

YOUTH IN TRANSITION SURVEY 2000

YITS READING COHORT

CYCLE 1

USER GUIDE

Revised September 2005



Statistics
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1.0 Introduction

Human Resources and Skills Development Canada (HRSDC) and Statistics Canada have developed the Youth in Transition Survey (YITS) in consultation with provincial and territorial ministries and departments of labour and education. Content includes measurement of major transitions in young people's lives including formal educational experiences and labour-market experiences. Some factors influencing transitions are also included—family background, school experiences, achievement, aspirations and expectations and employment experiences. The implementation plan encompasses a longitudinal survey of two cohorts, ages 15 and 18 to 20, to be surveyed every two years.

This guide is a reference for the YITS component of the Cycle 1 – 2000 survey of the 15-year-old Reading Cohort, which will be referred to as the “YITS Reading Cohort”.

This manual has been produced to facilitate usage of the micro data file of survey results.

Any questions about the data set or its use should be directed to:

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2.0 Background

Starting in 1996, Human Resources and Skills Development Canada and Statistics Canada began developing the Youth in Transition Survey (YITS). Consultations took place with representatives from federal government departments with an interest in youth policy, provincial ministries and departments of education and labour, practitioners working directly with youth (teachers, counsellors, school board personnel and social workers), employers, business and education associations, academic researchers, youth and parents¹. The result of these consultations was the development of the YITS as a longitudinal survey designed to provide policy-relevant information about school-work transitions of young people, and factors influencing pathways among education, training and work.

2.1 Overview

The first cycle of YITS (for the Reading cohort – 15-year-olds) was integrated with the Programme for International Student Assessment (PISA), a project of the Organisation for Economic Co-operation and Development (OECD). PISA is an international assessment of the skills and knowledge of 15-year-olds which aims to assess whether students approaching the end of compulsory education have acquired the knowledge and skills that are essential for full participation in society. The Programme for International Student Assessment (PISA) is developed jointly by member countries of the Organisation for Economic Co-operation and Development (OECD). More information on PISA can be found at www.pisa.oecd.org.

The goal of YITS is to provide longitudinal data to study school-work transitions of young people as they move from adolescence into young adulthood and to study the factors that influence such transitions. Content includes formal educational experiences and most labour-market experiences, and influencing factors like: family background, school experiences, achievement, aspirations and expectations, and employment experiences.

¹For more information about the consultation process and other aspects of YITS, see *Youth in Transition Survey Project Overview – T-00-5E (September 2000)* (Ottawa: Human Resources and Skills Development Canada, 2000, Cat. No. MP32-30/00-5E/F)

3.0 YITS Components

YITS is composed of the following components:

YITS:

- YITS Student questionnaire: A YITS-specific 30-minute questionnaire was developed for items not covered by PISA. These items gather information on transition experiences, school engagement, attrition rate and activity (possible drop-out rate and reasons why), academic streaming, work load, programs for work preparation, labour force participation, education barriers (, stressful experiences, school engagement, career aspirations, early formative influences, deviant behaviour, family relationships, living and learning conditions and other background variables.
- YITS Parent questionnaire: A 30-minute parent questionnaire, administered through a telephone interview, was used to collect information on the parents and their household to obtain more reliable data on socio-economic status.
- YITS School questionnaire content: the principals or head administrators from the participating schools, responded to a 20 to 30 minute, self-administered, School Questionnaire. In addition to PISA question items, the questionnaire also included “Canadian” content questions. Canadian content questions related to the type of institution; type of programs offered; participation in the program(s); community service requirements; and community partnership programs.

4.0 Survey Objectives

The aim of YITS is to provide policy-relevant information on educational and labour market pathways of Canadian youth. The survey will track the same individual over time, once every two years into their 20's. Content will evolve with age. The broad objectives of YITS are:

- To examine key transitions in the lives of youth, such as the transition from high school to post-secondary schooling and the initial transition from schooling to the labour market;
- to better understand educational and labour market pathways and the factors influencing these pathways;
- to identify educational and occupational pathways that provide a smoother transition to the labour market;
- to examine the incidence, characteristics, factors and effects of leaving school;
- to understand the impact of school effects on educational and occupational outcomes;
- to examine the contribution of work experience programs, part-time jobs, and volunteer activities to skill development and transition to the labour market;
- to study the attitudes, behaviours, and skills of young people entering the labour market;
- to gain a better understanding of the determinants of post-secondary entry and post-secondary retention, including education financing;
- to better understand the role of educational and labour market aspirations and expectations in investment in further education and career choice; and
- to explore the educational and occupational pathways of various sub-groups, particularly youth “at risk”.

5.0 YITS Student Questionnaire

One objective of YITS Reading Cohort is to understand the impact of high school effects on educational and occupational outcomes. To explore high-school effects, it is necessary to begin the survey while youth are attending high school. The typical age at which youth begin high school, however, varies by province and territory. Because of variation across the country, age 15 is the best choice for capturing the largest proportion of youth early in their high school years.

5.1 Objectives

For the YITS Reading Cohort the concentration on collection of information focuses on the influence of future transitions which include:

- school experiences;
- extracurricular activities;
- peer influence;
- volunteer activities;
- early labour-market experiences; and
- education and labour-market aspirations.

5.2 Data Collection

Collection of the YITS Student questionnaire took place during the YITS session which occurred in April and May of 2000. During the session, students were required to complete a PISA assessment followed by a PISA student questionnaire. After completing the PISA components, students completed the YITS Student questionnaire. The total time for this administration was three hours.

5.2.1 Questionnaire Content and Definitions

The YITS Student questionnaire was designed to collect information about the student's family, home environment, reading habits, school and everyday activities as follows:

Section A	School experiences (including education aspirations)
Section B	School attendance
Section C	Activities (outside of class and school)
Section D	Relationships with others
Section E	Events
Section F	Volunteer activities
Section G	Work (history – summer and during school)
Section H	Money (income from work and savings for education)
Section I	Perceptions and self-esteem
Section J	Use of skills
Section K	Ideas about work and the future
Section L	Courses (grade, level and overall marks for Mathematics, Science and Main Language)

Absence or missing school: refers to both authorized and unauthorized absence from school, versus “skip” which is an unauthorized failure to attend class.

Attendance is based on the school calendar and day-to day hours and the scheduled hours for course(s) in which a student is enrolled. Absence would not include curriculum requirements where a student was out of the classroom (co-op or work experience program). If a student was involved in either a student exchange program or a school trip longer than two weeks in duration, these would be considered an absence from the school.

