

Sex and Rural-Urban Differences in Standardized Achievement Scores and Mathematics Subskills

Bikkar S. Randhawa¹

Dennis Hunt

university of saskatchewan

A mental ability test and an achievement battery were administered to a large sample ($N = 4918$) of Grades 4, 7, and 10 students from a mid-Western province in Canada. Rural-urban, as well as male-female differences in achievement, particularly in mathematics, were examined. When ability differences were controlled statistically, it was found that, in general, there was a rural superiority in achievement in a majority of subtests with no sex and jurisdiction interactions. Also, the results supported the general notion that females score better than males in verbal tests, while males score better than females in quantitative tests. The mathematics item clusters were investigated in greater detail by an examination of the mathematical subskills involved. The results are discussed in terms of previous findings and related to various theoretical postulations about gender differences in mathematical achievement.

Un test d'aptitude intellectuelle et une batterie de tests d'exécution ont été administrés à un vaste échantillon ($N = 4918$) d'élèves des 4^e, 7^e, et 10^e années d'une province du mid-west canadien. Les différences de rendement, particulièrement en mathématiques, entre les élèves des écoles rurales et urbaines, et entre garçons et filles, ont été examinées. Une fois les différences d'habileté contrôlées statistiquement, il fut trouvé que, en général, le rendement des écoles rurales était supérieur dans la majorité des sous-tests, indépendamment du sexe et du milieu. En outre, les résultats confirmèrent la croyance générale que les filles obtiennent de meilleures notes que les garçons dans les tests verbaux, alors que les garçons sont supérieurs dans les tests quantitatifs. Les groupes d'items portant sur les mathématiques furent analysés dans le détail grâce à un examen portant sur les habilités de base en mathématiques. Les résultats sont étudiés en fonction des constatations antérieures et en relation avec divers postulats théoriques sur les rapports entre le sexe des élèves et leur réussite en mathématiques.

Sex differences in achievement and ability have been reported in numerous studies (Backman, 1972; Ernest, 1976; Fennema, 1974; Fox, 1976; Fox, Brody, & Tobin, 1980; Garai & Scheinfeld, 1968; Glennon & Callahan, 1968; Keating, 1974; Maccoby & Jacklin, 1974; National Assessment of Educational Progress, 1975; Suydam & Weaver, 1970; Very, 1967; Wilson, 1972). General high-school achievement and ability differences usually show females scoring better than males in verbal tests, and males scoring better than females in quantitative tests. Furthermore,

Randhawa and Fu (1973), after an extensive review of learning environments, pointed out that rural pupils may be disadvantaged in terms of the larger society. Though these general achievement and sociocultural differences are interesting, they do not provide specific details, nor are these findings necessarily applicable to Canadian settings. The present study, based on a large and representative sample from a mid-Western province in Canada, undertakes to provide specific information on skills in mathematics in which males and females and rural and urban students differ.

Benbow and Stanley (1980, 1981) found large and consistent sex differences in favour of males in Grade 7 in mathematical reasoning ability. As, up to the seventh-grade level, the formal mathematics courses and exposure are similar for both males and females, Benbow and Stanley point to the implausibility of the suggestion by Fennema and Sherman (1977) that differences in mathematics course selection by males and females cause the sex difference in mathematical reasoning ability at this particular grade level. A study by Lantz and Smith (1981) showing no sex-related differences in actual enrolment in or intention to enrol in mathematics courses further questions the differential course-taking explanation. Benbow and Stanley (1980) provide an alternative explanation for the observed sex differences in mathematical achievement and ability and specifically state that "less well-developed mathematical reasoning ability contributes to females taking fewer mathematics courses and achieving less than males" (p. 1262). An alternative explanation for observed sex differences in mathematics is that males and females differ in their retention of various kinds of mathematical content and these differences become critical when assessing mathematics achievement. In particular, it is argued that retention differences might exacerbate the achievement differences in mathematics on tests which involve comprehension and application of mathematical content. By examining the results for males and females at three different grade levels with similar formal exposure to mathematics courses and by examining the results of specific mathematical subskills, more evidence for any sex differential in mathematics can be provided.

