



Predicting Success: Key Characteristics of Youth Affecting Transitions to Education and the Labour Market

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Abstract

The importance of securing post-secondary education has been demonstrated earlier in this report and elsewhere. This chapter considers the association of earlier educational achievement, as measured in PISA 2000, with subsequent pathways to educational attainment, as well as the likely effects of higher PISA achievement on further educational attainment. The chapter also presents pathways by the age of 21, when transitions between education, work and inactivity are likely to be common. The relative influence of PISA achievement, simultaneously analysed with a number of background characteristics, confirms the importance of prior competencies. This also provides some important policy implications that are particularly relevant to equity.

INTRODUCTION

As noted in Chapters 2 and 4, higher levels of educational attainment are crucial in securing quality and stable employment, even when transitions to and from education, work and inactivity are complex. Identifying barriers to higher educational attainment and positive transition patterns therefore have high policy relevance in presenting options to improve the life chances of individuals who may be experiencing difficulties with respect to educational attainment and a smooth transition from education to work. This chapter examines educational attainment and pathways between education, work and unemployment in the context of both achievement in PISA 2000 and several key background characteristics. A key focus of this chapter is on the extent to which males and females differ in these outcomes.

It has already been shown in Chapter 4 that young people's achievement affects subsequent educational opportunities and outcomes. Competencies may also determine labour market outcomes over the medium to long term. This chapter builds on the previous one by considering both educational attainment and patterns of movement to and from education, work and unemployment with respect to a number of key background characteristics.

The research in this area reveals three reasonably consistent findings. First, parental education is an important determinant. Second, the economic resources available within the family at the time students are in their early teenage years have also been shown to have important effects on grade attainment. To what extent this reflects the existence of financial barriers is, however, unclear. Third, whenever measures of academic performance have been included in analyses, they are generally significant determinants of educational attainment. Research on pathways suggests that higher educational attainment is associated with more positive trajectories from education to work but that for many youth, pathways from education to work do not stabilise for two years. Furthermore, spells of unemployment in the early stages of labour market experiences are associated with a higher likelihood of unemployment in the longer term. This suggests that the benefits from early interventions may be large. See Hansen (2009) for a detailed review of research on educational attainment and school-to-work transitions.

The following questions form the focus of this chapter:

- How does educational attainment differ across students with different PISA achievement scores?
- What are the effects of increased achievement on educational attainment?
- Do patterns of transition from education, work and inactivity vary depending on PISA achievement scores?
- Do other characteristics of the respondents modify the association between PISA scores and pathways?

This chapter is based on analyses carried out by Hansen (2009).



PATTERNS IN PATHWAYS TO EDUCATIONAL ATTAINMENT

Examining the educational attainments of students and their experiences in shifting to and from work, education and employment at age 21 can offer some extremely useful insights, particularly with respect to factors that may be acting as barriers to achieve more positive outcomes. While it is true to say that in 2006, when students were aged 21, it is likely that many may still be in a state of flux with respect to their educational attainment and occupational outcomes. It was observed in Chapter 4 that a sizeable proportion of students – 55% – were still in post-secondary education in 2006 and many of these students may have needed some time to secure stable employment. Furthermore, even those in work in 2006 may move to other employment, unemployment or further education.

The outcomes considered in this chapter are highest grade level completed (*i.e.* educational attainment ranging from grades 10 to 16) and three patterns of transition in a pathway. This chapter looks at the probability of students moving from one state to another across time points, with the three possible states being education, inactivity (unemployment) and work.

Two sets of results are presented in this chapter. The first set of results examines the extent to which PISA scores affect the likelihood of grade completion for grades 10 to 16 separately for males and females. The second set of results examines patterns of transition to and from education, work and inactivity, again separately for males and females. The analysis also examines how PISA scores predict the likelihood of nine possible transitions between spring 2005 to autumn 2005, a particularly critical time as many YITS respondents approach the completion of their post-secondary education degree, after adjusting for a number of background characteristics.¹

In many OECD countries, female students outperform males in reading and also have higher aspirations for higher education. In Canada, there are more women graduates from post-secondary institutions than there are men, with the exception of vocational education. Still, women tend to cluster in certain disciplines and, therefore, also in certain sectors of the labour market. Thus, it is appropriate to carry out the analyses separately for men and women.