Education: Elementary / Junior high / High school: the responsibility for education in Canada rests with provincial and territorial governments. Each province and territory has developed its own system for education, and the structure can differ from jurisdiction to jurisdiction. The following table illustrates the similarities and differences for most schools, as of 1998-99.

Province/ Territory	Pre-grade 1 (by grade)	Elementary (by grade)	Junior High/ Intermediate/ Middle school (by grade)	Senior High/ High school (by grade)
Newfoundland and Labrador	5 yr-old kindergarten	1-6	7-9	Levels I-III (10-12)
Prince Edward Island		1-6	7-9	10-12
Nova Scotia	Pre-grade 1	1-6	7-9	10-12
New Brunswick (English Sector)	5 yr-old kindergarten	1-5	6-8	9-12
Quebec	4 & 5 yr-old kindergarten	1-6	---	Secondaire 1-5
Ontario	4 & 5 yr-old kindergarten	1-8	---	9-12 and OAC/ (grade 13)*
Manitoba	4 & 5 yr-old kindergarten	1-8	---	Senior 1-4 (9-12)
Saskatchewan	5 yr-old kindergarten	1-5	6-9	10-12
Alberta	5 yr-old kindergarten	1-6	7-9	10-12
British Columbia	5 yr-old kindergarten	1-7	---	8-12
Yukon	5 yr-old kindergarten	1-6	7-9	10-12
Northwest Territories	5 yr-old kindergarten	1-6	7-9	10-12

- OAC/(grade13) - phased out September 2003
- Nunavut is not included as it was not an independent territory prior to the reference period of the survey

Elementary school: the educational structure varies across the provinces. The elementary school level is the first level of instruction of children in the current school system. In general, at the elementary grade level, education is general and basic, and as a minimum includes grades kindergarten through six.

Extra-curricular activities – school based: school based activities would include membership in a sports, drama, newspaper production, or other activity organized under the authority of the school.

Grade: refers to the administrative level of the student in the school (e.g., grade 10, Senior 2, Level 1, Secondary 4).

High school: The educational structure varies across the provinces. In general, at the high school level there is usually a choice of at least two programs: academic or vocational. Some secondary schools may specialize in vocational training (technical and commercial) but most high schools offer both academic courses (preparatory to university) and vocational courses, which prepare students either for an occupation or for further post-secondary non-university education.

Homework: Specific tasks assigned by a teacher which would include studying, reviewing, working on projects in a group or alone, use of library or other resources.

Graduation from high school: obtaining a qualification following completion of all courses, with the required number of credits. This could be a high school diploma or graduation equivalency but does not include a trade or vocational certificate or diploma, an apprenticeship or graduation from CEGEP which are at a higher level. As well, just attending an institution where the qualifications can be obtained is not sufficient.

Junior high / Intermediate / Middle school:

The educational structure varies across the provinces. A school forming a link between elementary and secondary education usually consists of grades 7 to 9, which is not common to all provinces.

Language: courses which include drama, literature, spelling and grammar (English or French), but does not include second language training.

Mathematics: specific to courses that provide mathematical instruction such as algebra, trigonometry, and calculus. Not included are courses that use mathematics such as Physics and Chemistry.

School work: includes any academic and non-academic (including sport) activities required or expected by the school.

Science: consists of courses for Physics, Chemistry, Biology and the Earth Sciences (e.g., Geology).

Volunteer: A volunteer is someone who gives his/her unpaid time to a group or an organization such as charities, schools, religious organizations or community association. Volunteer activities could include activities such as serving on a board, organizing or supervising events, providing care, teaching or coaching, working as an administrator. This would include any unpaid community service whether it was done: voluntarily (school program for graduation requirement); in order to obtain social assistance; or as part of a court sentence. Excluded from the definition were any informal voluntary activities such as painting a neighbour's house or looking after someone's children or pets as a favour.

5.2.2 Sample Allocation

A sample allocation table (Sample Summary) can be found under section 9.4

5.2.3 Training

Training for the YITS student session, including the YITS Student questionnaire, was conducted in March 2000 (the exact dates varied among the regional offices). The training was for one-day only. The senior interviewers and project managers were trained by Head Office staff, and they, in turn conducted the classroom training sessions for interviewers in the regional offices.

Prior to classroom training, a self-study package was provided which included the Interviewer's Manual and the School Contact's Manual.

The role of the interviewer for the collection of the YITS Student questionnaire was to assist the School Contact and Test Administrator by providing the school with all materials and information for the assessment day, assisting them with administrative tasks as required, ensuring that materials were kept confidential and ensuring the safe and speedy return of these materials to Statistics Canada, head office.

5.2.4 The Interview

The YITS session occurs in the school and consists of:

- a PISA assessment (2 hours, paper and pencil);
- a PISA Student questionnaire (40 minutes, paper and pencil)
- a Youth in Transition Survey questionnaire (30 minutes, paper and pencil)

5.2.5 Supervision and Control

Statistics Canada representatives in the Regional Offices (Senior Interviewers and Project Managers), were responsible for coordinating field activities for the YITS session. However, because of the country's size and geopolitical boundaries, it was necessary to set up a national project management team to handle all aspects from design through to administration of the survey. In addition to two National Project Managers, a coordinator from each provincial Ministry of Education coordinated certain activities between the National Project Managers and the schools selected for the survey.

Each selected school then appointed a School Contact, who served as the main contact with the Provincial Coordinator, and who also worked closely with the Statistics Canada interviewers. The schools had the primary responsibility of administering the test on assessment day. The Test Administrator could have been the School Contact or a school staff member, designated by the School Contact. The role of the Statistics Canada interviewer was to assist the School Contact and the Test Administrator. The Senior Interviewers (SIs) and Project Managers (PMs) served as a reference contact for the interviewer to resolve issues, address concerns and answer any questions.

Quality assurance was crucial for obtaining credible results. PISA sent Quality Monitors to 25 schools which had been selected at random from schools participating in the survey. The monitors were present to observe and document that PISA procedures were carried out correctly and uniformly, including the administration of the YITS Student Questionnaire to the students selected for PISA.

5.2.6 Follow-up of Non-Response

Interviewers planned a follow-up session if five or more students from a class of 35, or 15% of the selected students, were absent during the first collection session scheduled at the school.