The Benbow and Stanley (1980, 1981, 1982) results for mathematics achievement and a variety of other variables were obtained from a Study of Mathematically Precocious Youth. Their samples, therefore, contained the 2 to 5% who were high achievers on standardized ability tests over a number of years. Generalizing their findings to representative samples of normal ability ranges found in regular classrooms is really not possible. Benbow and Stanley admitted that "a possible criticism of our results is that only selected mathematically able, highly motivated students were

tested" (1980, pp. 1263–1264), but they defended their conclusions in terms of the participation rates of precocious youth in further mathematics study and in terms of Ernest's (1976) concern about the lack of participation of intellectually able females. However, this explanation does not specifically address the issue of gender differentials in achievement. The present study, in contrast, examines the achievement differentials of males and females in the entire normal range of ability.

None of the earlier studies examined rural-urban differences in achievement. Randhawa and Fu (1973) point out that much has been written about rural pupils and many ideas advanced to account for their possible disadvantage in terms of the larger society (Jenkins, 1963; Taylor & Jones, 1963). For example, it is reported that socioeconomic status of rural youth plays an important role in aspirations (Taylor & Jones, 1963). This study and another (Sperry, 1965) indicated that rural youth from a higher socioeconomic level had higher educational aspirations and took greater advantage of educational opportunities than rural youth from lower socioeconomic levels. Furthermore, Kimble, Cramer, and House (1976) reported that different predictor variables predicted achievement differentially for rural schools and urban schools in Montana, with socioeconomic status having the most influence on achievement. In particular, Taylor and Jones (1963) pointed out that when emphasis on formal education was lacking, as in farm families, education was not perceived as a dominant value and consequently there was no motivation to obtain an education. A number of studies (Ackerson, 1967; Edington, 1971; Lamanna & Samora, 1967; White & Tweeten, 1974) have also shown that rural or urban residence is strongly related to educational status. Urban residents are almost always better educated than rural, regardless of age, sex, maturity, race, or parentage. Edington (1971) and White and Tweeten (1974) show that rural pupils are usually characterized by poor academic achievement in comparison with urban pupils; however, one study of Grade 3 children in Alberta demonstrated that children from rural schools performed better than those from urban schools in reading, mathematics, and language (Clarke, Nyberg, & Worth, 1980).

Since urban and rural achievement differences do exist, sex differences in achievement may be confounded by rural-urban differences. Therefore, the present study examined rural-urban differences in achievement in the core subjects for three grade levels and, in particular, subskill differences in mathematics.

It is generally accepted that achievement and general ability are highly correlated (e.g., Tyler, 1974). Therefore, if general ability is not controlled, studies of achievement differences between males and

females in specific subjects might be confounded. The present study uses a measure of general ability to partial out the effect of this confounding variable.

In view of the ambiguity of the research findings presented above, this study focuses on the following hypotheses:

1. The mean achievement profiles of males and females in each of the three samples (Grades 4, 7, and 10) will be equivalent.
2. The mean subskill profiles derived from each of the two mathematics tests for males and females in each of the three samples will be equivalent.
3. The mean achievement profiles of pupils from the rural and urban settings for each of the three samples will be equivalent.
4. The mean subskill profiles derived from each of the two mathematics tests of pupils from the rural and urban settings for each of the three samples will be equivalent.
5. There will be no significant interaction between sex and setting, either for achievement or mathematics subskill profiles.

METHOD

Sample

Each school jurisdiction in a mid-Western province in Canada was requested to provide a list of classrooms for Grades 4, 7 and 10. From this list, a 10% random sample of classrooms was obtained. If a jurisdiction did not have at least six classrooms in any one grade, then these classrooms were pooled. From this pool of classes for each grade, a further 10% sample of the classrooms was drawn. Using this procedure, 1,425, 1,591, and 1,902 students in Grades 4, 7, and 10 respectively were included. However, complete sets of data for Grades 4, 7, and 10 respectively were available only for 1,329, 1,496, and 1,759 students. The numbers of students attending schools in rural and urban locations and by sex are given in Tables 1, 2, and 3. A school in a town or city of population greater than 10,000 was defined to be in an urban jurisdiction; all the remaining schools were defined to be in rural jurisdictions.

Instruments

Each Grade 4 and 7 student was administered the Otis-Lennon Mental Ability Test (OL), Form J (Otis & Lennon, 1969) and the Canadian Tests of Basic Skills (CTBS), Form 4M (King, 1977). Each Grade 10 student was

administered the Sequential Tests of Educational Progress (STEP), Series 2, Form 2A (Educational Testing Service, 1971) and the OL, Form J. Advanced Level Grade 4, 7, and 10 students were given, respectively, the elementary, intermediate, and advanced levels of the OL.

