

## Reconciliation of Data on Aptitude Test Scores and University Grades of Teachers

*James M. Clark*

National comparisons demonstrate that education students and graduates tend to obtain lower Scholastic Aptitude Test (SAT) scores than noneducation students. Nonetheless some researchers assert that education students also obtain grade point averages (GPAs) equivalent to those of noneducation students at the same institutions and based on the same courses. Clark suggests a reconciliation of these two effects. Specifically, evidence is presented showing that the universities involved in the GPA studies enroll students with low average SAT scores compared to other universities, and also enroll a high percentage of education students. In relatively non-selective universities, education students obtain equivalent GPAs to noneducation students while at the same time they score relatively low with respect to national SAT results that include all institutions. Implications for future research and teacher education are considered.

**T**he academic ability of teachers and student teachers is an important topic that has many educational implications. Teaching is a complex task (e.g., Howey and Strom, 1987; Kagan, 1988; Veenman, 1984), and intellectual abilities are directly relevant to several contemporary developments in teacher education, including efforts to educate reflective teachers (e.g., Clark and Lampert, 1986; Schon, 1987) and to improve connections between academic research and teaching practice (e.g., Clifford, 1973). Studies of the relative academic abilities of teachers have been inconclusive, however, inasmuch as teachers score somewhat lower than national comparison groups on standardized aptitude tests, but obtain grade point averages equal to students from other disciplines. The present paper reviews and reconciles these apparently contradictory results.

### Contradictory Data on Teachers' Aptitude and Grades?

First, consider evidence about the relative academic aptitude of education and noneducation students, remembering that the issue concerns the aptitude of education students relative to other university students, other university-bound students, or graduates. Many of the same studies that demonstrate teacher-nonteacher differences would also confirm that educators have above average ability compared to the general population.

Much evidence indicates that education students obtain relatively low average scores on standardized aptitude measures (e.g., Howey and Strom, 1987; Weaver, 1981, 1983; Savage, 1983). In a detailed review, Weaver (1983) reported that (a) SAT and related aptitude test scores for seniors

choosing education are lower than the national mean, (b) the mean scores for education registrants and graduates are also low, (c) individuals who stay in teaching tend to have lower SAT scores than those who leave teaching, and (d) Graduate Record Examination (GRE) scores for education majors are also low. Such findings are not new. Lieberman (1956), for example, reported that education majors ranked 17th of 20 disciplines on mean intelligence test scores, and that education graduate students ranked 15th of 19 areas.

In apparent contradiction to these findings, other evidence indicates that the GPAs of teachers are comparable to or even exceed those of students in noneducation programs. Matczynski, Siler, McLaughlin, and Smith (1988) summarized the results of existing studies on GPAs and also presented new evidence that education students obtained GPAs equal to or surpassing those of nonteaching students in the same institutions. These findings cannot be explained in terms of different grading practices because the equivalence of education and noneducation students was observed even when only shared courses were considered. Such results appear to contradict evidence that education students obtain lower scores than noneducation groups on the SAT and related aptitude measures. Matczynski et al. (1988) noted several problems with the aptitude research, including possible overdependence on the SAT and inadequate consideration of selection procedures and other factors that could reduce some of the reported differences (e.g., those for high school seniors). They ultimately concluded that education and other university students have equivalent academic abilities.

It is possible, however, that both the aptitude test differences and the GPA

*Clark is Associate Professor, Department of Psychology, University of Winnipeg, Winnipeg, Manitoba.*

equivalence are valid because the two kinds of studies involve different contrasts between education and noneducation students. Specifically, the equivalent GPAs on common courses are obtained from within-institution comparisons, whereas the national aptitude test differences appear in comparisons that collapse across universities. Perhaps the universities used in the GPA comparisons had both relatively low average aptitude test scores as well as a high proportion of education students. Under such circumstances, education students could obtain equivalent GPAs to noneducation students at the same institution and still have low aptitude scores relative to the entire population of students taking the standardized aptitude test. Evidence with respect to this hypothesis can be obtained from institutional data on areas of academic emphasis and average student aptitude levels.

