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How PISA has informed learning policy in Canada

NCES research conference on the Programme for International Student Assessment

Satya Brink Ph.D.

Learning Policy Directorate
Human Resources and Skills Development Canada

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Direction de la politique sur l'apprentissage, RHDCC
Learning Policy Directorate, HRSDC

...THIS WEEK
WE TOOK A TEST
TO SEE IF WE'RE
READY FOR THE
TEST THAT TESTS
OUR TEST SKILLS...



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Importance of PISA evidence for policy

- Developed by the OECD with input from all participating countries, PISA assesses how 15 year olds perform in real life tasks.
- PISA allows countries to bench mark the performance of 15 year olds to a global standard.
- An assessment of competencies at age 15 when still in compulsory education, provides an indication of how well prepared youth are for entering higher education or the labour market.
- The distribution of PISA performance shows achievement of excellence and equity among countries and among groups.
- Results potentially predict the future quality of human capital within countries and signal future competitive advantages.



Canada invested in PISA in order to increase its potential for policy evidence

- Canada recognized the value of international comparisons, specially with countries of particular relevance such as the United States, NAFTA, G-8, etc.
- Canada had a large national sample of 25,000 students in order to provide provincial estimates of PISA performance
- The PISA assessment was conducted in English and in French and estimates were available for both English and French students
- The national sample was large enough to conduct analyses on Canadian born, immigrant and first generation immigrant performance.
- Canada collected additional data from parents, particularly on family and background variables, through a parent questionnaire
- Students who took the PISA assessment in 2000 were followed through a longitudinal survey (Youth in Transition survey) every two years, which enabled the development of trajectory relative to their competencies.
- A reassessment of competencies is being conducted at age 24 to examine patterns of learning gain and related trajectories



US-Canada comparisons and studies show North American patterns of performance

Both Canada and the US had average scores above the OECD average, but Canadian reading scores were significantly higher than those of the US

Mean, standard deviation, and skewness on the combined reading literacy scale for Canada, US, and OECD

	Mean PISA reading score (Standard Error)	Standard Deviation (Standard Error)	Skewness (Standard Error)
Canada	534 (1.6)	95 (1.0)	-0.26 (0.04)
United States	504 (7.0)	105 (2.7)	-0.24 (0.05)
OECD	500 (0.6)	100 (0.4)	-0.33 (0.01)



The Canadian distribution of performance in reading was skewed towards levels 4 and 5, whereas the US followed the OECD average distribution

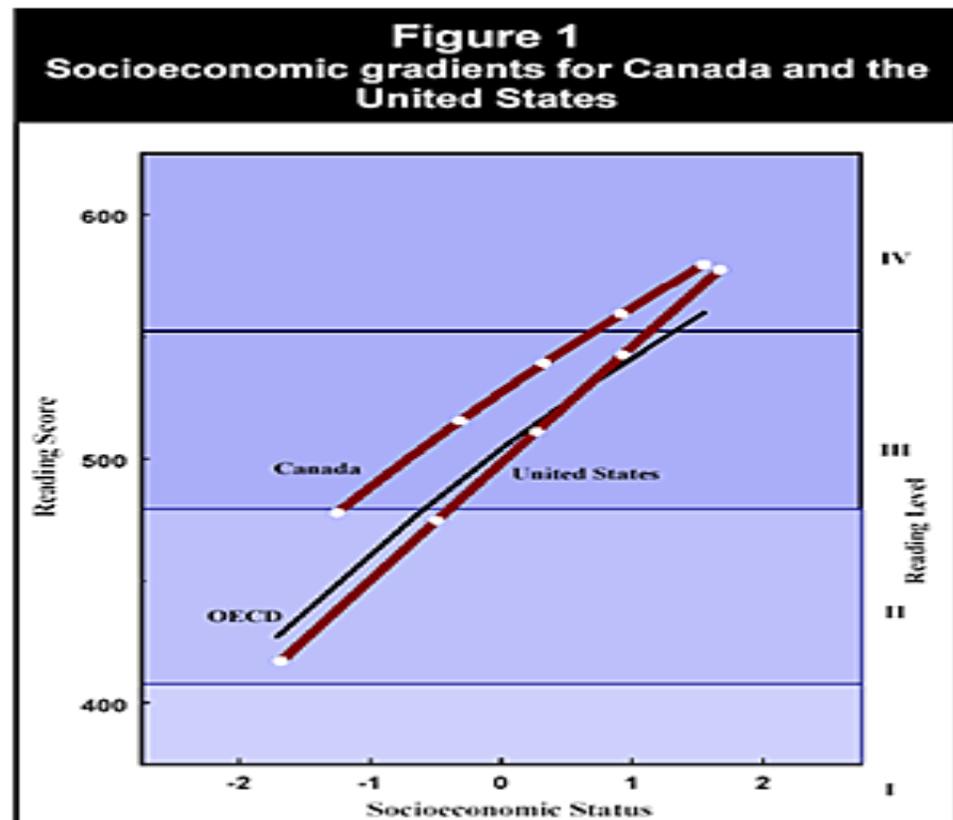
Percentage of students at each level of proficiency on the combined reading literacy scale (PISA 2000)