Procedure

All the testing in a school jurisdiction was coordinated by the superintendent or director of education or a designate. Students were administered the tests in their schools by the classroom teachers over the same three-week period. The order of administration of the tests at each grade level was the same for all the classes. The completed answer sheets from each school were forwarded to the jurisdiction coordinator who dispatched the entire set to the central office for checking, coding, and scoring.

Analysis

A two-factor (Sex by Jurisdiction) multivariate and univariate analysis of covariance (MANCOVA & ANCOVA) was used to examine the sex and jurisdiction effects. The first analysis was carried out using the CTBS and the STEP subtest raw scores as dependent variables for each grade level. The second analysis was carried out using the subskill raw scores within each of the two mathematics subtests as dependent variables for each grade level. The OL raw scores were used as a covariate.

RESULTS

Grade 4

The adjusted and observed means for jurisdiction and sex classifications are given in Table 1. There was a significant multivariate jurisdiction effect [$F(8,1317) = 4.68, p < .01$] for the CTBS subtest rawscores. This result gives us ground to reject the hypothesis of equivalence of mean profiles for rural and urban students. As shown in Table 1, the corresponding significant univariate differences in favour of rural students were obtained on Punctuation, Capitalization, and Mathematics Concepts (MC) subtests, while on the Vocabulary subtest the urban students surpassed the rural students.

A significant multivariate sex effect was obtained [$F(8,1317) = 13.80, p < .01$]. This result negates the hypothesis of equivalence of mean profiles for male and female students. As indicated in Table 1, the

TABLE 1
Grade 4:
Observed and Adjusted Subtest Means for Jurisdiction and Sex

Subtest	Jurisdiction			Sex	
	Urban (N = 497)	Rural (N = 832)	Male (N = 675)	Female (N = 654)	
Vocabulary	19.7*	19.2	19.2	19.6	(19.7)
Reading	38.2	38.2	38.0	38.3	(38.5)
Spelling	21.5	22.1	20.7	22.8**	(23.0)
Capitalization	17.7	19.1**	17.7	19.1**	(19.4)
Punctuation	17.1	17.9*	16.6	18.4**	(18.6)
Usage	16.1	16.0	15.5	16.6**	(16.7)
Mathematics Concepts (MC)	18.3	18.9*	19.1**	18.1	(18.3)
Mathematics Problems (MP)	12.7	13.1	13.1	12.7	(12.9)

NOTE: observed means in parentheses

* $p < .05$

** $p < .01$

corresponding significant univariate differences in favour of females were obtained on the Spelling, Capitalization, Punctuation, and Usage subtests, while on the Mathematics concepts subtest the males outperformed the females.

When the MC subskills were analyzed with OL as a covariate, a significant sex effect was obtained [$F(8,1338) = 8.96, p < .01$]. This result leads us to reject the hypothesis of equivalence of mean MC subskills profiles for males and females. Significant univariate differences favoured males on the Currency (1 item), Measurement (3 items), Whole Numbers (11 items), and Ratio and Proportion (1 item) subskills, whilst the females outperformed the males on the Equations, Inequalities, and Number sentences (2 items) subskills. No significant jurisdiction multivariate effect was obtained. This result upholds the hypothesis of equivalence of mean MC subskills profiles for rural and urban students.

When the Mathematics Problems (MP) subskills were analyzed, no significant multivariate effects were obtained. These results uphold the hypotheses of equivalence of mean MP subskills profiles for males and females and for urban and rural students.

Grade 7

The adjusted and observed means for jurisdiction and sex classification are given in Table 2. There was a significant multivariate jurisdiction effect [$F(8,1484) = 4.32, p < .01$] for the CTBS subtests raw scores. This result leads to rejection of the hypothesis of equivalence of mean profiles for rural and urban students. As shown in Table 2, the corresponding significant univariate differences in favour of urban students were obtained on Vocabulary and MP subtests, while on the Spelling and Punctuation subtests the rural students outperformed the urban students.