#### Institutional Differences in Education Emphasis and Student Aptitude

To examine possible differences in discipline emphases and student aptitudes, the institutions involved in the GPA research reviewed by Matczynski et al. (1988) were studied. The California State Universities and Colleges (CSU) provide a particularly good test case because (a) they were shown by Cohen (1983; cited in Matczynski et al., 1988) to produce similar GPAs for education and noneducation students, (b) there are many institutions (19), and (c) the University of California (UC, 8 campuses) provides relevant comparison data. The primary data on institutional differences in aptitude were obtained from the 12th edition of the American Council on Education (ACE) guide to American universities and colleges (ACE, 1983) and generally represent figures for 1980, a year close to the period examined by Cohen (1983). Numbers in parentheses represent the  $n$ s (i.e., institutions) on which the summary statistics are based and vary because some information was not available for some schools. Enrollments were 302,188 for CSU (47.4% male) and 131,941 for UC (55.1% male). The campuses were similar in average size, approximately 16 to 17 thousand stu-

dents for both CSU and UC.

The proposed hypothesis assumes that the GPA studies involved institutions with a high proportion of education students. Several findings are consistent with this assumption. Clifford and Guthrie (1988) reported that CSU graduated 75 percent of the teachers educated in California in 1982-83, compared to 5 percent for UC. An examination of the records for graduate degrees awarded at the different institutions also confirmed that CSU schools had a substantially greater role in teacher education than UC (ACE, 1983). The institutions of the CSU system ( $n = 18$ ) granted a total of 9,651 Master's Degrees in 1980 and education accounted for 35.46 percent of this total (3,422 degrees). UC schools ( $n = 7$ ), on the other hand, granted a total of 5,132 Master's Degrees, of which only 2.81 percent (144) were education degrees.

The hypothesis also assumes that the GPA studies involved institutions with relatively low aptitude test scores. Consistent with this assumption, average verbal (V) and mathematics (M) SATs for freshmen were considerably lower for CSU ( $V = 430$ ,  $M = 468$ ,  $n = 13$ ) than for UC ( $V = 504$ ,  $M = 557$ ,  $n = 7$ ) and these differences existed for both males and females, where data permitted such a comparison. Only CSU institutions reported ACT scores for freshmen and these were also modest ( $M = 18.67$ ,  $n = 10$ ). The reliability of these differences is demonstrated by the virtual absence of overlap between the CSU and UC distributions. Only one of the CSU campuses had a mean verbal SAT that overlapped with the low end of the UC verbal SATs, and there was no overlap for the mathematics scale; the highest mean mathematics SAT for CSU was 507 and the lowest mean for a UC campus was 533. To provide additional context for these values, the average SATs for Stanford were 610 and 660 for the verbal and mathematics scales, respectively. None of the CSU or UC schools approached these levels.

Two statistics associated with admissions confirmed that the CSU campuses studied by Cohen were somewhat less selective than those of UC. The mean percentage of applicants accepted was 74.88 for CSU ( $n = 17$ ) and 69.71 for UC ( $n = 7$ ), suggesting that neither

institution was very selective but that CSU was less so. Only a few campuses reported high school percentile ranks, but the mean rank was somewhat lower for CSU ( $M = 78.00$ ,  $n = 6$ ) than for UC ( $M = 88.00$ ,  $n = 3$ ). Overall, CSU scored somewhat lower than UC on these measures, but not dramatically so. Admission rates and percentile levels are difficult to evaluate, however, because the average quality of applicants and of high schools may differ between CSU and UC. Such self-selection could reduce the difference between CSU and UC. Indeed, variability among high schools is one justification for using SAT scores in admissions. Again to provide some context for these figures, Stanford, a selective institution, accepted only 19% of its applicants.

The CSU campuses used in the education-noneducation comparisons of Cohen do not compare favorably with other major universities in California. CSU also appears typical of the institutions involved in the other studies considered by Matczynski et al., although fewer data were available in the ACE (1983) guide for the other five universities (representing 65,012 students, 47.96% male, in four states). As was the case for CSU, education accounted for a high percentage, 38.18 percent (761 degrees), of the 1,993 Master's Degrees granted by the five institutions. ACT or SAT scores were available for four of the five universities. The mean freshman SAT was 441 for the verbal and 488 for the mathematics ( $n = 2$ ) and the mean ACT was 19.94 ( $n = 3$ ). These means are slightly higher than those for CSU but well below the means for UC. The universities for which information was available also had a high mean acceptance rate (74.5%,  $n = 4$ ) and a relatively low mean high school percentile rank (54th,  $n = 2$ ).