The approaches taken in the analyses presented reflect a recent tendency in research on pathways to education / work that acknowledges that such transitions are highly complex and that a variety of analytic methods is preferable over reliance on a limited set of methodologies (*e.g.* Raffé, 2003).

Box 5.1 provides an overview of the rationale and methods of analysis used. Annex B provides some additional technical information. Hansen (2009) gives further technical details on the methods used to analyse the data.

Box 5.1 How were educational and labour market pathways analysed?

Previous research on educational attainment has tended to be overly simplistic, *i.e.* focusing either on a single transition (*e.g.* entry to university), or the basis of multiple regressions (*e.g.* to assess the extent to which background characteristics are associated with educational attainment).

More recent approaches use a model in which a sequence of probabilities of continuing in education is established. This approach recognises that the probability of progressing from one grade level to the next is contingent upon the previous progression. This technique was employed in analyses of educational attainment.

The second technique that was employed in the analyses presented in this chapter is multivariate modelling or, more specifically, multinomial modelling. This technique is suited to outcomes that are not continuous as in the case of the present analyses; the outcomes examined were transition patterns to and from education, work and inactivity.



PISA SCORES AND PROGRESSION AND ATTAINMENT IN POST-SECONDARY EDUCATION

It is useful first to consider how PISA reading scores were associated with varying levels of educational attainment for males and females. Table 5.1 shows that, for both males and females, reading scores were associated with the likelihood of students progressing from one grade level to another across grades 10 to 16. For example, 37% of males with a high reading score, *i.e.* in the top reading quintile, attained grade 16 compared to just 3.4% of males with a low reading score (bottom quintile). Similarly, 52.4% of females with a high reading score attained grade 16 compared to 14.9% of females with a low reading score.

The results show that reading scores had a stronger association with grade progression in post-secondary school years than for schooling up to grade 12 and particularly so for males. The table also shows that educational attainment in general was higher for females. For example, 34.7% of female students attained grade 16 compared with 20.9% of males.

Table 5.1
Distribution of highest grade completed for males and females,
and for low and high PISA 2000 reading scores

Highest grade completed	Males	Females	Males, low PISA reading scores	Males, high PISA reading scores	Females, low PISA reading scores	Females, high PISA reading scores
Grade 10 or less	5.2	2.9	10.0	1.4	8.6	0.0
Grade 11	15.5	11.0	20.0	9.4	17.7	0.0
Grade 12	30.6	24.4	37.2	23.3	32.4	19.4
Grade 13	14.8	13.7	18.4	12.6	11.1	12.6
Grade 14	6.7	6.9	6.2	9.5	7.5	7.0
Grade 15	6.4	6.4	4.8	6.8	7.9	4.4
Grade 16 or more	20.9	34.7	3.4	37.0	14.9	52.4

Note: Low scores are in the bottom quintile and high scores are in the top quintile.
Source: OECD PISA and HRSDC.

Analysis of the probability of grade completion from one grade to the next confirms that PISA scores have a marked association with grade progression (Table B5.3).

Overall, the findings presented in this section for both males and females shows that competencies are important for success at every grade level and particularly so at grade levels beyond secondary school, when education is no longer compulsory and the educational experiences of these youth diversifies.

CAN IMPROVED PISA SCORES INCREASE LEVELS OF EDUCATIONAL ATTAINMENT?

This section considers how increases in achievement scores might play out in the distribution of educational attainment. This is done by deriving the transition probabilities for males and females on the basis of the information in Table 5.1.

For example, all students had the possibility of moving up to grade 11. Of these 5.2% of males and 2.9% females did not. These give transition probabilities of 0.948 for males and 0.971 for females. The average value of these transition probabilities across grades is 0.778 for males and 0.843 for females. These are the numbers that are used to estimate the relationship between mathematics and reading skills and grade progression. As an example, a 100-point increase in reading achievement would increase the probability of moving from grade 13 to grade 14 by 0.123 percentage points for males, which corresponds to a 16% increase in attainment to grade 14 ($0.123/0.778$). Therefore, even a more modest increase in reading scores may lead to increased educational attainment as the continuation probability is increased at all grade levels.