	Canada		United States		OECD	
	%	(SE)	%	(SE)	%	(SE)
Level 5	16.8	(0.5)	12.2	(1.4)	9.5	(0.1)
Level 4	27.7	(0.6)	21.4	(1.4)	22.3	(0.2)
Level 3	28.0	(0.5)	27.4	(1.3)	28.7	(0.2)
Level 2	18.0	(0.4)	21.0	(1.2)	21.7	(0.2)
Level 1	7.2	(0.3)	11.5	(1.2)	11.9	(0.2)
Below level 1	2.4	(0.3)	6.4	(1.2)	6.0	(0.1)



Canada has a more equitable distribution of performance compared to the United States based on the socioeconomic gradient

- The slope and length of the gradient is an indication of equity of scores – A flatter and shorter gradient indicates more equity.
- Fifteen year olds in Canada and the US from the highest socioeconomic backgrounds perform about the same.
- Canadian students with the lowest socioeconomic backgrounds perform at level three.
- The gap between the performance of Canadian and US low income youth is about 50 points.



The effect of average socio-economic status of students in schools was much more prominent in US than Canada

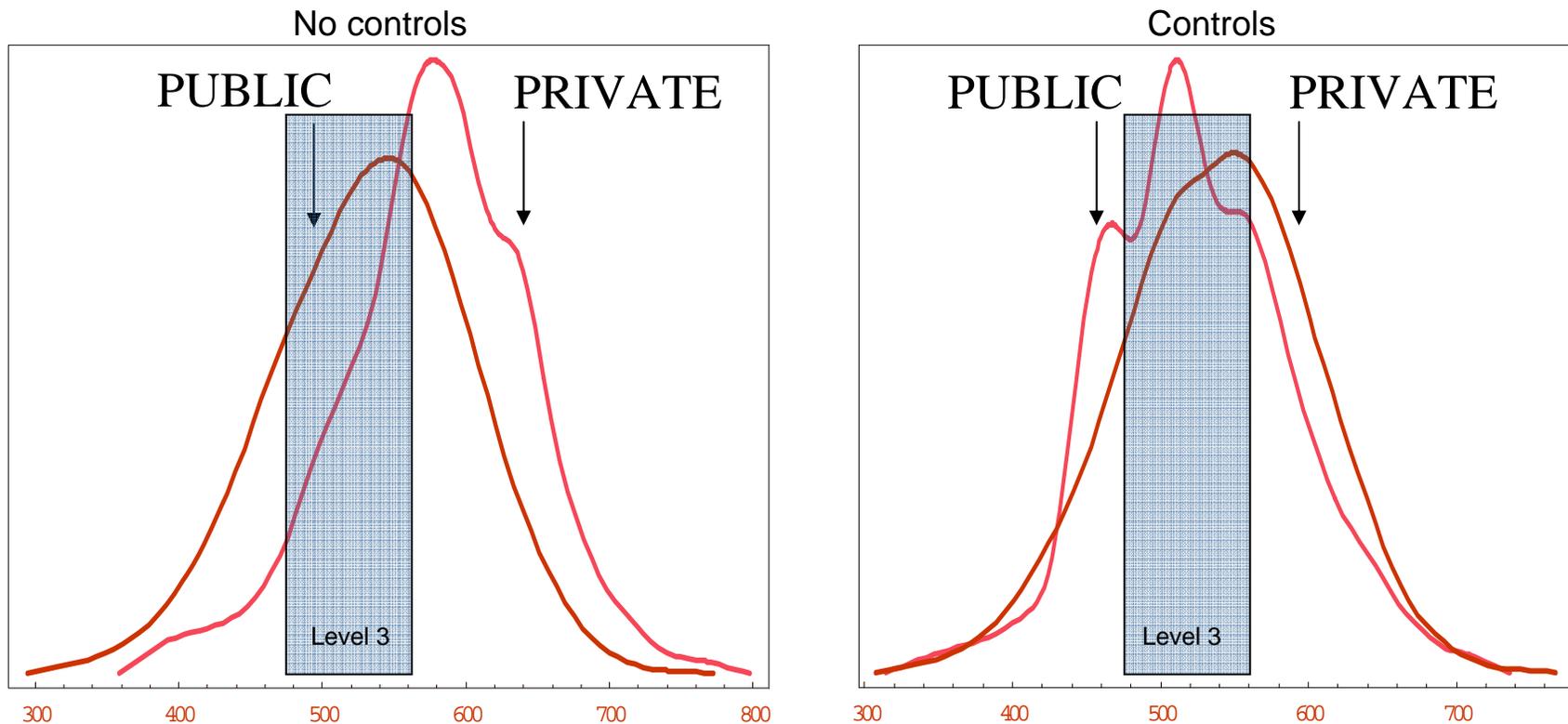
Socioeconomic gradients on the combined reading literacy scales, and SES segregation for Canada and the United States (PISA 2000)