5.3 Data Processing

5.3.1 Data Capture

Data capture of the YITS Student questionnaire was performed using Statistics Canada software - EP90. EP90 can handle large volumes of data and allows double-entry. The Statistics Canada software was used because of the large volume of data to be captured. Experienced coders keyed in the data. EP90 also provided more flexibility to implement data control procedures. For instance, the PISA questionnaire, as well as the marking sheets, had very similar cell numbers on every line. Because of the high probability of miscoding the cell

numbers, by reading the wrong line, Statistics Canada preferred to use the internal software that allowed double-entry. Double-entry involves the entry of the questionnaire by two independent coders. When the second coder captures the information, any discrepancy with the first code is flagged and then resolved, thus ensuring that the data is free of data capture errors. The YITS Student questionnaire was bundled, ordered and keyed-in, in batches organized by school and student. Data capture was done by OID (Operations and Integration Division) and transmitted in batch files to Special Surveys Division (SSD).

5.3.2 Head Office Editing

Once all the batch files were received from OID, they were concatenated into a single data set. In the pre-edit phase of Head Office editing, duplicates were removed, student IDs were verified, and comments were recoded as necessary. The “Other-specify” and “Mark All That Apply” questions were also recoded in the pre-edit phase. Pre-editing was conducted, one section at a time, on the YITS Student questionnaire.

Decision tables were created in order to clean the valid skips (cleaning the path) in the YITS Student questionnaire. At this point, the Streaming derived variables for Math, Science and Language merged responses from all provinces and created a global question. (See Province Level of Courses for Math, Main Language and Science in the appendices).

Derived variables were added to the Student data set. As a final step in the editing phase, the Student records were merged with the Student Reading Weight and a Record ID was added. (See Section 5.4 Derived Variables for YITS Reading Cohort)

5.3.3 Missing Data

Three different codes are provided for the coding of missing data:

- Missing codes: 9 for a one-digit variable, 99 for a two-digit variable. For longer numerical variables, the missing codes are given in the codebook. This missing code is used only if the student should have responded to the question but did not put any answer on the questionnaire.
- Multiple responses: 8 for a one-digit variable, 98 for a two-digit variable. This code is used for multiple choice items in both cognitive booklets and questionnaires. This code is not used for open-ended questions.
- Not applicable: 7 for a one-digit variable, 97 for two digit variables, 997 for three-digit variables for the Student questionnaire data file. Code “n” is used for a one-digit variable in the three files that contains cognitive data. If a cognitive variable consists of more than one digit, then the same codes as for the questionnaire data files are used. For variables longer than 1 digit, the code assigned to not-applicable is equal to missing code minus two. This code was used when it was not possible for the student to answer the question. For instance, this code is used if a question has been misprinted or if a question has been deleted from the questionnaire. Not-applicable code and especially code “n” are also used in the cognitive file to fill in questions that were not included in the booklet the student received.

5.4 Derived Variables

Answers from certain questions from the survey were combined to form specific concepts, indicators and scales. Such concepts are called: derived variables (DVs). A derived variable is the result of combining answers from a number of questions that pertain to a specific concept into a single variable. The derived variables developed for the YITS Reading Cohort have been categorised by subject matter.

Geography

YSDVPROV - Province of school attended (note student may live in one province and attend school in a different province such as the regions of Hull, Quebec and Ottawa, Ontario)

Linking Variables

Record ID - A combination of Student ID and School ID may be used as a link with the parent file for the YITS Reading Cohort.

Stidstd – PISA Student ID

YSLANGUE – Student language (English or French)

Section A

YSDV_A11 -The variable provides the respondent's highest level of education aspiration.

Section C

There are two indicators for respondents who have participated in activities:

YSSBXCD - School Based extracurricular activities

YSNSBAD - Activities not organized by the school

Section F

YSVOLAD - The indicator for volunteer activities in which the respondent participated in the last 12 months.

Section G

The following indicators are based on work done by the respondent:

YSDSWKD - Work during the referenced school year: at a job for pay; at odd jobs for pay; in the family's farm or family's business with or without pay.

YSEWRKD -Indicator of respondents who have ever worked at a job: for pay; at odd jobs for pay; or in the family's farm or the family's business with or without pay

YSSWRKD – Work during last summer for a job: for pay; at odd jobs for pay; or in the family's farm or the family's business with or without pay.

Section K

YSOCC91 - The respondent was asked about the kind of career or work they aspired to be doing at age 30. The derived variable is based on question 40 from the Student PISA questionnaire. This variable replaces question K4 on the YITS as analysis of responses in the two questionnaires indicates that in most cases, youth gave the same answers in both surveys.

Section L

YSPROVL0 - The first requirement in this section is to identify the province in which the respondent was attending school at the time of the survey. Provinces are identified numerically as:

<03> New Brunswick (French Sector)

<10> Newfoundland

- <11> Prince Edward Island
- <12> Nova Scotia
- <13> New Brunswick (English Sector)
- <24> Quebec
- <35> Ontario
- <46> Manitoba
- <47> Saskatchewan
- <48> Alberta
- <59> British Columbia

YSDVGRAD - The grade the respondent is in at the time of the survey is rolled up into the variable.

The following DVs are used for course levels:

YSL4 (03:59) (level of courses for mathematics for each province)

YSL7 (03:59) (level of courses for science for each province)

YSL10 (03:59) (level of courses for main language for each province)

Concepts for Math and Language and Science:

Questions about a student's English or French course refer to the student's main language course. English courses do not include ESL courses; French courses do not include FSL courses. While various language skills are generally learned through a student's second language course, the main language course is more comprehensive, providing a more in-depth study of the language, and enables students to master the ability to understand, to write a variety of texts and to communicate orally. This usually takes place through such courses as English or French literature, or English or French language arts.

Students are asked the level of their math, science and English or French (main language) courses.

Each course category has been identified as having a specific focus level: (See "Province Level of Courses for Math, Main Language and Science" in the appendices for a breakdown by province and by course)

No destination focus for grades listed:

Grades below the high school level and those grades at the high school level where courses are not required as a precondition to a particular destination. Often courses that are required as a precondition to a particular destination begin at higher grades.

University preparatory:

a) Courses which are generally those with the greatest academic challenge, designed primarily for students planning entry into university, into certain programs and colleges and technical schools, or into colleges offering University Transfer programs.

b) Advanced level courses that are enriched and where student achievement in such courses is reported at the advanced level and assessment is based on comparable standards.

