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**THE BERMAN, WEILER STUDY OF  
MINNESOTA STUDENT PERFORMANCE:  
A CRITICAL REVIEW**

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**THE FUTURE OF K-12  
PUBLIC EDUCATION IN MINNESOTA**

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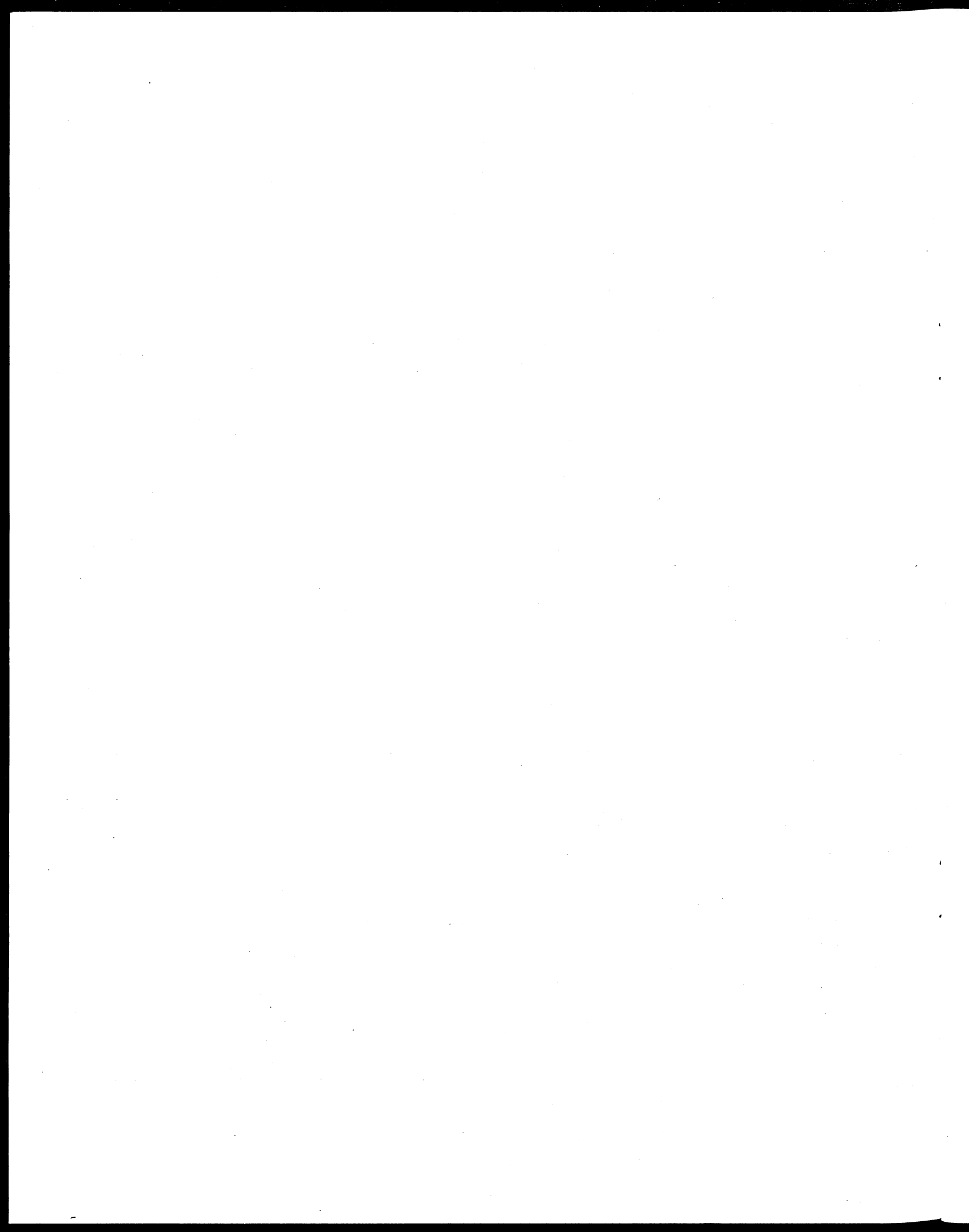
THE BERMAN, WEILER STUDY OF  
MINNESOTA STUDENT PERFORMANCE:  
A CRITICAL REVIEW