- Overall, Canadian PISA results are more equitable than the US.
- Individual variation within schools is similar in both countries but variation between schools is much higher in the US than in Canada.
- Contextual effects, including SES segregation are greater in the US.

	Canada		United States	
	Estimate	(SE)	Estimate	(SE)
SES Gradient	36.5	(1.3)	47.8	(2.6)
Within school slope	27.8	(1.0)	28.9	(1.9)
Between school slope	72.5	(3.2)	91.8	(4.8)
SES segregation index	19.5%		28.1%	
Contextual effects	44.9	(3.4)	63.4	(5.4)



Private schools appeared to perform better than public schools but the difference disappeared when individual and school characteristics were controlled

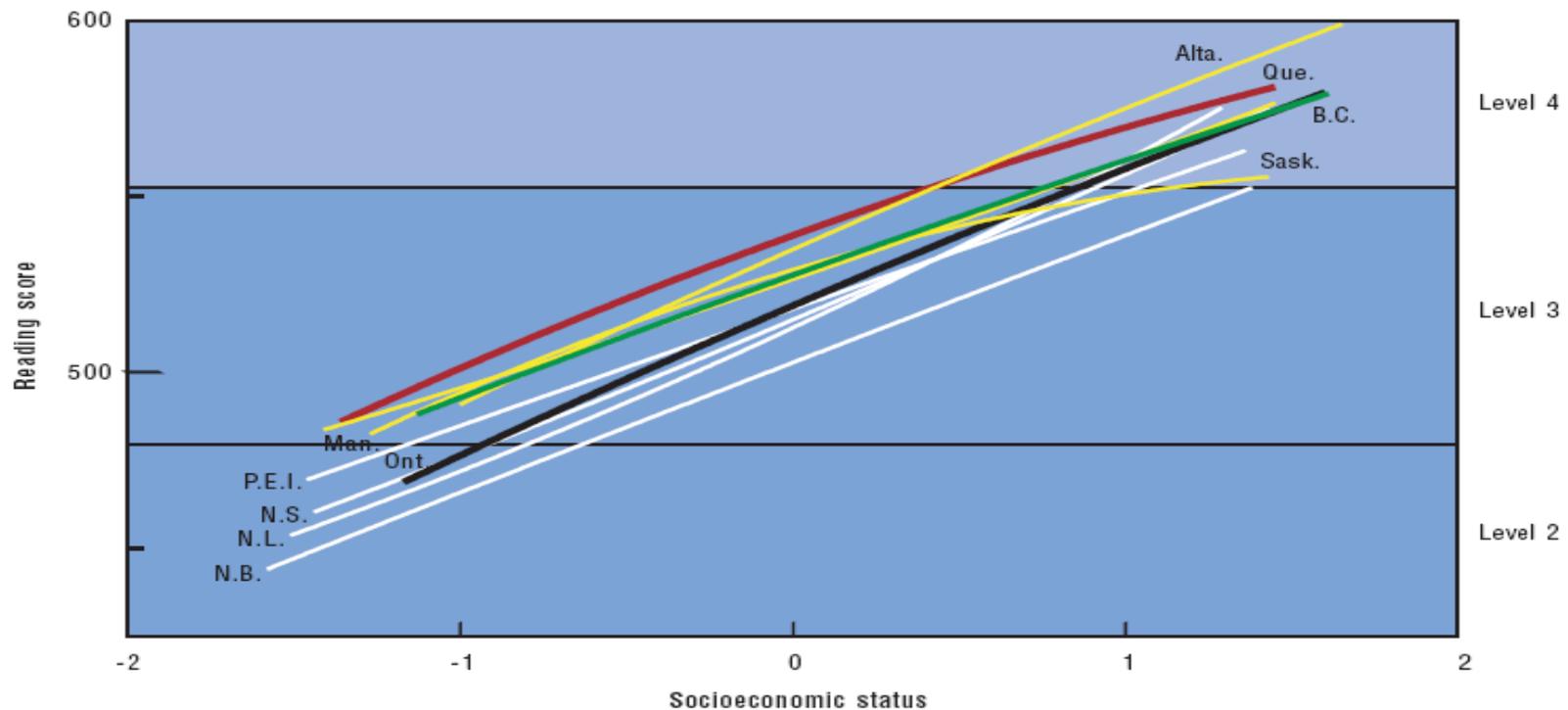


Source: Special analysis from the Centre for Education Statistics



Due to a larger sample size in Canada, the equity of performance in the 10 provinces could be measured