College/Work preparatory

a) Courses which are less academic and intended primarily for students planning entry into colleges, technical schools, trades or entry into the workplace.

b) Educational experiences which are broadly based and appropriate for all students and which may lead to further studies beyond senior high school years (e.g., apprenticeship, college and university).

Work preparatory:

Basic level courses designed for preparation into the world of work. These courses provide a good

preparation for direct entry into employment and serve the needs of a student who may not participate in post-secondary education.

Measures of Students' Attitudes Scales: (See Chapter 14 "YITS Scales")

The variables for identification and participation are part of the engagement questions throughout the questionnaire:

YSHACPS1 - This variable measures a respondent's academic participation at high school. The Item Response Theory (IRT) score was derived using the YITS items YSA6, YSA7, YSA8B and the PISA items ST32Q01, ST33Q01, ST33Q02 and ST33Q03. This variable has been standardized with mean 0 and standard deviation one.

YSHACPE1 This is the standard error for YSHACPS1.

YSHACIS1 - This variable measures a respondent's academic identification with high school. The Item Response Theory (IRT) score was derived using the YITS items YSA8I, YSA8J, YSA9E, YSA9F, YSA9G, YSA9H, YSA9J, YSA9L, YSA9M, YSA9N and PISA items ST30Q03, ST30Q04, ST30Q05, ST31Q07 and ST32Q06. This variable has been standardized with mean 0 and standard deviation one.

YSHACIE1 - This is the standard error for YSHACIS1.

YSHSOES1 - This variable measures a respondent's social engagement at high school. The Item Response Theory (IRT) score was derived using the YITS items YSA9K, YSA9O, YSA9P and PISA items ST31Q01, ST31Q02, ST31Q03, ST31Q04, ST31Q05 and ST31Q06. This variable has been standardized with mean 0 and standard deviation one.

YSHSOEE1 - This is the standard error for YSHSOES1.

YSHACES1 - This variable measures a respondent's academic engagement at high school. The score was derived by a simple average of the IRT scores of YSHACPS1 and YSHACIS1. This variable has been standardized with mean 0 and standard deviation one.

YSHACEE1 - This is the standard error for YSHACES1.

YSHSCES1 - This variable measures a respondent's overall engagement at high school. The score was derived by a simple average of the IRT scores of YSHACES1 and YSHSOES1. This variable has been standardized with mean 0 and standard deviation one.

YSHSCEE1 - This is the standard error for YSHSCES1.

YSHSFES1 - This variable measures a respondent's self-esteem (self-worth or self-acceptance). The Item Response Theory (IRT) score was derived using the YITS items YSI1A, YSI1B, YSI1C, YSI1D, YSI1E, YSI1F, YSI1G, YSI1H, YSI1I and YSI1J. This variable has been standardized with mean 0 and standard deviation one.

YSHSFEE1 - This is the standard error for YSHSFES1.

YSHSFFS1 - This variable measures a respondent's self-efficacy (confidence to achieve a positive outcome). The Item Response Theory (IRT) score was derived using the YITS items YSA8K, YSA8L, YSA8M and YSA8N. This variable has been standardized with mean 0 and standard deviation one.

YSHSFFE1 - This is the standard error for YSHSFFS1.

YSHSUPS1 - This variable measures how much social support a respondent receives from friends, family and other sources. The Item Response Theory (IRT) score was derived using the YITS items YSD1A, YSD1B, YSD1C, YSD1D, YSD1E and YSD1F. This variable has been standardized with mean 0 and standard deviation one.

YSHSUPE1 - This is the standard error for YSHSUPS1.

YSHMASS1 - This variable measures a respondent's sense of mastery - that is the extent to which a respondent regards his/her chances as being under his/her control. The Item Response Theory (IRT) score was derived using the YITS items YSI2A, YSI2B, YSI2C, YSI2D, YSI2E, YSI2F and YSI2G. This variable has been standardized with mean 0 and standard deviation one.

YSHMASE1 - This is the standard error for YSHMASS1.

Weighted Variables (Student weights and replicates will be covered in Chapter 12.5 – File Structure and Summary of Weights).

W_FSTUWT - decimal in 4th byte of the field

BPSR - Variables (BPSR1 to BPSR1000) used for variance estimation.

6.0 YITS School Questionnaire

To measure the impact of high school effects on educational and occupational outcomes, information is required about the schools youth are attending. This information was collected during Cycle 1 for the 15-year-old cohort from School Administrators via the PISA School Administrators questionnaire.

6.1 Objectives

The objectives of the Canadian content of the YITS School Questionnaire are to collect information on:

- work experience programs offered by schools and the community;
- volunteer experience programs offered by schools and the community; and
- educational and labour market pathways of graduates.

6.2 Data Collection

Data collection for the school questionnaire occurred during April and May 2000, at the same time as the YITS student assessment.

6.2.1 Questionnaire Content

The PISA School Administrators questionnaire was supplemented with eleven (11) additional YITS Canadian questions (question 23 to 30b) which were specific to the measurement of school-work transitions. Please refer to www.oecd.org for information on the PISA questionnaires.

6.2.2 Sample Allocation

Each provincial Ministry of Education was required to provide a list of all schools in its jurisdiction. Based on this list, a database was built taking into account PISA criteria governing the selection of schools. A random sample of schools for each province was then produced. Once a school had been selected, a letter from the respective provincial Ministry of Education was sent to that school, explaining the YITS survey. Further information on Sample Allocation can be found in Section 9.4.

Participating schools provided a list of all 15-year-old students (students born in 1984). These lists were sent to the Provincial Coordinators and then to Statistics Canada, and from them the final sample was chosen.

Sample Allocation						
Region	Number of schools selected			Anticipated number of students (15-years old)		
	Francophone	Anglophone	Total	Francophone	Anglophone	Total
Atlantic	33	292	325	1,609	10,626	12,235
Quebec	113	58	171	3,810	1,690	5,500
Ontario	47	148	195	1,492	5,074	6,566
Prairies	9	354	363	315	9,956	10,271
Pacific	0	133	133	0	4,185	4,185
Total	202	985	1,187	8,218	31,154	38,757

6.2.3 Training

There was no formal training session for the School Administrators questionnaire.

6.2.4 The Interview

As noted earlier, the principals or head administrators from the participating schools, responded to a 20 to 30 minute, self-administered, School questionnaire (see Section 3.0).