by

Edward L. Duren Jr. and Thomas R. Peek

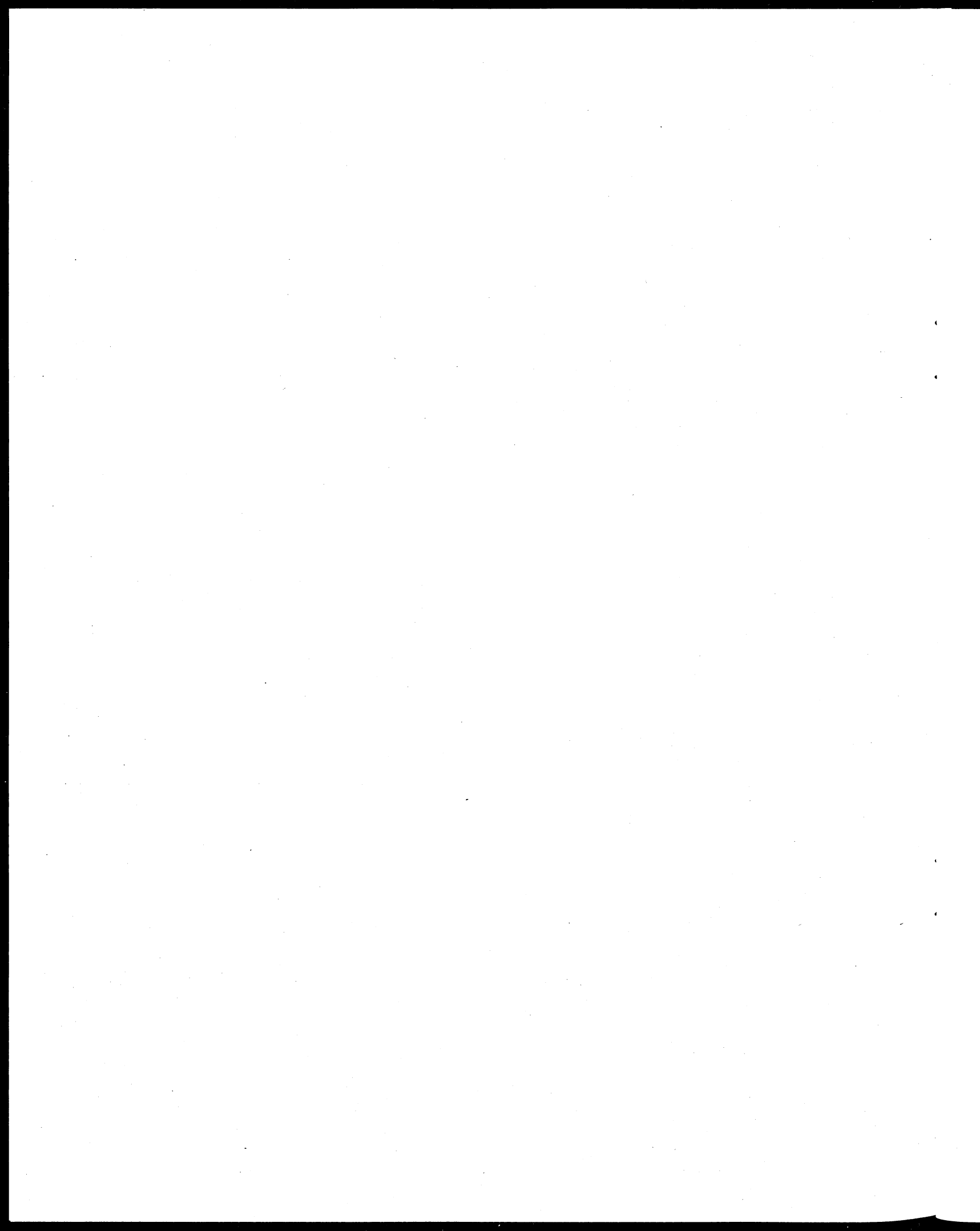
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## FOREWORD