Socioeconomic gradients for Canadian provinces

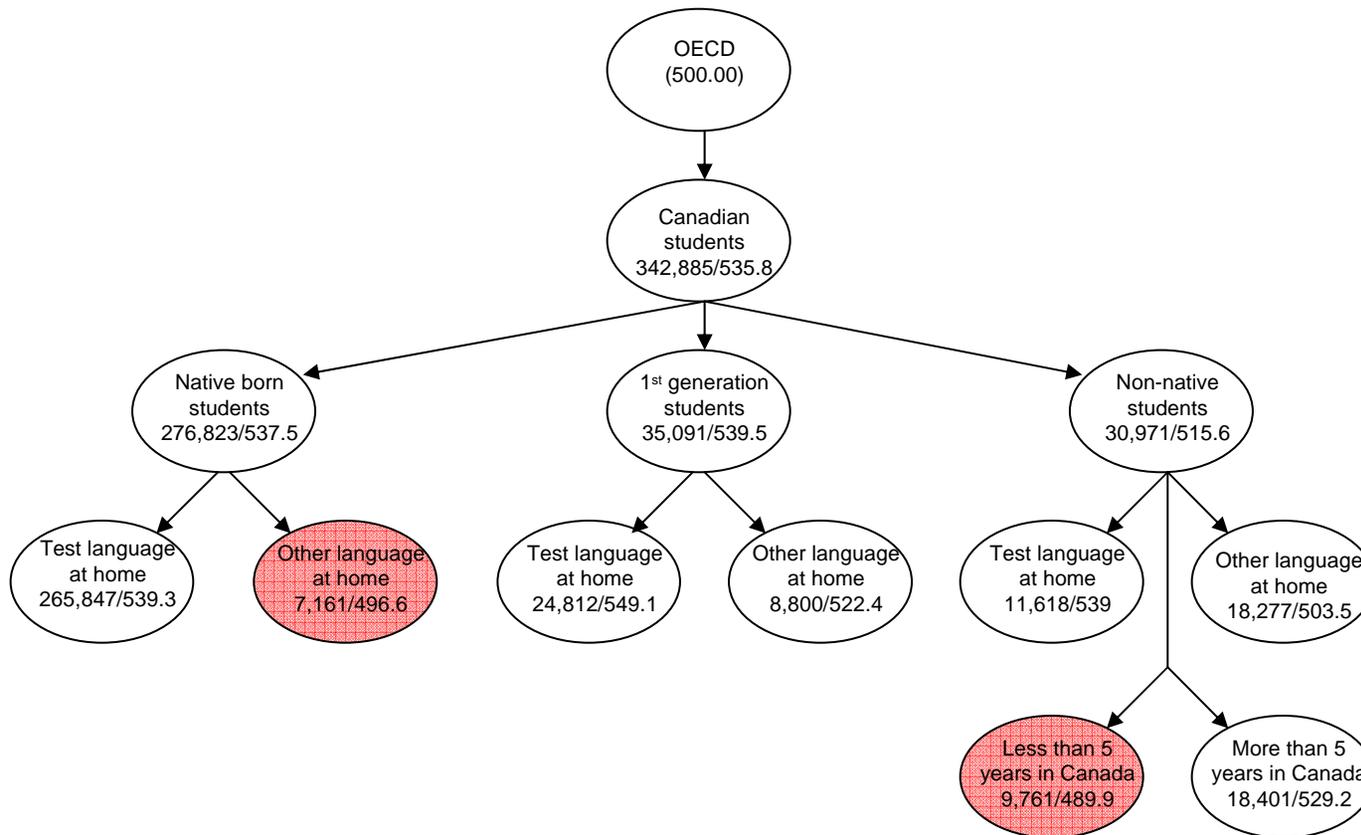


Source: Variation in literacy skills among Canadian provinces: findings from the OECD PISA study



The performance of Canadian immigrant youth was above the OECD average but below that of the native born

Average reading scores and population levels of Canadian 15-year-olds by immigration status, home language and length of residency, 2000 (population level/mean reading scores)



The performance of immigrants depended on their language and length of residence in Canada

	Test language	Other language
Short residency (less than 5 years)	522.4	478.3
Long residency (more than 5 years)	545.8	521.4



There were no significant differences in the reading performance of immigrants who spoke the test language at home, irrespective of their length of residence in Canada