6.2.5 Follow-up of Non-response

There was no formal follow-up program for the School questionnaire. The school principals/school administrators, from schools that did not respond within a specific period of time, were contacted by an interviewer to remind them to submit their completed questionnaires.

6.3 Data Processing

6.3.1 Data Capture

The data capture software (Key Quest) provided by PISA, was used to data capture the School Questionnaire.

6.3.2 Head Office Editing

Only the Canadian questions (23 to 30b) were edited by Statistics Canada. For information on questions 1 to 22, refer to the PISA documentation.

The first stage of editing of the School Questionnaire undertaken at head office was the treatment of errors in questionnaire flows where questions which did not apply to the respondent (and should therefore not have been answered) were found to contain answers. In this case, superfluous data was eliminated by following the flow of the questionnaire implied by answers to previous, and in some cases, subsequent questions.

Where errors involved a lack of information in questions which should have been answered, a non-response or “not stated” code was assigned to the item. The code that is used to identify “not stated” is “9”.

Multiple response items were recoded to a YES/NO field by changing the field length to “1” and valid skips (“6”) were applied where necessary. The 7 refusal records and 4 non-sharer records were populated with “9’s”.

In the YITS Canadian content, Question 26 asks “Which of the following programs are offered through this school and which programs, if any, are considered the main focus of this school?” The write-in response category “other programs” was recoded up into one of the existing categories where possible. The remaining write-in responses did not meet the definition of a program as specified in the question. Therefore, the “other programs” response category was not released on the file.

6.4 Derived Variables

No derived variables were developed for the YITS Canadian content portion of the School questionnaire

7.0 YITS Parent Questionnaire

While youth are the focus of the YITS Reading Cohort inquiry, Cycle 1 for the cohort aged 15 also includes a questionnaire for parents of participating youth. To explore factors influencing school-work transitions (which is a requirement of YITS), family background information was collected on a paper-and-pencil questionnaire during a telephone interview with a parent or guardian of a YITS student. Statistics Canada prepared a brochure/letter for the selected student's parent which was forwarded prior to the test session date.

7.1 Objectives

Young people get information on work and education from various sources, including their parents' experiences. The way young people experience the transition from home to school and, later, from school to work, as well as their interactions with their families, can have lasting effects on their personal development. These outcomes in turn affect economic situations and quality of life. We are interested in finding out how young people experience these situations. The parent or legal guardian, most knowledgeable of the 15-year-old student who was selected as a respondent for the YITS study, was asked his/her views on their child's schooling and also asked to provide family background information.

One of the objectives of the Parent questionnaire is to examine the factors influencing educational and labour market pathways through the data collected on:

- Parental view of youth's school experiences;
- Family background (family and custody history; language and ethnicity);
- Parent's education;
- Current Activity Status (work status of parent(s); and
- Family Income/socio-economic status.

7.2 Concepts and Definitions

The parent questionnaire collects information (by section) on the following topics:

Geography	Geographic codes for the parents/guardians' residence
Front End	Parent or guardian most knowledgeable about child, marital status
Section A	Household members: Relationship with child (for up to 8 family members) – gender and age
Section B	Child's school experiences
Section C	Family and custody history – which parent or legal guardian did child live with most of the time
Section D	Language and Ethnicity
Section E	Education
Section F	Current activity status
Section H	Contact information

Employed persons are those, who during the reference period, did any work at all and/or had a job but were not at work due to:

- own illness or disability
- personal or family responsibilities
- seasonal weather stoppage
- labour dispute
- vacation

This excludes those who were laid off and whose job attachment was to a job starting at a definite date in the future.

Full-time employment

Full-time employment consists of persons who usually work 30 hours or more per week, plus those who usually work less than 30 hours but consider themselves to be employed full-time (e.g. airline pilots).

Industry and Occupation

The Labour Force Survey provides information about the occupation and industry attachment of employed and unemployed persons, and of persons not in the labour force who have held a job in the past five years. Since 1984, these statistics have been based on the 1980 Standard Occupational Classification (SOC) and the 1980 Standard Industrial Classification (NAICS). Prior to 1984, the 1971 Standard Occupational Classification and the 1970 Standard Industrial Classification were used. More information is provided in Chapter 5.4 – Derived Variables – Section F.

Part-time employment

Work which is usually less than 30 hours per week is considered as part-time employment.

Work (Section F) includes any work for pay or profit, that is, paid work in the context of employer-employee relationship, or self-employment. It also includes unpaid family work where unpaid family work is defined as unpaid work which contributed directly to the operation of a farm, business or professional practice owned or operated by a related member of the household. Such tasks/activities may include keeping books, selling products, waiting on tables, and so on. Tasks such as housework or maintenance or the home, or assisting another family member with such tasks are NOT considered unpaid family work.

7.3 Data Collection

The collection period for the YITS Parent component of the YITS survey was from May 15 to June 30, 2000. Some questionnaires were completed in July and August due to an inability to interview the parent or guardian during the scheduled interview timeframe.

7.3.1 The Questionnaire

The parent portion of the Youth in Transition Survey (YITS) was conducted by telephone by regional office interviewers. The Parent questionnaire was voluntary and took about 30 minutes to complete. Paper questionnaires were completed with a parent/guardian/caregiver of the youth who was selected for the survey. The interview was conducted with the person who was most knowledgeable of the youth and their school experiences.

7.3.2 Sample Allocation

All parents of students who participated in YITS were part of the sample. A sample allocation table (Sample Summary) can be found under Section 9.4.

7.3.3 Training

The senior interviewers (SIs) and project managers (PMs) received one day of Head Office training on the YITS Parent questionnaire in April/May 2000. The purpose of the training was to familiarize the SIs and PMs with the CASES (survey application) specifications for the survey; the questionnaire concepts, definitions and content; and the interview procedures.

The SIs and PMs then trained the interviewers in the R.O.s. All training included role-playing and all interviewers were required to familiarize themselves with the training material provided such as “Questions and Answers” which covered questions which might be asked most frequently during interviews.

7.3.4 Interview

Following the administration of the YITS questionnaires, parents of selected students were asked to participate in the YITS Parent interview. This 30 minute interview was administered over the telephone by regional office interviewers.

7.3.5 Supervision and Control

All regional office interviewers were under the supervision of senior interviewers (SIs). SIs were responsible for monitoring the interviewers and reviewing the completed questionnaires before transmitting them to Head Office. Project Managers in each regional office supervised the senior interviewers.