Table 5.2 displays in more detail the relationship between increased achievement in mathematics and reading and overall educational attainment for males and females.

Introducing a uniform increase in the reading score of one standard deviation results in a 17.4% reduction in secondary school non-completion and a 12.6% increase in the proportion of males attending post-secondary education. For females, the effects of increased reading scores are also substantial. A one standard deviation increase in reading is associated with a 31.5% reduction in non-completion of secondary school and 11.4% increase in completion of at least some post-secondary education.

The results of increased mathematics scores in completion of some post-secondary education were more marked for males than females. When both mathematics and reading score increases are considered together, there is an interesting gender difference. That is, the results were more marked for females for completion of secondary school, while they were stronger for males for completing some post-secondary education.

Table 5.2
Actual and expected grade level and educational attainment, for males and females

	Actual (data)	Expected	Increase in reading scores	Increase in mathematics scores	Increase in both reading and mathematics scores
Males					
Average grade level	13.1	12.9	13.3	13.3	13.8
Relative change (%)			3.2	3.2	6.7
Grade distribution					
Less than high school	0.1206	0.149	0.123	0.13	0.106
Relative change (%)			-17.4	-12.8	-28.8
High school	0.306	0.358	0.322	0.277	0.243
Relative change (%)			-10.1	-22.4	-32
Post-secondary school	0.488	0.493	0.555	0.593	0.651
Relative change (%)			12.6	20.1	31.9
Females					
Average grade level	13.7	13.8	14.1	14.1	14.4
Relative change (%)			2.7	2.7	4.9
Grade distribution					
Less than high school	0.139	0.085	0.075	0.081	0.054
Relative change (%)			-31.5	-4.4	-37.2
High school	0.244	0.247	0.212	0.2	0.157
Relative change (%)			-15.4	-19.1	-36.5
Post-secondary school	0.617	0.668	0.713	0.719	0.79
Relative change (%)			11.4	7.6	18.2

Note: The increases refer to a uniform increase in test scores with one standard deviation. The relative changes compare grade distributions after the score increase with those before an increase.

Source: OECD PISA and HRSDC.

To summarise, improvements in mathematics and reading skills are associated with progression in years of education and increases educational attainment. The effects are in most cases statistically significant and also quantitatively important. Given the high average skill levels of Canadian youth, policy will need to focus on improving the competencies of sub-populations that have lower levels of achievement.

TRANSITIONS BETWEEN EDUCATION, WORK AND INACTIVITY IN THE CONTEXT OF PISA READING AND MATHEMATICS SCORES

This section first considers the pathways to and from education, work and inactivity for Canadian youth generally and then examines the extent to which transitions vary depending on levels of achievement as



measured in PISA 2000. The transition period considered is the six-month interval between the spring and autumn of 2005, when most of the participants would have been age 20. This period is of importance since at age 20, many youth will be choosing to move from education to work, or to continued education. These results will also provide some indication of sub-groups of the YITS cohort that are experiencing less desirable pathways, notably with respect to continued inactivity.

The section then goes on to consider whether a range of background characteristics predict nine possible transition patterns in the same period, again separately for males and females. These more detailed multivariate analyses will provide a more nuanced picture of those sub-groups experiencing more and less transitions. The nine transition patterns are to and from education, work and inactivity.

Table 5.3 shows the distribution of transitions for males and females between the spring and autumn of 2005, overall and also for males and females scoring in the top and bottom quintiles on PISA 2000 reading.

Two key findings emerge from this evidence. First, transitions from education to education and from work to work were stable for both males and females, while there was more variation in the transition patterns for youth moving from inactivity to education, inactivity and work.

Second, of all males in education in the spring semester of 2005, 90.5% were still in education in the autumn semester of 2005. Thus, there is high stability with respect to education. However, 8% were working in the second semester and around 1.5% were inactive. Of males in work in spring of 2005, a majority of 82.7% were again in work in the autumn. However, about one in eight (12.5%) went back to education and 4.8% were inactive. Of the inactive group, 12.5% returned to education, 44.9% secured work and 42.7% were again inactive. The pattern of transitions from school, work and inactivity were similar for females in this period.