- Even after controlling for other factors, immigrant students who had been in Canada for less than 5 years and did not speak the test language at home, scored on average 75 points lower than the Canadian born.
- However, the gap was reduced by 62% after five years of residence in Canada.

(Reference: Canadian born)	Difference
Recent immigrant, speak test language	-25.5 (not significant)
Established immigrant, speak test language	-6.9 (not significant)
Recent immigrant, does not speak the test language	-74.5
Established immigrant, does not speak the test language	-28.7



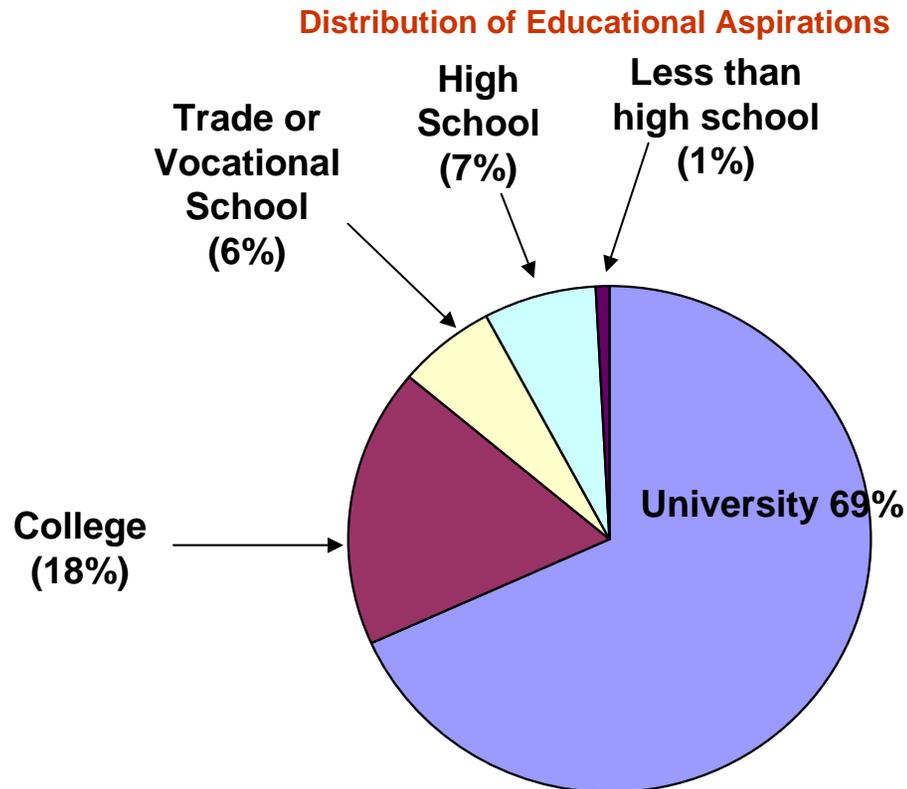
The average differences in reading scores for first generation and immigrants varied significantly across schools, more so for immigrant student