A significant multivariate sex effect was obtained [$F(8,1484) = 30.12, p < .01$]. This result negates the hypothesis of equivalence of mean profiles for male and female students. As indicated in Table 2, the corresponding significant univariate differences in favour of females were obtained on the Reading, Spelling, Capitalization, Punctuation, and Usage subtests, while on the MP subtest the males outperformed the females.

When the MP subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(8,1522) = 11.25, p < .01$]. This result leads us to reject the hypothesis of equivalence of mean MP subskills profiles for males and females. There were significant univariate differences in favour of males on the Decimals (3 items), Fractions (10 items), Percent (3 items), and Ratio and Proportion (1 item) subskills, while the

TABLE 2
Grade 7:
Observed and Adjusted Subtest Means for Jurisdiction and Sex

Subtest	Jurisdiction			Sex	
	Urban (N = 504)	Rural (N = 992)	Male (N = 790)	Female (N = 706)	
Vocabulary	25.2*	24.6	24.9	25.0	(25.1)
Reading	40.8	41.1	40.0	41.9**	(42.3)
Spelling	21.4	22.1*	20.0	23.5**	(23.9)
Capitalization	22.8	23.0	21.5	24.3**	(24.6)
Punctuation	20.3	20.9**	19.2	22.1**	(22.4)
Usage	15.4	15.6	14.7	16.3**	(16.5)
Mathematics Concepts (MC)	24.0	24.4	24.3	24.1	(24.4)
Mathematics Problems (MP)	14.1*	13.6	14.0*	13.7	(13.7)

NOTE: observed means in parentheses

* $p < .05$

** $p < .01$

females outperformed the males on the Currency (8 items) and Whole Numbers (4 items) subskills. No significant jurisdiction multivariate effect was obtained.

When the MC subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(10,1516) = 11.61, p < .01$]. This result leads us to reject the hypothesis of equivalence of mean MC subskills profiles for males and females. Significant univariate differences favoured males on the Measurement (2 items), Percents (1 item), Ratio and Proportion (2 items), and Whole Numbers (5 items) subskills, while the females outperformed the males on the Numeration and Number System (10 items) and Sets (2 items) subskills. There was no significant multivariate jurisdiction effect. This result upholds the hypothesis of equivalence of mean MC subskills profile for rural and urban students.

Grade 10

The adjusted and observed means for jurisdiction and sex classifications are given in Table 3. There was a significant multivariate jurisdiction effect [$F(6,1749) = 3.47, p < .05$] for the STEP subtests raw scores. This result negates the hypothesis of equivalence of mean profiles for rural and urban students. As shown in Table 3, the corresponding significant univariate differences in favour of rural students were obtained on the Capitalization and Punctuation, and English Expression subtests.

A significant multivariate sex effect was obtained [$F(6,1749) = 62.0, p < .01$]. This result negates the hypothesis of equivalence of mean profiles for male and female students. As indicated in Table 3, the corresponding significant univariate differences in favour of females were obtained in Reading, Spelling, Capitalization and Punctuation, English Expression, and Mathematics Computation (MC) subtests, whilst on the Mathematics Basic Concepts (MBC) subtest the males outperformed the females.

When the MC subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(5,1797) = 18.31, p < .01$]. This result negates the hypothesis of equivalence of mean MC subskills. There were significant univariate sex differences in favour of males on Denominate Numbers (6 items), while the females outperformed the males on Whole Numbers (7 items) and Fractions (14 items) subskills. No significant jurisdiction main effect was obtained. This result upholds the hypothesis of equivalence of mean MC subskills profile for rural and urban students.

When the MBC subskills were analyzed using OL as a covariate, a significant sex effect was obtained [$F(3,1804) = 10.28, p < .01$]. This

TABLE 3
Grade 10:
Observed and Adjusted Subtest Means for Jurisdiction and Sex

Subtest	Jurisdiction			Sex	
	Urban (N = 776)	Rural (N = 983)	Male (N = 859)	Female (N = 900)	
Reading	34.4 (35.0)	34.1 (33.6)	33.5 (33.6)	35.0**	(34.7)
Spelling	24.7 (25.1)	25.2 (24.9)	23.2 (23.3)	26.7**	(26.7)
Capitalization and Punctuation	24.0 (24.4)	24.8**	22.6 (22.7)	26.2**	(26.1)
English Expression	32.0 (32.7)	33.0**	30.9 (31.0)	34.2**	(34.0)
Mathematics Computation	33.1 (33.7)	33.6 (33.0)	33.0 (33.1)	33.6*	(33.5)
Mathematics Concepts	24.1 (24.5)	24.5 (24.0)	24.7**	23.8	(23.7)

