

CHAPTER 1

International Student Achievement in Science

1

Chapter 1 examines the achievement in the
TIMSS 1999. The achievement in the
starting year, in the first attempt
efficiency, the number of students in
TIMSS 1995 to the eighth grade. The number of
efficiency in the first attempt, the
percentage of efficiency, the number of






How Do Countries Differ in Science Achievement?

- Exhibit 1.1: The extent of the gender gap in science achievement for the 38 nations that participated in the 2006 PISA assessment

A . e l l h . a n g t h e . i e v e f t e n t . h e e m e n t . t h a n e . h
 n e , t h e e . e n t i e | v i e e e t i e n t h e i e f t h e f
 f e e n e m n g . n e . E e n t h g h e f f m n e g e n e . | f f e e
 e | t t e p e t e e n n e . n e n t h e n e t h g h e . v | . e - e f f m a n g
 n e , t h e v n g e a n e f f m n e . v t h e 38 . n e . e | v g e .
 F v e m l e , e g e e f f m n e a n C h a n e e i e i e . e e e e f f m -
 n e t t h e 95 t h e . e n t i e a n t h e | . e - e f f m a n g . n e . h t h e
 h i k a n e , v . . n t h A f . h i m e n t h t n | t h e m t
 v . e n t t e n t a n t h e | . e - e f f m a n g . n e . v h e t h e
 l e e l f . h e e m e n t f t e n t f e g e v . e n a n C h a n e e i e i e

i a n a n t e v e t i n , E h o t 1.1 | a n | e t h e e v f f m |
 h l a n g n e g e g e f t e t e n t a n e . | n e . E q i e n e f
 h n | g e | g e e n t n e e v i m e n t h t t e n t h e v e e i e
 t h e m e n m o e f e v f f m | h l a n g v t i e t h e m e v -
 v | m . t n t o | , t e n t a n F a n | n , v . . , t h e h i k a n e , n
 v t f t h e i n F e e t i n h f e e e v f f m | h l a n g t h n
 t h e v . n t e v t a n t h e . n e . h i e t h e a n t h e C e h e o | ,
 E n g l n , | , n v t f A e | i n e Z e l n h m v e
 e v f h l a n g . h e e g e g e f t e n t v n g e f m 13.8 e v a n
 C v n F a n | n t 15.5 e v a n t h A f .

1.2  E h o t 1.2 . m v e e | m e n . h e e m e n t m n g a n i i | n -
 e . h i g v e h . h e t h e v n t t h e f f e e n e a n e g e
 h e e m e n t p e t e e n v f . n e i e v e t t i t . | g n i . n t .
 e l e t a n g . n e f a n t e e t n v e a n g . v t h e t o l e , e i n g l e
 a n t a n g . n . t e g n i . n t | h g h e e f f m n e t h n t h e m -
 v i n . n e | i t e . v t h e t ; v l e m . t e n g n i . n t f -
 f e e n e a n e f f m n e ; n e i n g l e a n t a n g . n a n . t e
 g n i . n t | | . e e f f m n e .

h e t a n E h o t 1.2 v e a n f v e t h e a n t t h t . h e n v e e o e g e
 h e e m e n t , y e n t . n e i e | i n t g n i . n t | f f e f m
 e h t h e , t h g h t h e f f e e n e a n h e e m e n t p e t e e n t h e h g h -
 e f f m a n g n | . - e f f m a n g . n e . e e e | v g e . B e e f t h i
 i e v n g e a n e f f m n e , t h e t t e n f v n m o e f . n e i e .
 n e f h a n g | . e m e n . h e e m e n t t h n m e . n e i e , o t t h e
 m e m e n . h e e m e n t t h e . n e i e , n h g h e m e n . h e e -
 m e n t t h n t h i e f . n e i e .