Therefore, for both males and females, there was a relative degree of stability in the six-month period with respect to continuing in both education and work. However, small proportions of youth progressed from education or work to inactivity.

The results overall suggest that students experiencing a period of inactivity in the spring of 2005 were considerably more likely to continue to experience a period of inactivity six months later compared with youth in education or in work. Nonetheless, 44.9% of males and 39.2% of females who were inactive during the first period had managed to secure work by the autumn and 12.5% of males and 15.6% of females who had been in active in the spring were in education six months later. Hence, a period of inactivity was followed by a period in work or education in over half of these youth, indicating that prolonged periods of inactivity are certainly not inevitable. It should be borne in mind that there may be many possible reasons for experiencing a spell of inactivity, and that these results cannot provide information as to why this may be the case.

When the transition patterns of low and high achievers are compared, the most important difference to note is that high achievers were more likely than low achievers to still be in education and also less likely to have entered work. Also, high achievers who were in work during the spring semester of 2005 were more likely to have returned to education in the autumn, compared to low achievers. And finally, high achievers who were inactive in spring 2005 were considerably more likely than low achievers to return to education in the autumn of 2005 compared to low achievers. Generally speaking, these patterns were similar for both males and females.

Thus, not only is higher achievement associated with higher educational attainment as shown in the previous section, it is also associated with more positive transitions to education. The results also confirm the need for policy to focus on lower-achieving students, to develop ways in which to support these students at key decision stages and to actively intervene as early as possible when a period of inactivity is experienced.



Table 5.3

School and labour market transition rates, from spring to autumn 2005,
by gender and PISA reading scores

<i>Males</i>									
Spring 2005	All			Low PISA reading score			High PISA reading score		
	Autumn 2005			Autumn 2005			Autumn 2005		
	Education	Work	Inactivity	Education	Work	Inactivity	Education	Work	Inactivity
Education	90.5	8.0	1.5	86.5	11.1	2.4	94.8	4.6	0.6
Work	12.5	82.7	4.8	9.6	84.9	5.5	21.3	74.4	4.3
Inactivity	12.5	44.9	42.7	7.1	46.9	46.0	15.8	43.2	41.0

<i>Females</i>									
Spring 2005	All			Low PISA reading score			High PISA reading score		
	Autumn 2005			Autumn 2005			Autumn 2005		
	Education	Work	Inactivity	Education	Work	Inactivity	Education	Work	Inactivity
Education	92.9	6.2	0.9	88.6	10.1	1.3	95.7	3.7	0.5
Work	15.4	80.6	4.0	11.9	82.6	5.4	24.7	70.8	4.5
Inactivity	15.6	39.2	45.2	9.5	41.2	49.3	28.2	37.1	34.7

Note: Low scores are in the bottom quintile and high scores are in the top quintile.
Source: OECD PISA and HRSDC.

CHARACTERISTICS THAT PREDICT TRANSITIONS BETWEEN EDUCATION, WORK AND INACTIVITY

The principle purpose of the second set of results presented here is to examine the extent to which PISA scores predict patterns of transition after adjusting for background characteristics of the students. The results also provide more subtle insights that add to the first set of results reported in this section.

Tables 5.4 and 5.5 show the results of the multinomial analyses of transition to and from education, work and inactivity, separately for males and females. (The detailed results of the models are in Tables B5.3a, b, c and B5.4a, b, c in Annex B.)

These complex results are in themselves illustrative of the complicated nature of these transition patterns. In each case, three models were developed, depending on the status of youth during the spring of 2005. The three models were as follows:

- Youth transitioning from education to education, work or inactivity.
- Youth transitioning from work to education, work or inactivity.
- Youth transitioning from inactivity to education, work or inactivity.

In total, then, there are six models – three for males and three for females.

Three key observations may be made in considering these results. First, even after adjusting for the effects of a range of background variables, effects for achievement on PISA remained significant, although these effects were different for males and females. Second, educational attainment had a significant effect, over and above achievement on PISA, for the models that examined transitions from education. Third, the majority of variables were not statistically significant, particularly those from the models that examined patterns of transition from inactivity.