- A large part of variation in reading scores is at the individual level (82%) than at the school level (12%) (null model).
- The average SES of schools and the province explained only part of the observed differences, especially for the first generation and to a lesser extent for immigrants.

		<i>Null Model</i>	<i>Random effects</i>	<i>Province, SES</i>
<i>Between school</i>	<i>Intercept (Native)</i>	1603 (18%)	1632	1056
	<i>First generation difference</i>		1120	1026
	<i>Immigrant difference</i>		2583	2418
	<i>SES</i>			218
	<i>BOYS</i>			561
<i>Within School</i>	<i>Level 1</i>	7400 (82%)	7131	6124



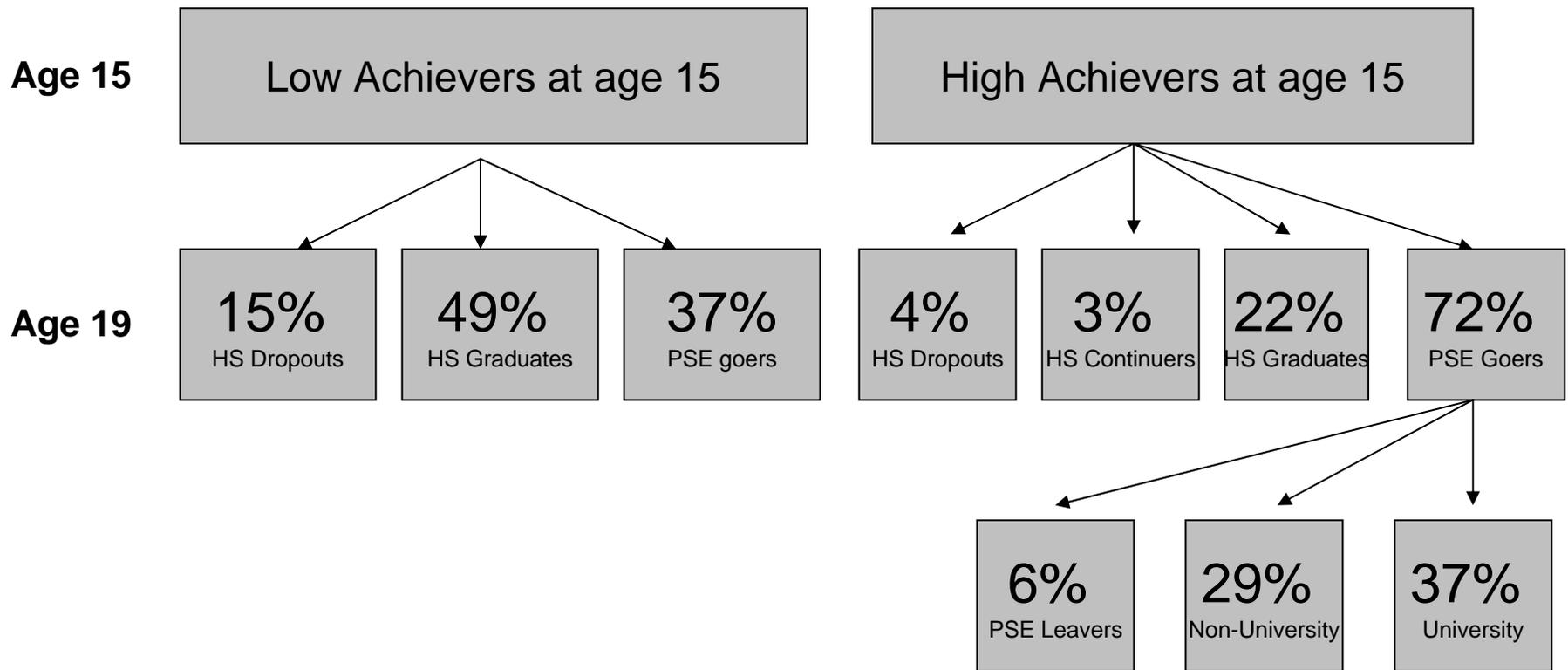
Educational aspirations of Canadian students was high but could they be fulfilled? Longitudinal data provided the answer