7.3.6 Follow-up of Non-response

Where telephone numbers provided were not valid, the case was sent to a tracing team in the regional office. Tracing generated up to three (3) new numbers for the respondent. If all of the new numbers were tried without success, the case was coded “cannot locate”. For cases where the parent refused to share the data, interviewers were instructed to code these cases “refusal to share the data (Code 65)”. The SIs and PMs were responsible to call respondents to try to convert refusals.

7.4 Data Processing

7.4.1 Data Capture

During a telephone interview, responses to the Parent questionnaires were captured on paper questionnaires in the regional offices and then all questionnaires were forwarded to Head Office to be data captured by OID.

Data capture of the Parent questionnaire was done through Statistics Canada software “EP90”. EP90 was used because of the large volume of data to be captured by coders. EP90 also provided more flexibility to implement data control procedures. All Parent questionnaires were double-entered for 100% verification of all responses on the questionnaire.

7.4.2 Head Office Editing

When the text files for the Parent questionnaire came back from OID, all records were verified and matched to the sample. Responses to the text questions were stripped from the files and sent to OID for NAICS/SOC91 coding. Records that needed to be cleaned or re-coded were identified, duplicates were stripped off and final status codes were verified to create a final data file of “good” records. This was done by creating a pre-edit table for each section of the Parent questionnaire. As well, pre-edit specifications were written. The “Other – specify” and “Mark All” questions were recoded.

LogiPlus was used to create decision tables to “clean the path” of each of the questionnaire sections. A SAS program joined all the decision table programs together into the “clean path program”. Frequencies were run, output verified, decision tables were modified, and the programs were re-run until a clean data path emerged.

The NAICS/SOC codes that were coded by OID were added back onto the file, along with the imputed income values for certain records.

Derived variables (Section 7.4.5), the parent weights (Section 12.5 – File Structure and Summary of Weights), and the parenting scales (see section 14.9) were also added to the parent file. The Parent Record ID was the last item added to the file.

7.4.3 Coding of Open Ended Questions

A few data items on the questionnaire were recorded by interviewers in an open-ended format. A total of 8 partially or completely open-ended questions were included in the survey. These were items relating to INDUSTRY and OCCUPATION – Section F, questions F9, F10, F11, F12 (respondent) and F39, F40, F41 and F42 (spouse/partner).

7.5 Derived Variables

Specific concepts and scales for the Parent portion of the YITS Reading Cohort are measures of parental behaviour scales; family structure; and labour force status in December 1999.

The derived variables developed for the YITS Reading Cohort have been categorised by subject under geography, education, employment, financing post-secondary, volunteering, demographics, and family background

Linking Variables

The following variables are from administrative data on the files and may be used to link with the corresponding YITS Reading Cohort respondent:

RecordID - Record identifier can be linked to student RecordID
SCHOOLID – School ID identifying the school within a PISA country
STIDSTD – Student ID unique within a school (SCHOOLID)
LCODE - Language code of interview

Geography

NOTE: The only Geographical DVs released on the micro data file are PROV DV and URRURM ZP. Other codes are kept on the master data file held at Statistics Canada and MAY be provided upon request from researchers or analysts.

CMA25 - Census Metropolitan Area (CMA) of residence for the household as of date of interview (1996 Census Geography).

CMA CA - Census Metropolitan Area (CMA) or Census Agglomeration (CA) of residence for the household as of date of interview (1996 Census Geography).

A census metropolitan area (CMA) or a census agglomeration (CA) is an area consisting of one or more adjacent municipalities situated around a major urban core. To form a census metropolitan area, the urban core must have a population of at least 100,000. To form a census agglomeration, the urban core must have a population of at least 10,000.

CSDC - Census Subdivision Code (CSD) of residence for the household as of date of interview (1996 Census Geography).

EIER - Employment Insurance Economic Regions (1996 Census Geography).

ECR - Economic region (ER) of residence for the household as of date of interview (1996 Census Geography). An economic region is a grouping of complete census divisions (with one exception in Ontario). Prince Edward Island and the two territories each consist of one economic region. Economic regions are used to analyse regional economic activity.

REG - Region of residence for the household as of date of interview (1996 Census Geography).

SATYPE - Statistical Area Classification (SAC) type of residence for the household as of date of interview (1996 Census Geography).

Census tracts (CTs) are small, relatively stable geographic areas that usually have a population of 2,500 to 8,000. They are located in census metropolitan areas and in census agglomerations with an urban core population of 50,000 or more in the previous census.

The Metropolitan Influenced Zone (MIZ) category is assigned to a municipality not included in either a census metropolitan area (CMA) or a census agglomeration (CA). A municipality is assigned to one of four categories depending on the percentage of its residents who commute to work in the urban core of any census metropolitan area or census agglomeration.

PROVDV - Province of residence for the household as of date of interview (1996 Census Geography). This variable is derived from the parent/guardians' address as of date of interview.

URRURM ZP - Indicator of rural or urban geography, based on the Statistical Area Classification (SATYPE), based on the 1996 Census geography). This variable is derived from the parent/guardians' address as of date of interview. Indicator of rural or urban geography, based on the MIZ coding (Metropolitan Influence Zone) is coded from the Statistical Area Classification (SATYPE) code (1996 Census Geography).

Section A

RESPD - Relationship of Respondent (Person 2) to 15-year-old youth.

SPORD - Relationship of Spouse/partner of respondent (Person 3) to 15-year-old youth.

Section B

IMMRD - This variable identifies if a child is enrolled in an Immersion Program. A child is said to be enrolled in a French Immersion Program if he/she was ever enrolled in an English school, in a program where 25% or more of instruction time was in French.

A child is said to be enrolled in an English Immersion Program if he/she was ever enrolled in a French school, in a program where 25% or more of instruction-time was in English.

Measures of Parental Behaviour Scales (See Chapter 14.0 “YITS Scales”)

PMONS1 - The variable (PMONS1) measures parents' **monitoring behaviour**. The Item Response Theory (IRT) score was derived using the YITS items PB17A, PB17D and PB17G. This variable has been standardized with mean 0 and standard deviation one.

PMONE1 - The variable PMONE1 is the standard error for PMONS1 (monitoring behaviour)

PNURS1 - The variable (PNURS1) measures parents' **nurturing behaviour**.