Considering first the results for males who were in education in the spring of 2005 (the left portion of Table 5.4), it can be seen that higher PISA reading scores predicted a transition to education in the autumn, as well as a transition to work. In contrast, educational attainment, while having a positive relationship with transitioning to education in the second period, had a negative relationship with transitioning from education to work. This finding is of interest since it suggests that achievement and attainment are operating in different ways when it comes to education-work transitions in males.



Table 5.4

Summary of three models predicting transitions from education, work and inactivity – Males

	From education to...			From work to...			From inactivity to...		
	Education	Work	Inactivity	Education	Work	Inactivity	Education	Work	Inactivity
PISA reading									
PISA mathematics									
Minority language									
Number of siblings									
Second-generation immigrant									
Family income (100 000 USD)									
Nuclear family									

Mother's education

Secondary school									
Post-secondary school									

Father's education

Secondary school									
Post-secondary school									
School activities									
Paid or unpaid work									
Highest grade completed									

	Significant positive effect (p < 0.05)
	Not significant
	Significant negative effect (p < 0.05)

Source: OECD PISA and HRSDC.

Table 5.5

Summary of three models predicting transitions from education, work and inactivity – Females

	From education to...			From work to...			From inactivity to...		
	Education	Work	Inactivity	Education	Work	Inactivity	Education	Work	Inactivity
PISA reading									
PISA mathematics									
Minority language									
Number of siblings									
Second-generation immigrant									
Family income (100 000 USD)									
Nuclear family									

Mother's education

Secondary school									
Post-secondary school									

Father's education

Secondary school									
Post-secondary school									
School activities									
Paid or unpaid work									
Highest grade completed									

	Significant positive effect (p < 0.05)
	Not significant
	Significant negative effect (p < 0.05)

Source: OECD PISA and HRSDC.

Table 5.4 also shows that for males, transitions from education to inactivity were negatively associated with being in paid work while still in school and also negatively associated with educational attainment. Thus, males who had worked while in school and had higher levels of attainment were less likely to move from a period of education to inactivity. This indicates that supporting work while at school whilst at the same time promoting higher educational attainment in males might protect against the likelihood of experiencing inactivity after being in education.



The model for females moving from a period of education is not the same as that for males (shown in the left portion of Table 5.5). One of the main differences was that PISA mathematics scores, not PISA reading scores, remained significant after adjusting for the other characteristics. Females' mathematics achievement was positively associated with an education-education transition and negatively associated with education-work and education-inactivity transitions. It is not possible to infer from these models why achievement is differentially related to transitions from education in males and females and it would be well worth while to follow up on this finding as subsequent waves of YITS data become available.

The effects of educational attainment for females moving from a period of education were similar to those of males, and again confirm the advantages of both high achievement and high attainment in securing more positive transitions. Similarly, working while in school was significant for females, but appears to be more relevant for females than for males since it was associated with all three transition patterns rather than just the move from education to inactivity.

Turning now to the model for males in work in the first period examined (the middle portion of Table 5.4), it can be seen that the model is better suited to predicting work-work and work-education transitions than work-inactivity transitions. A return to education was associated with higher PISA mathematics scores and also higher educational attainment and negatively associated with being in paid work while at school. The results for work-work transitions indicated that these were more likely with lower PISA mathematics scores, lower educational attainment and working while at school. Lower paternal education was also associated with work-work transitions.

The model for females transitioning from work (shown in the middle portion of Table 5.5) is different to that for males. The only pattern that the two models have in common is that PISA mathematics scores were associated in a similar manner with work-work and work-education transitions. And in considering these two transitions, maternal rather than paternal education was significant. Also for females there was a marked association for second-generation immigrants, which was not the case in males, where females with an immigrant background were more likely to have experienced work-work and work-education transitions compared to non-immigrant groups. Finally, participating in extra school activities by females was positively associated with work-education transitions.

Thus, a key finding of the work transition models (for both males and females) is the positive relationship between positive transitions and higher achievement in PISA and more years of education (educational attainment). Again, the reasons for the gender differences cannot be inferred from the models but would be worth examining in more depth since these differences may have implications for gender-specific policy interventions.