Source: Aspirations of Canadian youth for higher education



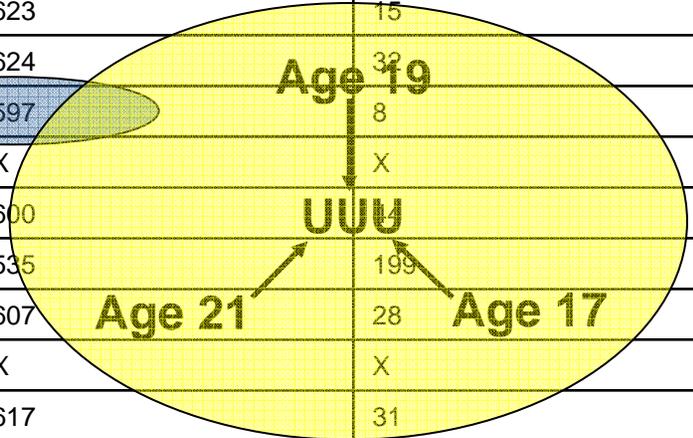
Educational pathways at age 19 were affected by reading competencies at age 15



What are the common pathways to university and how do they relate to scores?

Type of pathway	PISA reading score at age 15	Standard Error (of average)	Distribution of 2006 university students (%)
UUU	649	48	1
UUC	623	15	6
U UW	624	32	2
UUH	597	8	73
UCU	X	X	X
UCC	600	UUU	1
UCW	535	199	X
UCH	607	28	1
UWU	X	X	X
UWC	617	31	2
UWW	595	51	X
UWH	561	17	10
UHU	X	X	X
UHC	X	X	X
UHW	549	93	X
UHH	546	112	1

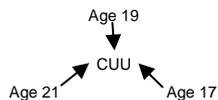
X denotes insufficient sample sizes



What are the common pathways to college and how do they relate to scores?

Type of pathway	PISA reading score at 15	Standard Error (of average)	Distribution of 2006 college students (%)
CUU	X	X	X
CUC	591	90	X
CUW	X	X	X
CUH	566	54	X
CCU	X	X	X
CCC	587	20	11
CCW	557	44	3
CCH	538	14	39
CWU	X	X	X
CWC	573	59	2
CWW	531	76	2
CWH	507	16	30
CHU	X	X	X
CHC	X	X	X
CHW	474	131	X
CHH	503	57	3

X denotes insufficient sample sizes

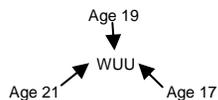


U - university C - college W - work

What are the common pathways to work and how do they relate to scores?

Type of pathway	PISA reading score at 15	Standard Error (of average)	Distribution of respondents working in 2006 (%)
WUU	624	68	0.2
WUC	621	73	1.3
WUW	612	87	0.2
WUH	575	17	5.5
WCU	X	x	X
WCC	578	17	4.2
WCW	539	31	2.0
WCH	520	10	21.3
WUW	X	x	x
WWC	556	32	2.3
WWW	499	23	6.6
WWH	491	9	49.5
WHU	X	x	x
WHC	X	x	x
WHW	446	85	0.5
WHH	456	20	6.5