NOTE: observed means in parentheses

* $p < .05$

** $p < .01$

result leads us to reject the hypothesis of equivalence of mean MBC subskills profiles for males and females. There were significant univariate sex differences in favour of males on Recall of Facts and/or Perform Mathematical Manipulation (17 items), and Exercise Ingenuity or Higher Mental Process (10 items). No significant jurisdiction main effect was obtained. This result upholds the hypothesis of equivalence of mean MBC subskills profile for rural and urban students.

No significant sex and jurisdiction interactions were obtained throughout; hence, the hypothesis of no interaction for either achievement or mathematics subskills profiles was supported.

DISCUSSION

Clarke, Nyberg, and Worth (1980), using a third grade Alberta province-wide sample, found that children from non-urban schools performed better than those from urban schools in reading, mathematics, and language. It is difficult to reach a generalized conclusion (Clarke, Nyberg & Worth 1980; Edington, 1971; White & Tweeten, 1974) about urban superiority in achievement, for global measures were used and no statistical control for general ability was employed in the data analysis. These studies might have had different conclusions had they used component measures and controlled for general ability as in the present study. However, our results are still consistent with Clarke, Nyberg, and Worth for Capitalization, Punctuation, and Mathematical Concepts in Grade 4, Spelling and Punctuation in Grade 7, and Capitalization and English Expression in Grade 10. On the other hand, our results also agree with those of Edington (1971) and White and Tweeten (1974) for Vocabulary in Grade 4 and 7 and Mathematics Problems in Grade 7. Therefore, from these observations it would appear that rural-urban differences should be interpreted in terms of specific tasks after partialling out group differences in general ability.

When the subskills in the two mathematics tests were analyzed separately for each grade level, no significant multivariate differences were obtained. In spite of the fact that the global analysis of mathematics tests resulted in significant univariate differences, the subskills did not. This may be due somewhat to the unreliability of the subskill scores derived from combining smaller numbers of items in these tests. Therefore, any subskill differences involving only one item should be treated with caution. Perhaps, however, if more reliable subskill measures were available the outcomes might have been different.

Almost all research into sex differences has borne out the superiority of females on tasks involving verbal ability (Maccoby & Jacklin, 1974). The

present research substantiates this finding at all three grade levels. In all the subtests other than the mathematics ones, the differences, if any, were in favour of females.

Any significant differences that appeared in Grades 4 and 7 in the mathematics subtests, adjusted for general ability, favoured males. At Grades 4 and 7, the mathematics subtests are grouped into knowledge of mathematical concepts and competence in problem solving. At the Grade 10 level, the subtests are divided into knowledge of mathematical concepts and competence at mathematical computation. At the Grade 10 level, in the subtest involving concepts, the males still maintained their superiority; but, in the subtest involving computation, the females were superior. This latter result again substantiates previous research which shows that the superiority of females in mathematics lies in straight computation (National Assessment of Educational Progress, 1975). It would appear that the significant sex difference that favours male understanding of concepts at the Grade 4 level vanishes at the Grade 7 level only to reappear again in Grade 10. One possible explanation could be the change of curriculum in the province from 1975 to 1978. A change from a normative approach to a performance criterion approach occurred. The latter, because of the need for much more drilling and the need to work to criteria, could, at the Grade 7 level, have produced a ceiling effect for the males on some subskills whereas the females would be able to increase their performance. This explanation was partially substantiated in light of the subskills analysis where the nonsignificant sex effect on mathematics concepts at Grade 7 resulted in male superiority in four out of the six subskills and female superiority in two of these subskills.

In the Mathematics Problem Solving subskills analysis, there was a trend from a nonsignificant sex difference at Grade 4 to a significant sex difference at Grades 7 and 10. At Grade 7, the males were superior in four and the females superior in two of the six significant subskills, while at Grade 10 the males were superior on all significant subskills. One of these Grade 10 subskills, Exercise Ingenuity or Higher Mental Processes, demands some use of logical thought.