This report grows out of the work of the CURA/College of Education Project on the Future of Public Education in Minnesota. The effort, begun in the summer of 1983, is designed to develop an accurate picture of the current condition of K-12 public schools in Minnesota, examine school reform proposals and their applicability in various Minnesota settings, and develop findings and policy recommendations that reflect an interdisciplinary and integrated examination.

A central component of the project is the University of Minnesota Panel on The Future of Public Education in Minnesota, comprised of faculty from various disciplines within the University who have expertise or interest in state and local education policy. This report is a presentation made by the authors to the University panel on June 6, 1984. It summarizes and critiques an assessment of Minnesota student performance prepared by Berman, Weiler Associates for the Minnesota Business Partnership.

## INTRODUCTION

In the summer of 1983 the Minnesota Business Partnership, a lobbying group representing officers of the state's largest corporations, hired Berman, Weiler Associates of Berkeley, California to conduct a \$250,000 study of Minnesota K-12 education. While the Partnership's interest in education may have been fueled by the growing national debate about educational excellence, their interest in the topic dates back at least to the summer of 1982. At that time, the Partnership hired a local consultant to work with its education task force to examine education spending and finance issues. The broad aims of the current study are (p. i):

1. An objective description of K-12 student performance, and an assessment of how well students are prepared for college, for work, and for citizenship.
2. A diagnosis of the problems and needs of the K-12 system, particularly in key areas amenable to public policy or private assistance.
3. An analysis of ideas for improving the effectiveness, and cost effectiveness, of Minnesota's K-12 schools and for insuring that the Minnesota schools are responsive to future needs.

The study is being conducted in two phases. Phase I consists of an objective description of Minnesota student performance (completed in February 1984) and a description and analysis of changing patterns of costs for Minnesota public education (completed in June 1984). Phase II (scheduled for completion in November 1984) will analyze school-related explanations for any deficiencies in student performance and will propose government and non-government actions for improving Minnesota public education.

As part of the Phase II research, Berman, Weiler surveyed approximately 400 "knowledgeable observers" to identify strengths and weaknesses of Minnesota K-12 public education and collect proposals for improving the system. Personal interviews were also conducted and meetings with panels of experts were held. The Partnership's Educational Quality Task Force, chaired by 3M's Lewis Lehr, is responsible for review of the study in preparation for the Partnership's issuance of policy proposals for the governor and legislature.

This report summarizes that part of the Phase I study assessing Minnesota student performance. In addition, the conclusions of the assessment are critically examined. Specifically, this report reflects examination of Volume 1 ("Summary"), Volume 2 ("Findings") and Volume 3 ("Appendix") of An Assessment of Minnesota K-12 Education, Student Performance in Minnesota. Volume 2, "Findings" is referred to here as the "full

report" because it represents the basic and complete analysis of the assessment. Therefore, this summary focuses on Volume 2 and, except where noted, page numbers refer to that volume.

## LOOKING AT K-12 STUDENT PERFORMANCE IN MINNESOTA

The Berman, Weiler Study of Minnesota Student Performance tries to answer three questions (pp. 1, 2):

- How well are Minnesota K-12 students doing relative to students in the past, in neighboring states, and across the nation?
- How well prepared are Minnesota K-12 students for work and education after high school?
- Do Minnesota K-12 students from different backgrounds and educational experiences perform differently on comparable tests?

