68.0103	68.7297	-.71942	30.1649	29.7297	.43522
2	204	34	84.3235	79.8529	4.47059	33.6667	25.1176	8.54902
3	127	23	97.1260	100.5652	-3.43923	30.8425	37.7826	-6.94009
4	108	38	106.6204	105.6842	.93616	28.7593	26.6053	2.15400
5	302	20	122.9503	122.3500	.60033	35.6159	33.3500	2.26589
6	158	16	127.0443	124.6250	2.41930	26.5157	25.3750	1.14072
7	318	24	143.3396	140.9167	2.42296	35.0658	31.7917	3.27416
8	164	16	146.8720	164.6250	-17.75305***	28.4132	48.8125	-20.39933***

Significance: .05 *
.01 **
.001 ***

Table 8: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Math Scores African Americans Only

Grade	MPS Sample	Voucher sample	MPS Math Composite Standard Score Mean	Voucher Math Composite Standard Score Mean	Math Composite Standard Score Mean Difference	MPS Math National Percentile Rank	Voucher Math National Percentile Rank	Math National Percentile Rank Mean Difference
1	82	37	71.2805	72.5135	-1.23303	30.1098	29.8108	.29895
2	132	32	94.0833	93.6562	.42708	47.6667	45.5625	2.10417
3	29	23	97.4483	100.8696	-3.42129	27.0000	32.4348	-5.43478
4	25	38	111.1600	111.4211	-.26105	30.6000	30.0263	.57368
5	295	20	127.5424	124.0500	3.49237	40.5661	31.7000	8.86610
6	50	16	128.3800	133.3750	-4.99500	21.7843	30.3750	-8.59069
7	197	23	147.9340	150.9565	-3.02251	37.5051	41.4348	-3.92973
8	89	16	152.8764	164.3125	-11.43610**	30.7912	47.5625	-16.77129**

Significance: .05 *
.01 **
.001 ***

Table 9: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994 Reading Scores Spanish Surnamed Only

Grade	MPS Sample	Voucher sample	MPS Reading Standard Score Mean	Voucher Reading Standard Score Mean	Reading Standard Score Mean Difference	MPS Reading National Percentile Rank	Voucher Reading National Percentile Rank	Reading National Percentile Rank Mean Difference
1	14	8	70.8571	77.0000	-6.14286	34.7857	46.7500	-11.96429
2	15	12	95.2667	83.3333	11.93333*	52.0000	30.4167	21.58333*
3	15	10	99.0667	92.2000	6.86667	34.9333	24.7000	10.23333
4	16	7	105.4375	111.0000	-5.56250	26.5625	32.5714	-6.00893
5	41	2	131.4390	93.0000	38.43902**	48.9268	17.5000	31.42683
6	41	7	135.1463	130.7143	4.43206	36.8780	29.1429	7.73519
7	63	6	147.8730	146.1667	1.70635	40.9048	37.1667	3.73810
8	35	7	159.0857	147.0000	12.08571	41.8286	26.5714	15.25714