Climate is changing, and we have the highest energy efficiency,

Exhibit 1.1

Science Achievement Scale Score	Average Scale Score	Years of Formal Schooling	Average Age
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0 100 200 300 400 500 600 700 800



▲ Country average significantly higher than international average

● No statistically significant difference between country average and international average

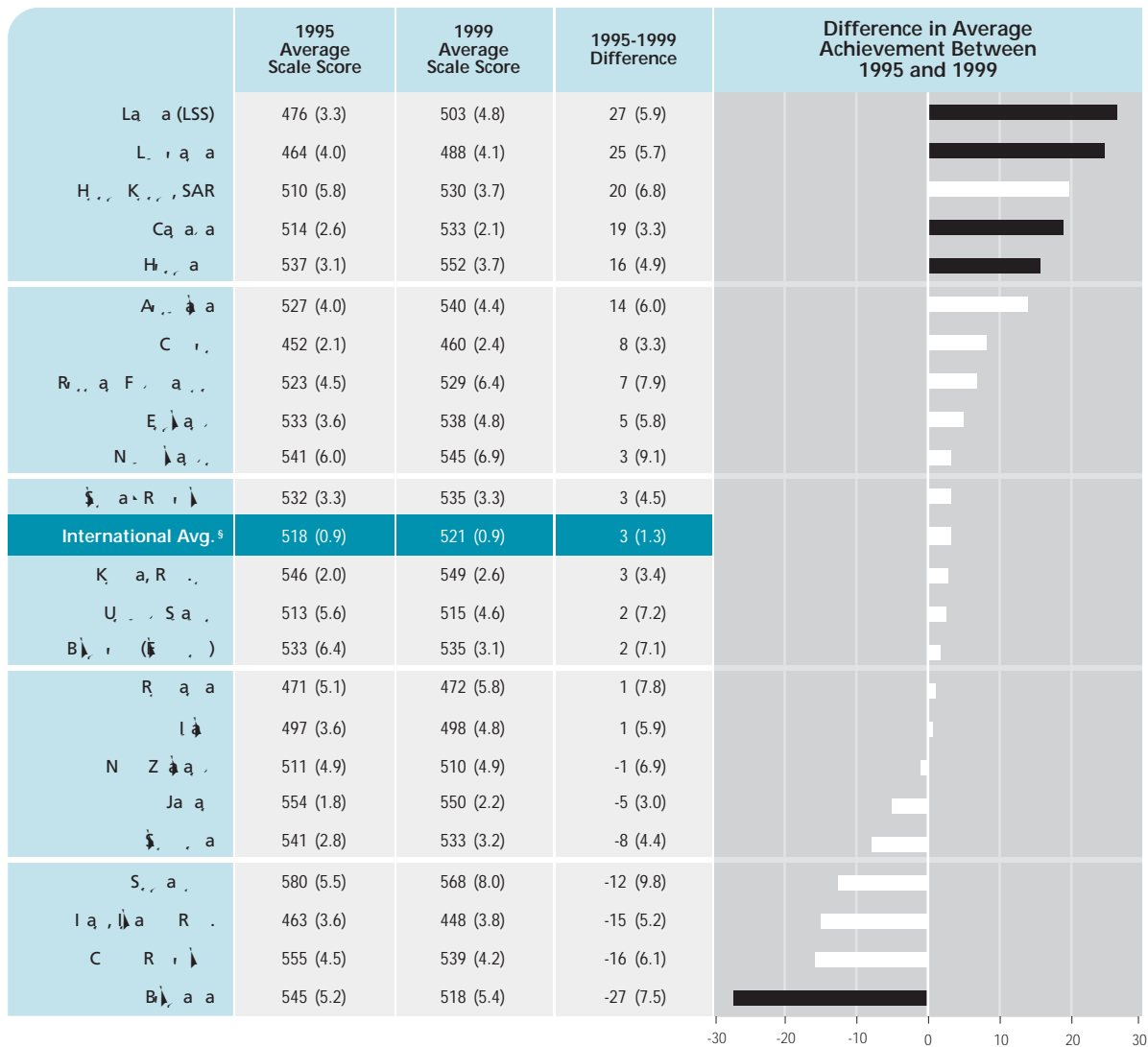
▼ Country average significantly lower than international average

Significance tests adjusted for multiple comparisons





It has been argued, that the nature of the test, the extent of the sample, the number of test items, the reliability of the test, and the test results are all important factors in the interpretation of the test results. In the TIMSS 1999 study, the test results were compared with the results of the TIMSS 1995 study. The test results were compared with the results of the TIMSS 1995 study in the following areas: the mean score, the standard deviation, the number of correct answers, the number of incorrect answers, the number of items answered correctly, the number of items answered incorrectly, the number of items answered, and the number of items not answered. The test results were compared with the results of the TIMSS 1995 study in the following areas: the mean score, the standard deviation, the number of correct answers, the number of incorrect answers, the number of items answered correctly, the number of items answered incorrectly, the number of items answered, and the number of items not answered. The test results were compared with the results of the TIMSS 1995 study in the following areas: the mean score, the standard deviation, the number of correct answers, the number of incorrect answers, the number of items answered correctly, the number of items answered incorrectly, the number of items answered, and the number of items not answered.