Overall, it would seem that, with this large and representative sample, the general notion of male superiority in quantitative and female superiority in verbal tests is upheld. Furthermore this male superiority in quantitative tests may be developmental and independent of rural-urban residence. However, these general findings must be viewed in the light of subskills analysis both for males and females so that specific instructional and curriculum implications can be explored. An initial attempt to minimize these group differences, if desirable, would have to start

with a detailed comparative study of the context and the process of instructional situations. The theory of differential course work exposure (Fennema & Sherman, 1977) does not apply in this case since the mathematics courses in Grades 4 and 7 are compulsory. Because different tests were used at the Grade 10 level and the present study was not longitudinal, conclusive evidence cannot be presented for either an innate or an environmental explanation of male mathematical competence and female verbal competence.

NOTE

- ¹ An earlier version of this paper was presented at the American Educational Research Association Conference in New Orleans in April, 1984.

REFERENCES

- Ackerson, N. J. (1967). *Rural youth in a changing world*. Paper presented at the National Outlook Conference on Rural Youth, Washington, D.C.
- Backman, M. E. (1972). Patterns of mental abilities: Ethnic, socioeconomic, and sex differences. *American Educational Research Journal*, 9, 1-12.
- Benbow, C. P., & Stanley, J. C. (1980). Sex differences in mathematical ability: Fact or fiction? *Science*, 210, 1262-1264.
- Benbow, C. P., & Stanley, J. C. (1981). Mathematical ability: Is sex a factor? *Science*, 212, pp. 118, 121.
- Benbow, C. P., & Stanley, J. C. (1982). Consequences in high school and college of sex differences in mathematical reasoning ability: A longitudinal perspective. *American Educational Research Journal*, 19, 598-622.
- Clarke, S. T. C., Nyberg, V., & Worth, W. H. (1980). *Alberta Grade 3 achievement study, Fall 1978*. Edmonton: Alberta Department of Education. (ERIC Document No. ED 179 552)
- Edington, E. D. (1971). *A summary of research in rural education: Testimony to the U.S. Senate Select Committee in Equal Educational Opportunity*. Washington, DC: U.S. Department of Health, Education and Welfare, Office of Education. (ERIC Document No. ED 053 842)
- Educational Testing Service. (1971). *Sequential tests of educational progress, Series II, Form 2A*. Princeton, NJ: Educational Testing Service.
- Ernest, J. (1976). Mathematics and sex. *American Mathematical Monthly*, 83(8), 595-612.
- Fennema, E. (1974). Mathematics learning and the sexes: A review. *Journal for Research in Mathematics Education*, 5, 126-139.
- Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematics achievement, spatial visualization, and sociocultural factors. *American Educational Research Journal*, 14, 51-71.
- Fox, L. H. (1976). Sex differences in mathematical precocity: Bridging the gap. In D. P.