As already mentioned, the models that examined transitions from inactivity in males and females did not generally yield many significant results (the model for males is in the right-hand portion of Table 5.4 and the model for females is in the right-hand part of Table 5.5). One possible explanation for this is that the reasons for being inactive are likely to be very varied and in the majority of cases, inactivity is likely to be a transitory state that is dependent on factors that were not included in the models. However there is some evidence for the positive relationship between PISA mathematical proficiencies and securing a transition from inactivity to education in females while in males, lower mathematics scores were associated with a transition from inactivity to work.

CONCLUSION

The results presented in this chapter demonstrate the importance of achievement, as measured by PISA, in securing higher levels of educational attainment. That is, higher proficiency had a substantial contribution to lower rates of non-completion of secondary school and participation in at least some post-secondary



education. Increases in PISA scores could also potentially raise educational attainment levels and these effects were both significant and of substantial importance.

If one goal of the Canadian education systems is to increase levels of educational attainment, then policy interventions may focus on improving the achievement levels of lower achievers while at the same time maintaining the high levels of achievement at the middle and upper ends of the achievement distribution. The diversity of the Canadian population, coupled with provincial variations in education systems, levels of achievement and other socio-economic and cultural factors, implies that successful policy will need to be tailored to meet this diversity.

An examination of the patterns of transition to and from education, work and inactivity indicate, in the case of education and work, that a majority of youth who were in education and work in the spring of 2005 remained in the same state in the autumn of 2005. A small minority, however, transitioned to other states, and the models that included PISA achievement scores and background characteristics give some clues as to why this might be the case.

Transition patterns from inactivity in spring 2005 were more diverse and although this represents only a small set of the population, it was found that about two-fifths of youth that were inactive in the spring of 2005 were still inactive in the autumn of the same year. In general, lower achievers were more likely to remain inactive than higher achievers. This sub-group of students represents a group that would benefit from a targeted intervention such as active assistance in job-seeking or up-skilling.

High achievers were more likely to persist in their education while low achievers were more likely to cease education and take up work. Again, the lower achievers who transitioned from education to work represent a target group for policy, particularly if the work that they are doing is short-term or otherwise transient in nature.

When the patterns of transition were considered by adjusting for a range of background variables, the most striking finding to emerge is that, even with these adjustments, both achievement in PISA and educational attainment were associated with a higher likelihood of continuing in education and a lower likelihood of proceeding to work or a period of inactivity. Hence, even at this early stage in young people's pathways, the importance of both achievement and attainment was confirmed. It is possible that the effects associated with achievement and attainment will increase as students progress further into their adult lives and for this reason, it would be well worth investigating these transitions as subsequent waves of data from YITS and other PISA longitudinal studies become available.

While other characteristics were found to predict some of these transition patterns and some of these findings confirm the importance of certain background characteristics, others, perhaps surprisingly, did not. Parental income for example did not predict any transition pattern. Again, it is possible that the effects of these characteristics will emerge as significant in future cycles of YITS.

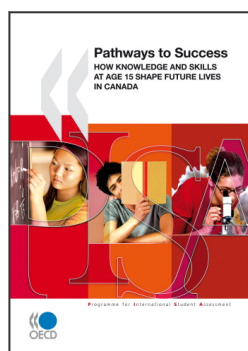
Finally, some gender differences were observed in transition patterns. For example, reading achievement was more relevant to the transition patterns in males, while for females, mathematics achievement was more important. The possible reasons for these gender differences should be explored further, since they may be indicative of gender-specific policy interventions.

In conclusion, policy interventions to promote higher attainment and persistence in education begin with ensuring high quality compulsory education, particularly for low performers and those at risk of disengagement from secondary school.



Note

1. Recall from Chapter 2 that although participants were surveyed only every two years, the YITS dataset has information on participants' education and work statuses on a month-by-month basis.



From:

Pathways to Success

How Knowledge and Skills at Age 15 Shape Future Lives in Canada

Access the complete publication at:

<https://doi.org/10.1787/9789264081925-en>

Please cite this chapter as:

OECD (2010), “Predicting Success: Key Characteristics of Youth Affecting Transitions to Education and the Labour Market”, in *Pathways to Success: How Knowledge and Skills at Age 15 Shape Future Lives in Canada*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264081925-6-en>

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