Countries with Unapproved Sampling Procedures at the Classroom Level in 1995

Latvia	509 (6.3)	484 (5.7)	-25 (8.3)
Slovenia, Australia	263 (11.1)	243 (7.8)	-20 (13.7)
Taiwan	510 (4.7)	482 (4.0)	-28 (6.2)

Difference statistically significant
 Difference not statistically significant
 Significance tests adjusted for multiple comparisons

[§] International average is for countries that participated and met sampling guidelines in both 1995 and 1999.

Trend notes: Because coverage fell below 65% in 1995 and 1999, Latvia is annotated LSS for Latvian-Speaking Schools only. Lithuania tested later in 1999 than in 1995, at the beginning of the next school year. In 1995, Italy and Israel were unable to cover their International Desired Population; 1999 data are based on their comparable populations.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.



E hōt 1.6 i | the ē ent ge f t ent ane. h v t i t i n g
 nē t h t v e. h e e. h a t e n t i n | B e n h m v k a n e v e a n g
 v ē B ē ent ge v e. h a n g t h e 10% B e n h m v k I f t e n t
 h e e m e n t a n. e n e. e e i t e n t e a t h e m e. a n e ē. n
 ē, t h e n e. h nē. | B e e e t e t h e B t i o ē ent f
 t t e n t v e. h a n g t h e 10% B e n h m v k 25 ē ent t h e ē
 v t e B e n h m v k 50 ē ent t h e e i n B e n h m v k n 75 ē-
 ent t h e ē v t e B e n h m v k A t h g h nē ē h
 t i (LSS), I t |, I v e | | i, n i t h n i. m e f v | | e, n
 nē f | | e t h i t t e n e. t |. I n t e, t h e h g h ē f v m a n g
 nē ē g e n e | | h g e t e ē ent ge f t ent v e. h a n g e. h
 B e n h m v k n t h e |. - ē f v m a n g. nē ē h | e ē ē ent ge.
 A m n g t h e h g h ē f v m e, f v e m | e, a n g v e n C h a n e e
 i e h m v e t h n n e- q v t e f t h e v t e n t v e. h a n g t h e
 10% B e n h m v k m v e t h n h f v e. h a n g t h e ē v t e
 B e n h m v k f v - f t h v m v e v e. h a n g t h e e i n B e n h m v k n
 | m t | | (94 t 95 ē ent) v e. h a n g t h e ē v t e B e n h m v k
 I n nē t, |. - ē f v m a n g. nē ē h t h A f. n
 v h m t n t e n t v e. h a n g t h e 10% B e n h m v k
 n | n e v t ē ent v e. h a n g t h e ē v t e B e n h m v k e
 v i ē ent v e. h a n g t h e e i n B e n h m v k n n m v e t h n
 20 ē ent v e. h a n g t h e ē v t e B e n h m v k

A t h g h E hōt 1.6 i v g n e t v. v t i v t t e n t i n t t h e
 ē ent ge f h g h h e a n g t e n t a n e. h nē, i n e a n f v -
 m t i n B t t h e i t e n t i n f m i | e n |. ē f v m e |. F v
 e m | e, e ē h nē ē, a | a n g B e g i m (F l e m i h), H n g n g,
 | i, i t h n i, n h i | n, h g e t e ē ent ge f t ent
 v e. h a n g t h e e i n n ē v t e B e n h m v k t h n m g h t h e
 e e t e f m t h e v ē ent ge f h g h ē f v m a n g t e n t.

E hōt 1.7 t h g h 1.10 v i e m v e a n f v m t i n n t h e h n g e a n
 t e n t ē f v m n e f m 1995 t 1999 B h a n g t h e ē ent ge
 v e. h a n g e. h a t e n t i n | B e n h m v k a n e. h f t h e e v f v t h e 26
 nē ē t h t v t i t e a n B t h e m e n t.⁹ C h n g e f m 1995 t
 1999 a t h e ē ent ge f t ent v e. h a n g t h e 10% B e n h m v k
 v e h. n a n E hōt 1.7. A t h g h n ē g e. v t h e 26. nē ē
 t h e ē ent ge f t ent v e. h a n g t h i B e n h m v k e f m 13 ē-
 ent a n 1995 t 14 ē ent a n 1999, t h i a n v e e. n t t t i t i | |
 g n i. n t. n | a n H n g v. t h e e g n i. n t a n v e e, f m 14
 ē ent a n 1995 t 22 ē ent a n 1999. B g v i. t h e n |. nē
 i t h g n i. n t e v e e, f m 24 ē ent f t ent v e. h a n g t h e
 B e n h m v k a n 1995 t 14 ē ent a n 1999.