This variable measures parents' nurturance behaviour. The Item Response Theory (IRT) score was derived using the YITS items PB17C, PB17F, PB17J, PB17M and PB17O. This variable has been standardized with mean 0 and standard deviation one.

PNURE1 – This variable is the standard error for PNURS1 (nurturance behaviour)

PREJS1 - The variable PREJS1 measures parents' **inconsistent discipline or rejection-oriented behaviours**.

This variable measures parents' inconsistent discipline or rejection-oriented behaviours. The Item Response Theory (IRT) score was derived using the YITS items PB17B, PB17H, PB17I, PB17L, PB17N and YPB17E. This variable has been standardized with mean 0 and standard deviation one.

The methodology to derive PREJS1 was adapted to take into account the different response patterns of the question PB17E. An analysis of the responses to this question indicates that the question may have been interpreted differently on the English and the French questionnaires.

PREJE1 – This variable is the standard error for PREJS1 (rejection-oriented behaviours).

Section C

FAMSD - The variable for Family Structure (FAMSD) is developed to draw equivalencies between the two cohorts of YITS (YITS Reading Cohort including the parent interview and 18-20 year-old), the following details how categories may be collapsed.

To draw equivalencies between the two cohorts of YITS (15 and 18 to 20 year-olds), the following details how categories may be collapsed.

Description and Codes for YITS		
Description	YITS 18–20 year-olds	YITS Reading Cohort, parent interview
Two biological parents	01	01
biological mother and stepfather	02	02
biological father and stepmother	03	03
adoptive mother and adoptive father	04	04
biological mother and adoptive father	05	05
biological father and adoptive mother	06	06
biological mother and foster father	07	07
biological father and foster mother	08	08
adoptive mother and stepfather	09	09
adoptive father and stepmother	10	10
stepmother and stepfather	11	11
foster mother and foster father	12	12
two guardians - other (grandparents, brothers, sisters, etc.)	13 <i>note A & D</i>	
two other guardians		14 <i>note A,C,E</i>
biological parent with spouse/partner		15 <i>note A,C,E</i>
adopted/step/foster parent with spouse/partner		16 <i>note A,C,E</i>
biological mother and no father	21	21
biological father and no mother	22	22
adoptive/step/foster mother and no father	23	23
adoptive/step/foster father and no mother	24	24
biological mother and other guardian	25 <i>note A & D</i>	
biological father and other guardian	26 <i>note A & D</i>	
adopted/step/foster mother and other guardian	27 <i>note A & D</i>	
adopted/step/foster father and other guardian	28 <i>note A & D</i>	
single guardian - other	29 <i>note A</i>	29
single biological parent (unknown sex)		35 <i>note E</i>

Description and Codes for YITS		
Description	YITS 18–20 year-olds	YITS Reading Cohort, parent interview
single adoptive/step/foster parent (unknown sex)		36 <i>note E</i>
split custody - two biological parents	31 <i>note F</i>	
split custody - biological mother and other	32 <i>note F</i>	
split custody - biological father and other	33 <i>note F</i>	
split custody - two others	34 <i>note F</i>	
lived without parents	41 <i>note F</i>	
lives in an institution	42 <i>note F</i>	
status unknown	50	
don't know	97	99
refused	98	
not stated	99	
<p>Note A: “Other Guardians” are individuals who were reported as being Other - Related or Other - Unrelated (i.e., grandparent, an aunt or uncle, or family friend).</p> <p>Note B: The YITS 15-year-old youth, parent interview survey can only identify at most 2 parents/guardians. This is determined from person 2 (the parent or guardian of the child) and person 3 (the spouse/partner of person2).</p> <p>Note C: The YITS Reading Cohort, parent interview survey can only identify a second parent/guardian from person 3 (the spouse/partner of person 2). Therefore, the second parent/guardian is always identified as being a spouse/partner of person 2 (respondent).</p> <p>Note D: The YITS 18-20 year-old youth, survey can identify several parent/guardians within the family, however these individual are not necessarily married.</p> <p>Note E: There are several cases in which the sex of person 2 or person 3 was not stated. In order not to lose the biological parent relationship, the “sex” criterion was dropped. May include same sex spouse/partner.</p> <p>Note F: The YITS Reading Cohort, parent interview survey did not ask any questions that would enable us to determine these categories.</p>		

Section D

PD7P1, PD7P2; PD7P3- Question D7 asks, for each person identified in the household, “What is the language that this person first learned at home in childhood and still understands?” Respondents were asked about the first language that was first learned at home in childhood and still understood, for themselves, their child and the spouse/partner. This concept relates to mother tongue.

Although respondents may have declared that they learned two or more languages simultaneously, interviewers attempted to have these respondents choose one language over the other. However, in the few circumstances where respondents would not choose between English and French as their first language, the cases have been included in the new category "Other English and French".

ACTDD - The indicator of activity difficulty at home, or school or other, for child, refers to activity difficulties/reductions in at least one of the areas of home, or school, or in other activities (i.e., transportation or leisure). This variable is derived from questions *D9, D10a, D10b* and *D10c*.

If the respondent answered YES - OFTEN to at least one of the four questions, then the derived variable subset would be YES-OFTEN. Else, if the respondent answered YES-SOMETIMES to at least one of the four questions, then the derived variable subset would be YES-SOMETIMES. Else, if the respondent answered NO to all questions, then the derived variable subset would be NO. Otherwise, the derived variable subset would be set to NOT STATED.

D8 - Question D8 is asked for persons 1, 2 and 3 in the household (D8P1 = Language(s) spoken well enough to conduct a conversation - Youth; D8P2 = Language(s) spoken well enough to conduct a conversation- Respondent; D8P3 =Language(s) spoken well enough to conduct a conversation. - Spouse or partner).

Languages spoken well enough to conduct a conversation, is based on respondent’s assessment of ability of the child, themselves and/or their spouse/partner to speak the language.

VISMIMP1, VISMIMP2, and VISMIMP3 - The concept of visible minority applies to persons who are identified according to the *Employment Equity Act* as being non-Caucasian in race or non-white in colour. Under the *Act*, Aboriginal persons are not considered to be members of visible minority groups.)