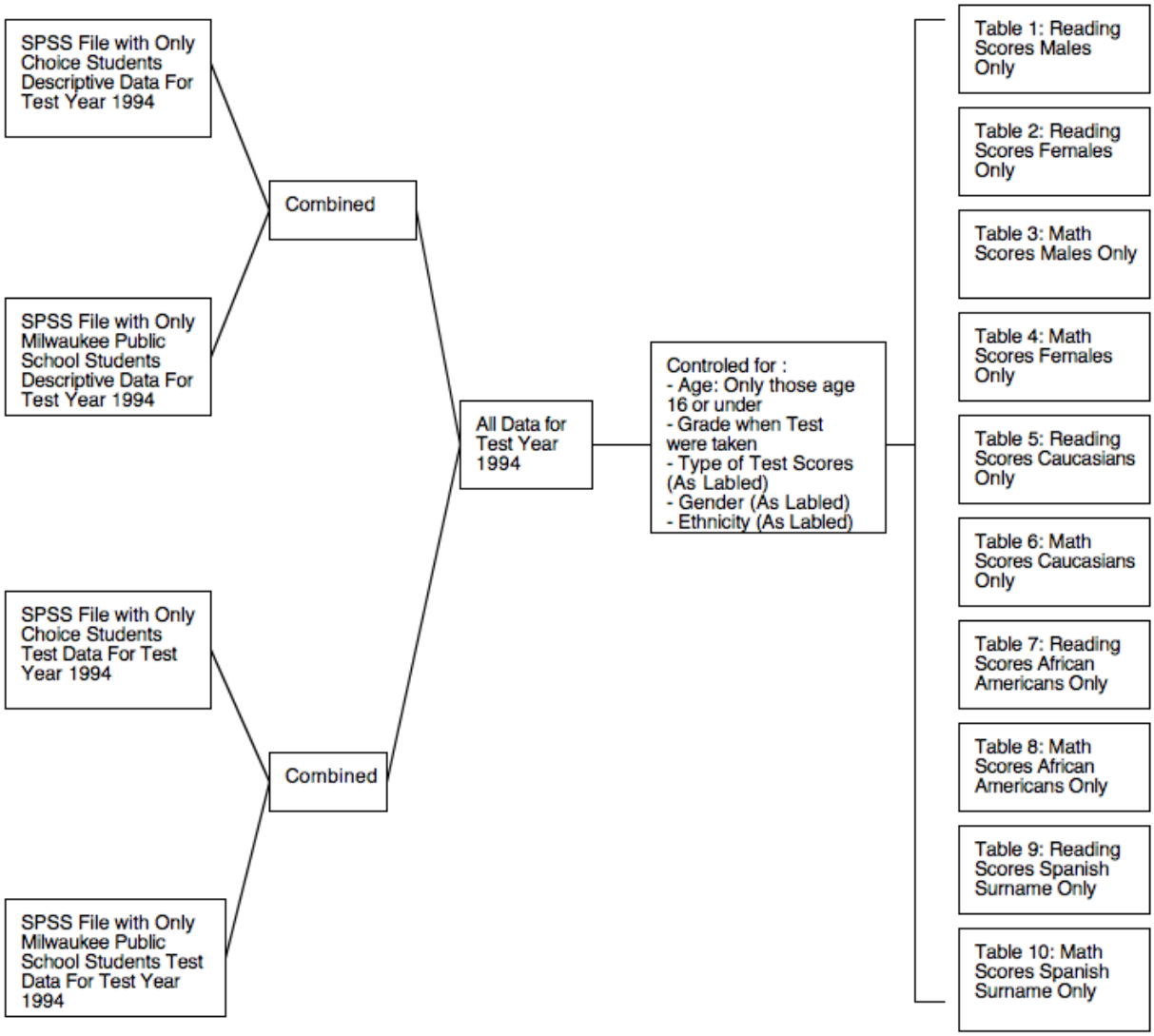
Significance: .05 *
.01 **
.001 ***

Table 10: Difference of Means Analysis by Grade of Milwaukee Public Schools (MPS) and Voucher Students in 1994
Math Scores Spanish Surnamed Only

Grade	MPS Sample	Voucher sample	MPS Math Composite Standard Score Mean	Voucher Math Composite Standard Score Mean	Math Composite Standard Score Mean Difference	MPS Math National Percentile Rank	Voucher Math National Percentile Rank	Math National Percentile Rank Mean Difference
1	14	8	76.2857	79.0000	-2.71429	40.2857	47.0000	-6.71429
2	11	12	98.0000	93.0000	5.00000	57.7273	42.6667	15.06061
3	3	10	96.3333	95.6000	.73333	22.3333	23.3000	-.96667
4	3	7	108.3333	117.0000	-8.66667	22.3333	42.7143	-20.38095
5	42	2	132.2143	128.0000	4.21429	49.3571	38.0000	11.35714
6	10	7	139.0000	136.5714	2.42857	37.4000	35.5714	1.82857
7	36	6	152.3056	142.5000	9.80556	45.0556	26.6667	18.38889
8	22	7	159.8182	157.2857	2.53247	40.2727	33.1429	7.12987

Significance: .05 *
.01 **
.001 ***

Figure 1: Data Managing Process



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