C n f e g e n e s l l h m r e e n r e a n g t h e e e n t g e f t -
 e n t r e h a n g t h e e e n t e B e n h m r k (e e E h o t 1.8).
 A t h g h n e g e n t e n t i n l l t h e e. I t t e a f f e e n e t e e n
 t h e e e n t g e r e h a n g t h e B e n h m r k a n 1995 (34 e e n t) n a n
 1999 (35 e e n t), t h e e. g n i n t a n r e e a n C n , H n g r ,
 t i (LSS), n a t h n i, n n n e h g n i n t e r e e.

E h o t 1.9 h t h e h n g e f m 1995 t 1999 a n t h e e e n t g e f t -
 e n t r e h a n g t h e e i n B e n h m r k i k e t h e t r e i B e n h
 m r k, t h e e g e e e n t g e f t e n t r e h a n g t h e B e n h m r k
 a n r e e l g h t, a n t h i a n t n e f m 65 e e n t a n 1995 t



Exhibits 1.5–1.10 Overleaf

• Top 10% Benchmark

S d e d e m a e a m e c m e a d a b r a c c e c e c e

0 1

• Upper Quarter Benchmark

S d e d e m a e c e a l d e a d i m e c e r e c y c l e y e m a d i c e

2

• Median Benchmark

S d e c a n e c i e a d c m m i c a e b a i c c e m e d e a c a a e i c

0 4

• Lower Quarter Benchmark

S d e e c i e m e b a i c a c m e e a l e a d y i c a l c e c e e e d i c a l l a a e

2 410

Handwritten musical notation in a blue oval.

Exhibit 1.6 Percentages of Students Reaching TIMSS 1999 International Benchmarks of Science Achievement

	Peo0 0 k 2 Peo0 0 k ages of Stud k s Reaching				
Czech Republic					
Russian Federation					
Netherlands					
Hong Kong, SAR					
Latvia (LSS)					
Italy					
Malaysia					

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.8 for details).

¹ National Desired Population does not cover all of International Desired Population (see Exhibit A.5). Because coverage falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.

² National Defined Population covers less than 90 percent of National Desired Population (see Exhibit A.5).

‡ Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

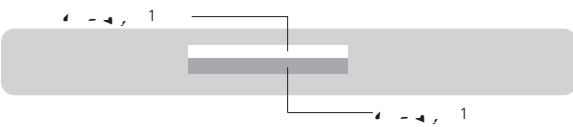
() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

Exhibit 1.8



Countries with Unapproved Sampling Procedures at the Classroom Level in 1995

I. a	31 (2.6)	24 (1.5)	-7 (3.0) ●
S. a A. a	4 (1.3)	2 (0.6)	-2 (1.4) ●
T. a .	23 (2.6)	15 (2.0)	-8 (3.2) ●



1999 significantly higher than 1995 ▲

No significant difference between 1995 and 1999 ●

1999 significantly lower than 1995 ▼

Significance tests adjusted for multiple comparisons

S... a ..

Ja a

N... a ..

H... a

K... a, R ..

B... r (k...)

H... K... , SAR

A... a

C... R... r

a... R... r

Ca... a

	64 (2.8)	75 (2.1)	11 (3.6) ●
	69 (1.6)	74 (2.0)	6 (2.5) ●
	81 (1.5)	74 (1.8)	-7 (2.5) ●
	72 (1.7)	74 (1.7)	2 (2.4) ●
	63 (1.4)	73 (1.2)	9 (1.7) ▲

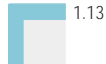
(..)



q v t e | e e | g n i n t | g e t e t h n t h e e e n t g e f g r | ,
 h e t h i t h e e n i g n e t t h e m e i n l e e | I n n
 n e i t h e e e n t g e f g r | v e h a n g e t h e | e e | g n i n t |
 e e e t h e e e n t g e f g r | .