- Keating (Ed.), *Intellectual talent: Research and development* (pp. 183–214). Baltimore, MD: Johns Hopkins University Press.
- Fox, L. H., Brody, L., & Tobin, D. (Eds.). (1980). *Women and the mathematical mystique*. Baltimore, MD: Johns Hopkins University Press.
- Garai, J. E., & Scheinfeld, A. (1968). Sex differences in mental and behavioral traits. *Genetic Psychology Monographs*, 77, 169–229.
- Glennon, V. J., & Callahan, L. G. (1968). *A guide to current research: Elementary school mathematics*. Washington, DC: Association for Supervision and Curriculum Development.
- Jenkins, R. L. (1963). *Incidence of emotional disturbance and mental illness among rural children and youth*. Washington, DC: National Committee for Children and Youth.
- Keating, D. P. (1974). Study of mathematically precocious youth. In J. C. Stanley, D. P. Keating, & L. H. Fox (Eds.), *Mathematical talent: Discovery, description, and development*. Baltimore, MD: Johns Hopkins University Press.
- Kimble, J. W., Cramer, G. L., & House, V. W. (1976). *Basic quality of secondary education in rural Montana* (Bulletin 685). Bozeman, MT: Montana State University. (ERIC Document No. ED 212 418)
- King, E. M. (1977). *Canadian tests of basic skills: Form 4M*. Toronto: Thomas Nelson.
- Lamanna, R. A., & Samora, J. (1967). *Recent trends in educational status of Mexican Americans*. South Bend, IN: University of Notre Dame.
- Lantz, A. P., & Smith, G. P. (1981). Factors influencing the choice of non-required mathematics courses. *Journal of Educational Psychology*, 73, 825–837.
- Maccoby, E. E., & Jacklin, C. N. (1974). *The psychology of sex differences*. Stanford, CA: Stanford University Press.
- National Assessment of Educational Progress. (1975). Males dominate in educational success. *National Assessment of Educational Progress Newsletter*, 8(5), insert.
- Otis, A. S., & Lennon, R. T. (1969). *Otis-Lennon mental ability test: Form J*. New York: Psychological Corporation.
- Randhawa, B. S., & Fu, L. W. (1973). Assessment and effect of some classroom environment variables. *Review of Educational Research*, 43, 303–321.
- Sperry, I. V. (1965). *Educational and vocational goals of rural youth in the South* (Bulletin 107, Southern Cooperative Series). Raleigh, NC: North Carolina State University. (ERIC Document No. ED 012 743)
- Suydam, M. N., & Weaver, J. F. (1970). *Individualizing instruction*. Washington, DC: U.S. Office of Education.
- Taylor, L., & Jones, A. R. (1963). *White youth from low-income rural families: Achievement milieu and agribusiness opportunities*. Paper presented at the National Conference in Problems of Rural Youth in a Changing Environment, Washington, DC.
- Tyler, L. E. (1974). *Individual differences: Abilities and motivational directions*. Englewood Cliffs, NJ: Prentice-Hall.
- Very, P. S. (1967). Differential factor structures in mathematical ability. *Genetic Psychology Monographs*, 75(2), 169–207.
- White, F., & Tweeten, L. (1974). *Planning educational services for rural areas*. Stillwater, OK: Oklahoma State University. (ERIC Document No. ED 091 133)
- Wilson, J. W. (1972). *Patterns of mathematics achievement in Grade 11: Z-population*. Stanford, CA: School Mathematics Study Group.

In einer Probe ($N = 4918$) die in einer der Provinzen des kanadischen Mittlern-Westen durchgeführt wurde, wurden Schülern des 4. 7. und 10. Grades auf ihre geistige Fähigkeit geprüft und Leistungsprüfungen unterzogen. Städtische-ländliche so wohl wie männliche-weibliche Unterschiede, besonders auf dem Gebiet der Mathematik, wurden untersucht. Wenn Fähigkeitsunterschiede statistisch ausgeschaltet wurden, fand man in der Mehrzahl der Einzeltests eine höhere Leistungsfähigkeit in ländlichen Bezirken ohne Wechselwirkung zwischen Geschlecht und Jurisdiktion. Auch bestätigten die Ergebnisse die allgemeine Annahme, daß Mädchen bessere Ergebnisse in Worttests als Jungen erzielen und daß das Umgekehrte auf quantitative Tests zutrifft. Die Mathematik fragengruppen wurden näher untersucht durch eine Prüfung der betroffenen mathematischen Unter-Fertigkeiten. Die Ergebnisse werden im Rahmen der früheren Funde erläutert und auf verschiedene theoretische Annahmen über Geschlechtsunterschiede in mathematischen Leistungen bezogen.

Se administró un test de aptitud mental y una batería de pruebas de rendimiento a una amplia muestra ($N = 4.918$) de estudiantes de 4, 7 y 10 años de una provincia del medio oeste canadiense. Se examinaron las diferencias de rendimiento especialmente en matemáticas, entre los estudiantes rurales y urbanos, así como entre varones y mujeres. Cuando las diferencias de habilidades se controlaron estadísticamente, se encontró que en general, el rendimiento de las escuelas rurales era superior en la mayoría de los sub-tests, independientemente del sexo y del medio. Asimismo, los resultados confirmaron la noción general de que las mujeres tienen mejores resultados que los varones en tests verbales, mientras que los varones tienen mejores resultados en los tests cuantitativos. Los grupos de items de matemáticas se examinaron en mayor detalle por medio de un examen de las habilidades matemáticas básicas. Los resultados se discuten en función de resultados anteriores y se relacionan a varios postulados teóricos acerca de la relación entre el sexo de los alumnos y su rendimiento en matemáticas.

Bikkar S. Randhawa is professor and associate dean and Dennis Hunt is professor at the College of Education in the University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0.