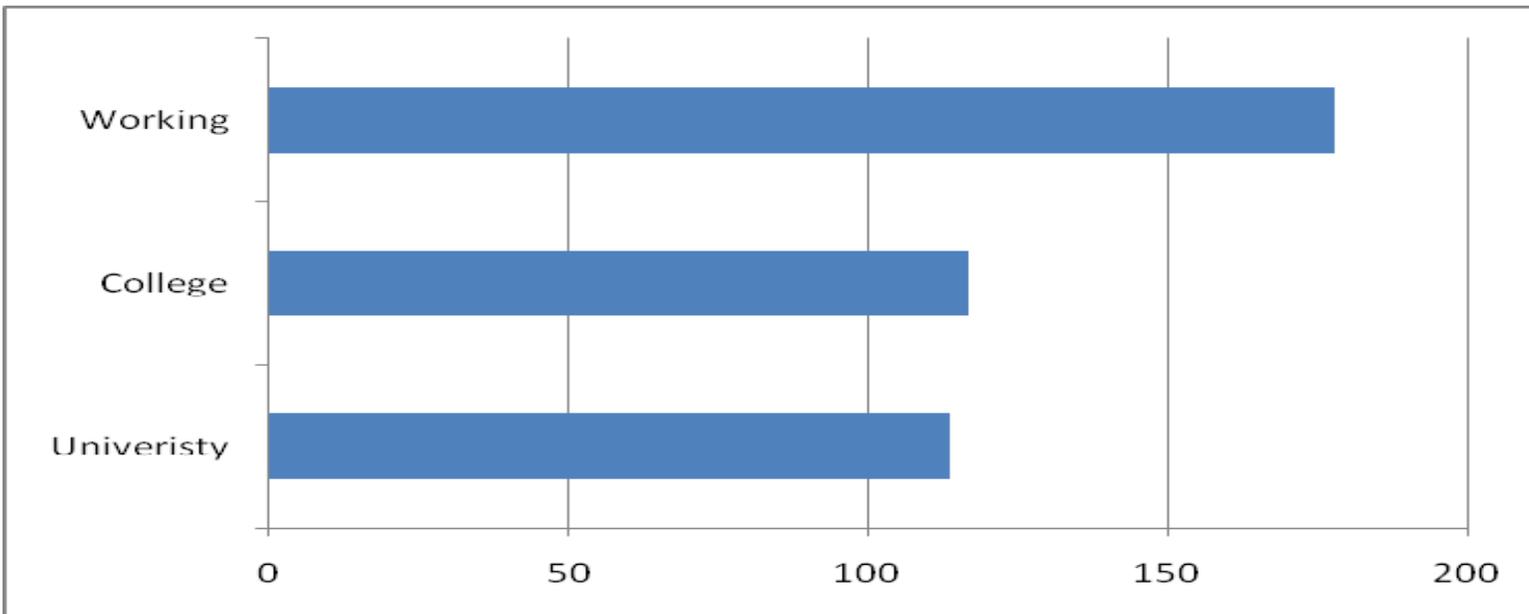
X denotes insufficient sample sizes



U - university C - college W - work

Those working at age 21 were more heterogeneous in PISA scores than those who were at university or college

Differences in scores at age 15 between the highest and lowest scoring group within each category by age 21



Not only do reading skills play a role in enrolment into higher education, they also have an effect on persistence

Marginal effects of cognitive ability measures on the probability of grade completion

Addition year of education after grade 10	+1	+1	+1	+1	+1	+1
	Males					
PISA reading score/100	0,014** (0,005)	0,029** (0,011)	0,057** (0,017)	0,123** (0,020)	0,085** (0,028)	0,070** (0,033)
PISA math score/100	-0,007 (0,005)	0,024** (0,012)	0,103** (0,020)	0,122** (0,024)	0,036 (0,031)	0,102** (0,035)
	Females					
PISA reading score/100	0,008** (0,004)	0,043** (0,010)	0,073** (0,016)	0,034* (0,019)	0,042* (0,022)	0,085** (0,027)
PISA math score/100	0,004 (0,004)	0,005 (0,010)	0,071** (0,018)	0,093** (0,021)	0,069** (0,023)	0,024 (0,027)



- The investments in PISA linked to the Youth in Transition Survey have paid off for Canada
- The public policy discussions and policy development at the national and provincial levels have benefited from national analysis of the PISA and Youth in Transition data
 - All presented results are/will be available electronically at the official Government of Canada PISA website: www.pisa.gc.ca
 - Additional research reports prepared by Statistics Canada can be located at www.statcan.ca