TIMSS in 1995 h e e e i e f f e e n e n e n e h e e m e n t
 f v a n g d , f m v e e i e n t t h n a m t h e m t .¹⁰ h e e n a n g
 e e n i t e n t i t h t h e v e t f m t h e e n i e a e n e t n
 t e a n 1983-84 . h i h f v 14 e v - | f n t n v v e f f e -
 e n e f v a n g d a n || 23 f t h e v t i t a n g n e i e .¹¹ I n t h e | g | t
 f t h i e i e n e f | n g t n a n g g e n e f f e e n e n e n e h e e m e n t
 E h o t 1.13 n 1.14 e m a n e e e n a n g e n e f f e e n e e
 f m 1995 t 1999 f v n e i e t h t v t i t e a n d t h e m e n t .

A h e e m e n t f f e e n e e f m 1995 t 1999 v e v e e n t e e v t e |
 f v g r | n f v d a n E h o t 1.13 . A e g e e n e h e e m e n t
 v n e i e f v g r | a v e e g n i n t | , f m 506 t 512 , e
 t h i e i . A h e e m e n t f v d i n t a n v e e g n i n t | ,
 t h g h t h e 1999 a n e n t i n | e g e f 531 f v d v e m a n e ||
 d e t h e e g e f v g r | . C n e i e h e e e n e h e e m e n t f v
 g r | a v e e g n i n t | 19.6986 n t | 531