In posing these questions the researchers make several observations that are important to keep in mind when examining the data. First, student performance reflects a number of "non-school pressures" which have affected the schools. These include "major demographic and economic changes" and "profound shifts in the social and political climate." Second, differences between the composition of the school population in Minnesota and in the region and nation must be recognized. Third, a statewide perspective necessarily requires the collection and analysis of data that are comparable -- student to student, school to school, district to district, and between Minnesota and other states. These data are generally not as rich as first-hand experiences with students, schools and districts. Fourth, test results by themselves will not be enough and so must be supplemented with relevant "non-test" data that are objective and accessible, such as percent of students receiving high school diplomas. Finally, the researchers note that their study does not examine observational or attitudinal data, such as student study habits or motivation toward work.

The methodology employed by the study includes collection and synthesis of existing information, which was identified with the assistance of a panel of experts. Some of these experts, and others, reviewed drafts of various chapters. In addition the study received feedback from a liason group organized by the partnership that was briefed quarterly.



## IDENTIFYING THE LIMITATIONS OF EXISTING DATA

Most of the study is devoted to an assessment of the existing data on K-12 student performance, particularly the identification of significant limitations. The study's search for information revealed three primary sources of data -- local school district assessments, statewide testing programs, and admissions tests for post-secondary institutions. However, because local district data were not directly or easily comparable on a statewide basis, they were not used in the study.

## CONCLUSIONS ABOUT THE LIMITATIONS OF THE DATA

Perhaps the most significant set of conclusions to be found in the study are the following (p. 29):

- o Minnesota students are tested extensively, but no single data source provides a reliable and conclusive picture of K-12 student performance.
- o A combination of different data bases can support broad inferences about comparative trends in K-12 student performance, but cannot provide exact information to formulate specific policies. For the latter purpose, school factors -- e.g., curriculum, instruction, staff and administrative capability, governance, etc.--must be analyzed directly in addition to this report's assessment of student performance.

The study also notes additional strengths and restrictions of using available data for making statewide conclusions (pp. 29, 30):

- o Student performance data are the most conclusive for secondary and college-bound students, least so for elementary students.
- o Information about employment-bound students is not adequate to support generalizations about the quality of their education.
- o Though the data for comparing public to private schools are limited, some comparisons are possible.
- o Most data in Minnesota concern student performance in basic skills, whereas limited information is available about higher-level skills, though some inferences can be drawn.
- o The data for making international comparisons of student performance are dated and have limited value for the study's purposes.

The Berman, Weiler conclusions regarding the limitations of existing data, while supported in the full report, Volume 2, are further substantiated in the analysis contained in the Appendix, Volume 3.

## WHAT THE DATA TELL US ABOUT STUDENT PERFORMANCE

After identifying the limitations of the data the study draws on the Minnesota Educational Assessment Program (MEAP) and experts' interpretations of MEAP, and college admission tests to find out how Minnesota K-12 students are performing. This information is summarized below.

### The Minnesota Educational Assessment Program

The Minnesota Educational Assessment Program (MEAP) is a statewide testing program designed to evaluate educational programs by measuring student performance against criteria and learning objectives identified by Minnesota Department of Education experts. Modeled after the National Assessment of Educational Progress (NAEP), MEAP tests are given to a sample of students in 4th, 8th, and 11th grades from one third of Minnesota school districts. Science, social studies, music, reading and math are the areas covered by the tests.

Berman, Weiler identify three deficiencies of MEAP tests (pp. 26, 27):

- Because MEAP measures educational programs in a given year its results are comparable only to the extent that they involve identical or almost identical test questions.
- Between test periods the particular experts involved and the judgements of the experts change regarding particular questions. Thus, while questions may not change, the relevance of questions as determined by the experts might change.
- The four year test cycle means data must be collected for two or three decades before trends are evident.
- Often only a small number of MEAP questions are used on the MEAP examinations so that regional and national comparisons can only be suggestive.

Despite these limitations the study says MEAP is useful in that it can "help in formulating a broad picture of student performance in Minnesota." Because of sampling design, MEAP also "can be used confidently to compare test results (for grades 4, 8 and 11) of males and females and of students from districts of different sizes and locations." (p. 27)

The study draws the following conclusions about student performance as measured by MEAP (pp. 37-43):

- Minnesota student performance on MEAP appears to be above the average of a national sample.