These results confirm that the GPA studies compared performance of education and noneducation students within institutions that have low average SATs relative to other universities and that the GPA institutions register a high proportion of education students. Because national SAT comparisons collapse across students from all institutions, education majors obtain relatively low aptitude scores despite

having GPAs equivalent to those of noneducation students in their own institutions.

### General Discussion

The present analysis has demonstrated that lower than average SAT scores for education students can be reconciled with GPAs similar to noneducation students in the same or similar institutions. Equivalent GPAs despite overall SAT differences between education and noneducation students arise from the lower selectivity of institutions with heavy commitments to education (see also Astin, 1965). Several considerations should be kept in mind when considering these data. First, as noted earlier, the differences occur between education and noneducation students or graduates, both groups being relatively select with respect to the general population. Second, as with all group comparisons, differences between means ignore overlap among the distributions. Many education students have academic abilities comparable to students in other disciplines and more selective institutions. Third, ability measures such as the SAT have come under attack for various reasons (e.g., Crouse and Trusheim, 1988; Owen, 1985), including the possibility that they may discriminate against certain test-takers. Given the social and other factors that contribute to participation in education programs, education students may not be fairly assessed by such instruments. Fourth, teaching satisfaction and effectiveness depend on factors in addition to academic ability, and relevant interests and personality characteristics are not necessarily associated with high levels of academic ability.

Given such complications, the observed differences between teachers and nonteachers should be interpreted cautiously. Nevertheless, the findings have both practical and theoretical implications. Educational institutions might reflect about their selection processes and consider how intellectually suited education students are for teaching, how candidates with higher aptitudes could be attracted to teaching, and how education programs might strengthen the intellectual aptitudes of education students. Such self-reflection

is seldom easy, but the academic ability of teachers is potentially of such importance to society that it would be unwise to ignore evidence that teachers do not come from the highest academic ranks. In particular, a major objective of education is the development of intellectual ability, and it seems plausible that teacher aptitude may influence the success with which such objectives are attained. Some findings do show that teacher aptitude is related to success in education programs (e.g., Thornell and McCoy, 1985) and to student learning (e.g., Levin, 1970).

At a theoretical level, research on the aptitudes of education students and teachers is relevant to emerging theories of teacher selection and education (e.g., Howey and Strom, 1987; Veenman, 1984) and to current attempts to strengthen both teacher thought processes and connections between research and practice (e.g., Cross, 1987; Clark and Lampert, 1986). Not only will such changes increase the already considerable intellectual demands of education, but it also seems likely that the success of those efforts and the choice of appropriate methods of instruction will depend on aptitudes, values, and other characteristics of teachers (e.g., Sparks, 1988). Experimental teacher education programs have been successfully based on rigorous academic requirements (e.g., Andrew, 1983) and integrated with a research orientation (Egbert, 1984 and following papers). It remains to be seen, however, whether such innovations can be successfully applied to all education programs and to all education students, assuming that such programs in fact produce better teachers. Given the rocky history of the relation between academic research and teaching practice (Clifford, 1973; Clifford and Guthrie, 1988; Creemers, 1986), studies that address teacher aptitudes relevant to the theory-practice relation, such as that of Matczynsky et al., make an important contribution to the science and practice of teaching and teacher education. Such research may ultimately permit the development of effective teacher education programs appropriate to education students of differing aptitudes.

### Author Note

This work was supported by the

Social Sciences and Humanities Research Council of Canada through a grant to the University of Western Ontario. I thank Carla Johnson and Michael Pressley for comments on an earlier draft of this paper. Address correspondence to James M. Clark, Department of Psychology, University of Winnipeg, Winnipeg, Manitoba, Canada, R3B 2E9.