1.13

Exhibit 1.11

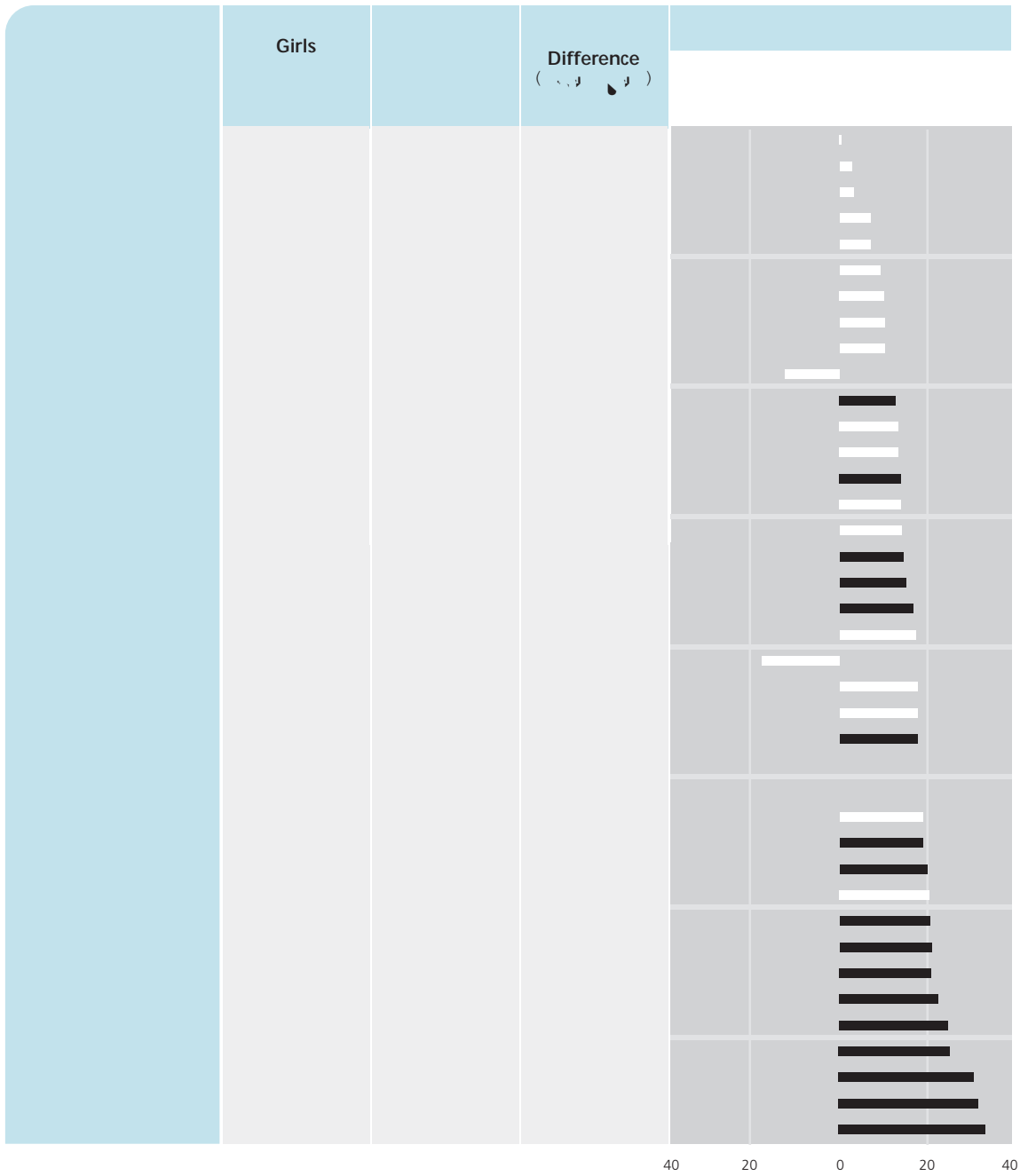


Exhibit 1.12

	Upper Quarter			Median	
	Percent of Girls	Percent of Boys		Percent of Girls	Percent of Boys
†	20 (1.8)	30 (2.4)	▲	46 (2.9)	55 (3.0)
	20 (1.7)	30 (2.5)		44 (2.6)	56 (3.5)
	21 (2.6)	29 (2.9)		47 (2.8)	53 (3.2)
	21 (1.5)	29 (1.3)	▲	46 (1.7)	54 (1.7)
	19 (1.6)	31 (2.3)	▲	45 (2.2)	55 (2.3)
†	20 (1.6)	30 (2.1)	▲	46 (2.0)	54 (2.4)
	21 (1.4)	29 (1.3)	▲	47 (1.4)	53 (1.4)
	18 (1.8)	32 (2.4)	▲	42 (2.5)	58 (2.5)
	19 (2.5)	31 (2.4)	▲	43 (3.0)	56 (2.3)
	22 (2.0)	28 (2.1)		47 (2.3)	53 (2.3)
†	20 (2.5)	30 (2.4)		45 (2.8)	55 (2.6)
	19 (1.6)	31 (1.9)	▲	44 (2.0)	56 (2.1)
	22 (1.7)	28 (2.0)		46 (2.6)	55 (3.1)
	18 (2.4)	30 (2.1)	▲	40 (2.9)	57 (2.1)
	21 (1.5)	29 (1.8)	▲	48 (2.4)	53 (2.3)
1	21 (1.8)	30 (2.0)	▲	45 (2.1)	55 (2.1)
	21 (1.3)	29 (1.4)	▲	46 (2.0)	54 (1.7)
	26 (1.8)	24 (1.6)		53 (1.9)	47 (2.3)
	21 (1.4)	29 (1.4)	▲	44 (1.7)	55 (1.5)
	21 (1.7)	29 (2.0)	▲	46 (2.3)	54 (2.2)
††	20 (2.0)	30 (2.4)	▲	46 (2.4)	54 (2.4)
	25 (1.9)	25 (1.8)			49 (2.2)
	23 (2.2)	27 (3.0)			52 (3.0)
	23 (1.6)	28 (1.8)			53 (2.4)
	22 (1.8)	27 (1.3)			53 (1.9)
†	21 (2.5)	30 (3.4)	▲		56 (4.0)
	23 (2.1)	27 (2.9)			52 (3.3)
	26 (2.7)	24 (2.4)			47 (2.6)
	24 (2.2)	26 (2.4)			51 (2.6)
	21 (2.7)	29 (2.8)	▲		55 (2.6)
	20 (2.9)	30 (4.0)			55 (4.2)
	19 (1.7)	31 (2.1)	▲		56 (2.2)
	21 (1.3)	29 (1.4)	▲		53 (2.0)
	23 (2.7)	27 (2.5)			53 (2.1)
	24 (2.5)	26 (2.3)			51 (2.4)
	19 (1.4)	31 (1.7)	▲		58 (1.6)
	23 (1.9)	26 (1.6)			51 (2.0)
	20 (1.6)	30 (2.0)	▲		54 (2.2)
	21 (0.3)	29 (0.4)	▲		54 (0.4)

▲ Significantly higher than other gender
 Significance tests adjusted for multiple comparisons

Exhibit 1.13

Girls				Boys			
9				9			
Countries with Unapproved Sampling Procedures at the Classroom Level in 1995							