- Many national experts, including some who helped design the test, feel national student performance is below what it should be in critically important ways. If this is the case, Minnesota students also may not be performing adequately.
- Minnesota education experts have shown that student improvement is needed in some areas.
- When scores are further analyzed as indicating lower or higher order skills, improvement is needed in higher order skills by 11th graders in reading, math, and perhaps social studies.
- In summary:
 

"The MEAP test results suggest cause for concern, as well as satisfaction. They indicate that generally Minnesota students perform better than similar students in national and central states samples on the same test questions. However, they also point to student deficiencies in various curricular areas. Specifically, Minnesota experts have identified problems in higher-order skills, particularly for high school students." (p. 43)

### College Admission Tests

The Scholastic Aptitude Test (SAT), The Preliminary Scholastic Aptitude Test (PSAT) and the American College Test (ACT) are aptitude tests designed to predict how well a student will fare in college and are used by colleges and universities to assist in determining which students to admit. For the purposes of the Berman, Weiler study these tests have two deficiencies (pp. 27, 28, 60):

- They do not directly measure specific school-related student achievement.
- The number and percentage of students within a state taking each of these tests vary greatly among the states. This can make interstate comparisons of raw scores misleading.

Even so, the study suggests that the admissions tests can be used "for the analysis of the performance of Minnesota college-bound students over time, and in comparison with college-bound students across the nation and in other states." They can also be used "to analyze test results for males and females" and PSAT data can be used "to analyze the performance of students from districts of different sizes and locations, and from private and public schools." (p. 28)

The study suggests that in view of their limitations, available data from admission tests "do not allow a conclusive investigation . . . but sufficient evidence exists to support reasonably confident answers." (p. 47) They suggest this is possible for the following reasons. Fifty-eight percent of Minnesota high school graduates have entered post-secondary institutions, with 35 percent of these entering four year colleges. Virtually

all students going to four year colleges must take one or more of the three admission tests (SAT, PSAT, ACT). These tests are generally standardized so their results allow comparisons over time and tests. Therefore, "though the tests do not directly measure school-related student achievement, these data are nonetheless valuable sources of information about broad statewide trends in student preparation for college and other post-secondary institutions." (p.47)

The study discusses the PSAT and SAT results with emphasis on the latter. These discussions are summarized below.

### PSAT

The PSAT, because it is accepted by most Minnesota colleges, is the most widely taken admission test in the state. Its results indicate the following (pp. 49-52):

- Minnesota students are above average on verbal and math tests. However, with scores ranging from 0-80, Minnesota's scores in the forties are neither extremely low or high. This means Minnesota's PSAT average is not high in absolute terms.
- Data suggest a small decline in Minnesota PSAT averages during the past decade. The indications are, though not conclusive, that the proportion of Minnesota students scoring higher has also decreased during that period.
- Minnesota scores are suggestive only because state test takers are less heterogenous than students across the U.S. If scores were adjusted for the low percentage of non-whites, verbal scores would be closer to the national average, although math scores would still be above average.

### SAT

The study notes that SAT scores are more difficult to compare than those of the PSAT because the low percentage of test-takers in Minnesota suggests that only the most able and high-scoring students take the test. However, the researchers suggest this can be adjusted by constructing a regression line representing that relationship to indicate how Minnesota students might be expected to score if a broader range of students took the SAT. They conclude the following (pp. 49-63):

- Unadjusted, Minnesota students rank 11th in verbal scores and 7th in math. Using the regression analysis, they rank 21st in verbal, and 10th in math.
- Calculations suggest that the state's most able students are doing well but may not have an extraordinary performance compared to the nation. However, the statistical analysis is only suggestive because it does not take into account the size of the test taking population or the variation of scores within states.

- Test scores show a decline over the decade but this may be due to the increased number of test takers in Minnesota. On the other hand this appears to reflect a true drop in the performance of Minnesota's most able students.