### References

- American Council on Education. (1983). *American universities and colleges* (12th ed.). New York: Walter de Gruyter.
- Andrew, M. D. (1983). The characteristics of students in a five year teacher education program. *Journal of Teacher Education*, 34 (1), 20-23.
- Astin, A. W. (1965). *Who goes where to college?* Chicago: Science Research Associates.
- Clark, C., & Lampert, M. (1986). The study of teacher thinking: Implications for teacher education. *Journal of Teacher Education*, 37 (5), 27-31.
- Clifford, G. J. (1973). A history of the impact of research on teaching. In R. M. W. Travers (Ed.), *Second handbook of research on teaching* (pp. 1-46). Chicago: Rand McNally.
- Clifford, G. J., & Guthrie, J. W. (1988). *Ed school: A brief for professional education*. Chicago: The University of Chicago Press.
- Creemers, B. P. M. (1986). Relationships between research on teaching, educational innovation, and teaching: The case of the Netherlands. *Teaching & Teacher Education*, 2, 105-113.
- Cross, K. P. (1987). The need for classroom research. In *To improve the academy: Resources for student, faculty, and institutional development* (pp. 3-17). Professional & Organizational Development Network in Higher Education.
- Crouse, J., & Trusheim, D. (1988). *The case against the SAT*. Chicago: The University of Chicago Press.
- Egbert, R. L. (1984). Improving teacher education through the use of research information. *Journal of Teacher Education*, 35 (2), 9-11.
- Howey, K. R., & Strom, S. M. (1987). Teacher selection reconsidered. In M. Haberman & J. M. Backus (Eds.), *Advances in teacher education* (Vol. 3)

- (pp. 1-34). Norwood: NJ: Ablex.
- Kagan, D. M. (1988). Teaching as clinical problem solving: A critical examination of the analogy and its implications. *Review of Educational Research*, 58, 482-505.
- Levin, H. M. (1970). A cost-effectiveness analysis of teacher selection. *The Journal of Human Resources*, 5, 24-33.
- Lieberman, M. (1956). *Education as a profession*. Englewood Cliffs, NJ: Prentice-Hall.
- Matczynski, T. J., Siler, E. R., McLaughlin, M. L., & Smith, J. W. R. (1988). A comparative analysis of achievement in Arts and Science courses by teacher education and non-teacher education graduates. *Journal of Teacher Education*, 39 (3), 32-36.
- Owen, D. (1985). *None of the above: Behind the myth of scholastic aptitude*. Boston: Houghton Mifflin.
- Savage, T. V. (1983). The academic qualifications of women choosing education as a major. *Journal of Teacher Education*, 34 (1), 14-19.
- Schon, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching the professions*. San Francisco: Jossey-Bass.
- Sparks, G. M. (1988). Teachers' attitudes toward change and subsequent improvement in classroom teaching. *Journal of Educational Psychology*, 80, 111-117.
- Thornell, J. G., & McCoy, A. (1985). The predictive validity of the graduate record examinations for subgroups of students in different academic disciplines. *Educational and Psychological Measurement*, 45, 415-419.
- Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational Research*, 54, 143-178.
- Weaver, W. T. (1981). The talent pool in teacher education. *Journal of Teacher Education*, 32 (3), 32-36.
- Weaver, W. T. (1983). *America's teacher quality problem: Alternatives for reform*. New York: Praeger.

# Teachers College

**Forthcoming Fall 1989**

## RECORD

Since 1900 *Teachers College Record* has been a leading quarterly journal of educational opinion, analysis, and debate

### **NATIONAL STANDARDS FOR AMERICAN EDUCATION?** A SYMPOSIUM

**Participants: Jerome Bruner, Alonzo Crim, Chester E. Finn, Jr., Maxine Greene, Sara Lawrence Lightfoot, Deborah Meier, Bill Moyers, and Harold J. Noah**  
**Jonas F. Soltis, Editor**

Is the reform of American education a truly national goal? How can we improve the quality of American education if our tradition of local control gives us different answers to reform questions? Has the time come for America to discard the antiquated principle of local control and join other nations in setting uniform national standards? How can we compete with others if we do not? What would be the costs and benefits of universal standards? How high should such standards be set given our commitment to both equity and excellence in American education? Can a pluralistic society be true to its vision of democracy if it holds all groups and individuals to the same standards regardless of their legitimate differences? These are the sorts of questions addressed in this symposium by a panel of nationally prominent educators.

Four issues a year (September, December, February, and May)			AACTE
	Individual*	Institution	Mail to:
One year	<input type="checkbox"/> \$24.00	<input type="checkbox"/> \$50.00	Teachers College Record
Two years	<input type="checkbox"/> \$42.00	<input type="checkbox"/> \$90.00	525 W. 120 St., Box 103
Foreign postage, add \$12.00 per year			New York, NY 10027
Name _____			
Address _____			
City/State/Zip _____			
*(Paid for by individual check, not by institution check)			