### Non-Test Information

At the time the study was completed no data were available indicating the degree to which Minnesota students required remedial coursework in college. However, according to the study, many faculty believe most standard university courses contain a great deal of material that should have been mastered in high school. A number of college and university personnel believe students are deficient in basic skills and that students are less curious and less motivated than in previous times.

### **SUMMARY OF THE STUDY'S FINDINGS REGARDING STUDENT PERFORMANCE**

The researchers completed their study with a summary of conclusions that they say "can be stated confidently" and suggest areas where data are lacking (pp. 83, 84):

- Minnesota students appear to be performing above the national average, though the data for comparisons are weak. In the absence of explicit statements of expectations from the public, post-secondary institutions, and employers, we cannot conclude that the Minnesota average is adequate and that Minnesota's students are generally well prepared for the future.
- The data do not allow many specific conclusions to be drawn about changes over time in the general performance of Minnesota students.
- Minnesota's college-bound students appear to perform about the same as students elsewhere in verbal skills, and this performance is not high.
- Minnesota's college-bound students appear to perform above national and regional averages in mathematics, and their average is good.
- There may be a need to improve the creative thinking and problem-solving skills of high school students. This issue merits attention because these higher-order skills may become essential for future employment opportunities.
- Test scores appear to have declined among the state's most able students, and such a decline may mean that Minnesota is not producing as high a proportion of top scoring students as it once did.
- The available data neither allow reliable comparisons of Minnesota students with students of other nations, nor permit specific conclusions about employment-bound students.

- In science and mathematics, males in secondary schools score higher than females. This test performance gap is particularly large for college-bound students and the state's most able students.
- The average scores of students from cities-of-the-first-class and from smaller out-state districts are generally below those of other districts.
- Although the data for comparing the performance of students from private to public schools are limited, the available data suggest that there is little difference in performance in verbal skills among college-bound students, but that public school students score higher in mathematics than do their private school counterparts.

### EVALUATING THE BERMAN, WEILER STUDY

There are two broad questions to consider when evaluating the Berman, Weiler study of student performance:

- In view of the limitations of the data, can the researchers legitimately draw the conclusions they do?
- To the degree that the conclusions about performance are correct, are the researchers justified in implying that the problems evident in student performance are caused by the schools?

Each of these questions is discussed below, drawing exclusively on the Berman, Weiler study rather than outside data sources.

#### What About the data? Can they conclude what they do?

In the summary (Volume 1), the researchers state the study's findings rather dramatically (pp. 33, 34). They say "there are numerous warning signs":

- **"that Minnesota's advantage may be eroding . . ."** This is based on SAT scores as well as PSAT and ACT scores.
- **"that Minnesota's highest achieving students are not doing as well as they once did . . ."** This is based on SAT scores, particularly as adjusted with the regression analysis.
- **"that high school students may be deficient in higher order thinking and reasoning skills . . ."** This is based on MEAP test results.

These are strong statements, given the highly specific analysis of the limitations of the data. Indeed, in the body of the full report (Volume 2, "Findings"), the researchers are

more equivocal in drawing conclusions than in that volume's summary. Conclusions in the more widely-distributed "Summary" Volume 1 are even more provocative. In both volumes quite a few statements are made which are heavily qualified yet leave the impression that the situation is clearer than is indicated by the researchers' own analysis. They identify the limitations of the data, but then go on to imply conclusions based on that data. For example, on page 30 of the full report (Volume 2):

In summary, despite extensive testing within Minnesota, a comprehensive description of K-12 student performance on a statewide basis requires the drawing together of various data sources, each of which exists primarily for purposes other than the task at hand. The resulting description cannot be definitive, but it can provide a basis for policy making.

What does that last sentence mean? Should policy making occur based on a description of student performance of which we cannot be sure?

Another example is found in the summary of the full report, Volume 2. On page 83 the report states "Minnesota students appear to be performing above the national average, though the data for comparisons are weak." Are the researchers telling us that because the data are "weak" Minnesota students only "appear" to be performing above the national average? Or, are they trying to tell us that, despite the weak data, they think Minnesota students actually are performing above the national average? The summary is replete with this type of vague, qualified conclusion. Yet the researchers say right above those statements "The following findings . . . present conclusions that can be stated confidently . . ." and then further confuse the reader by continuing that sentence " . . . and suggest areas where data are lacking." Are the data clear or aren't they?

A number of differences in Minnesota test scores -- relative to the nation and neighboring states and compared over time-- are identified in the study. What is not made clear is the degree to which those differences are significant. The reader is not given margins of error or other measures of significance which provide a perspective with which to judge the differences.

Further, and related to this point, some of the visual representations of these differences may or may not be misleading. For example, the way in which the reader interprets the drop in SAT scores, illustrated in figures IV-4 and IV-5 of the full report, Volume 2 (pp. 53, 54), in part reflects the scale drawn in the figures. Without knowing the significance of the differences the reader has no way to judge the legitimacy of the scale selected to illustrate the scores.

The researchers, in the conclusions presented in the summary, Volume 1, accept what they call "reasonable predictions about the nature of work in the future." (p. 34) These assumptions are not substantiated by the study. On the contrary, two interpretations about the future of work are briefly described in the study, neither in great detail. In addition, the appearance of this discussion in the conclusion, given its minimal treatment in the study, is puzzling.

Other questions might be raised regarding findings reflecting the use of regression analysis in examining SAT scores or other aspects of the Berman, Weiler analysis. However, this would require evaluation using alternative data sources, an approach beyond the intended scope of this report. Instead, all of the questions raised here relate to the internal consistency of the Berman, Weiler study and the persuasiveness of its findings.

Are the researchers justified in implying that whatever problems are evident in student performance are caused by the schools?

The study strongly implies that the schools are responsible for whatever decline in student performance is evident. For example, it is stated in the summary, Volume 1, that "both the data on student performance and reasonable predictions about the nature of work in the future indicate that Minnesotans are correct in debating the need for improvements in the K-12 education system." (p. 34)

There seems to be an a priori assumption that if student performance is declining the schools are the cause, despite what the researchers say in chapter 1 of the full report (pp 1-18). There they identify a number of factors which they say could affect student performance, but which are beyond the control of the schools. Some of these factors impact the schools directly, such as changes in school enrollments in the past and emerging trends which will affect these enrollments. Others of these factors impact the student population in ways that might affect their performance. These include:

- growth in working-parent households.
- increasing divorce rate and the growth in single-parent families.
- fundamental attitude change, particularly among the young, regarding government, authority and education.
- growth in the importance of television.
- increased exposure to drugs, alcohol and sex.
- changing employment patterns affecting children's attitudes about the kinds of work and post-secondary plans they might pursue.



How can we be sure that these other factors are not primarily responsible for whatever decline has occurred in student performance? Will improvements in the K-12 education system improve student performance if that performance is primarily related to the "non-school pressures" outlined in the study? The researchers do not adequately address these questions. Yet, they strongly imply that reform of the system is necessary.

## CONCLUSION

In short, the Berman, Weiler study of student performance is a thorough examination of the data which currently exist for making comparisons of student performance. The analysis of the limitations of the data is an important contribution to the discussion of public education in Minnesota because so much of that discussion is fueled by concern about student performance, particularly as measured by standardized tests. The study raises many concerns about the quality of those measurement tools as they are currently being used in this public discussion.

Close reading of the study indicates that, unfortunately, it is impossible to make definitive conclusions about student performance in Minnesota on the basis of the existing performance data. What is needed are, first, other measures of performance and second, means of assessing the impact on performance of forces external to the schools and the public education system.

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Center for Urban and Regional Affairs  
University of Minnesota  
1927 5th Street South  
Minneapolis, Minnesota 55454  
(612) 373-7833