Section F:

The variables for current work status are:

CASRD201 (Current Activity Status Respondent (indicator of ever worked – Respondent); and

CASSD201 (Current Activity Status Spouse/partner of respondent (indicator of ever worked – spouse/partner)

Labour market activity: Occupation Standard Occupational Classification (2 digit)

Respondents were asked to describe the kind of work they and their spouse/partner were doing and the most important activities or duties. The information from these responses was then used by coders to assign an occupation code from the 1991 Standard Occupational Classification (SOC).

POCC is the 4 digit occupation code of respondent (SOC).

PARROC is the 2 digit occupation code of respondent (SOC grouped).

SOCC is the 4 digit occupation code of respondent's spouse or partner (SOC)

SPROC is the 2 digit occupation code of respondent's spouse or partner (SOC grouped)

The most detailed SOC code has 1 character, followed by 3 digits². This classification is composed of four levels of aggregations. There are 10 broad occupational categories containing 47 major groups that are further subdivided into 139 minor groups. The minor groups contain 514 unit groups.

If the respondent did not specify an occupation or did not define it in sufficient detail to permit coding then a code of 11 was assigned.

Labour market activity: Industry
North American Industry Classification System (2 digit)

Respondents were asked to indicate for whom they and their spouse worked (their employer name) and the kind of business or service offered by this employer. The information from these responses was then used by coders to assign an industry code from the 1997 North American Industry Classification System (NAICS).

If the respondent did not specify an industry or did not define it in sufficient detail to permit coding then a code of 17 was assigned.

The most detailed NAICS code has 4 digits.³ For the YITS, the NAICS code has been derived at the 2 digit industry sector level for respondents and their spouse/partner.

PIND is the 4 digit industry code of respondent (NAICS)

PARRIC is the 2 digit industry code of respondent (grouped) (NAICS)

SIND is the 4 digit industry code of respondent's spouse or partner (NAICS)

SPRIC is the 2 digit industry code of respondent's spouse or partner (grouped) (NAICS)

Section G

Income reported for the respondent, the respondent's spouse or partner, income of parents and legal guardians were released. Income for other household members was deemed insufficient and therefore not released.

Income variables are calculated and may include imputed values:

RTID - Respondent's Total Income Derived

STID - Spouse/Partner's Total Income Derived

³ In the SOC code, the first character identifies the broad occupation category, the second digit identifies the broad occupational group, the third digit identifies the minor occupational group, and the fourth digit identifies the unit group.

⁴ In the NAICS code, the first two digits identify industry sector, the third digit identifies industry sub-sector, and the fourth digit identifies industry group.

CTID - Combined (respondent and spouse/partner) Total Income Derived

Total income is derived from a sum of the nine income sources collected during the Parent interview. They are: (1) Wages and Salaries before deductions, including bonuses, tips and commissions; (2) Net Income from Farm and Non-farm Self-employment (after expenses and before taxes); (3) Employment Insurance benefits (before deductions); (4) Canada Child Tax Benefits and provincial child tax benefits or credits (including Quebec Family Allowance); (5) Social Assistance (welfare) and Provincial Income Supplements; (6) Support payments received, such as spousal and child support; (7) Other Government Sources, such as Canada or Quebec Pension Plan Benefits, Old Age Security Pension, or Workers' Compensation Benefits; (8) Goods and Services Tax Credit / Harmonized Tax Credit received in 1999; and (9) Other Non-Government sources including dividends, interest and other investment income, employer pensions, RRIFs and annuities, scholarships, and rental income.

8.0 Imputation of Parent Income Variables

The parent questionnaire asked detailed questions concerning the income of the respondent and the respondent's spouse (if applicable). For such quantitative variables, imputation was carried out rather than using special non-response codes. Imputation is the process by which missing or inconsistent items are "replaced" with plausible values. When carried out properly, imputation can improve data quality by reducing non-response bias. It also has the advantage of producing a complete data set for those variables being imputed.

Although the income from 9 different sources (e.g. wages, employment insurance, child tax benefit) was collected, only total income was imputed for both the respondent and the respondent's spouse (when applicable). This is consistent with the fact that only total income is on the microdata file. The missing data were imputed using nearest-neighbour donor imputation. This is a widely used technique for treating item non-response. It aims at replacing missing information for a respondent with values provided from another respondent which is "similar" to him/her. Donor imputation methods have good properties and generally will not alter the distribution of the data, which is a drawback of many other imputation techniques. Rules for identifying the respondent most similar to the non-respondent can vary depending on the variable being imputed. Some of the variables used for identifying similar records included family structure, gender, province, education, hours worked per week and salary.

The imputation was performed in several stages or passes. The records that could not be imputed in a given pass would go through another pass. At each of the passes, less and less restriction was required in order to match to a donor. For example, a pass can force a match on four variables (as long as they are available) and the next pass could be based on only 3 variables (the other one can be missing).

If the combined total income of the household before imputation was greater than or equal to \$80,000, no imputation was done and the sum of the sources that were there were considered to be the actual income. In these cases, the salary was very often given so only the other sources would need imputation. Since the salary weighs very high in comparison to the other sources, the latter were considered negligible.

9.0 Survey Methodology

The integration of YITS with PISA 2000 (OECD's⁴ Programme for International Student Assessment) had an enormous impact on the design of YITS.

The basic sampling plan prescribed for countries participating in PISA entailed two-stage probability sampling, with a stratified PPS sample of at least 150 schools selected in the first stage and a systematic equal-probability sample of 35 students selected at the second stage. Schools with fewer than 35 students in the target population would be sampled with equal probability and within those schools selected, all students would be included in the sample. Ideally the sample would be allocated to school strata such that the expected student sample size would be proportional to the total number of students. This would result in approximately equal weights at the student level.

In Canada, special requirements for the survey estimates influenced the stratification and sample allocation, dictating a much larger sample than 150 schools. Reliable YITS estimates were required for each of the ten provinces of Canada. In five of the ten provinces, namely, Nova Scotia, New Brunswick, Quebec, Ontario and Manitoba, there was also a requirement to provide estimates from the PISA tests by language of instruction for each of the two official languages, English and French. For its part as a longitudinal survey, YITS ideally would accommodate province-level estimates and analysis of at-risk sub-groups of the target population (for example high-school leavers) at each of the five planned cycles. Although the sample design for all countries participating in PISA was specified by Westat, Canada did some modifications to the proposed design to account for the YITS component of the survey⁵.

9.1 Target Population versus Survey Population

The target population, which was determined largely by the survey design for PISA, comprises persons who were born in 1984 and in the 1999/2000 school year were attending any form of schooling in the provinces of Canada.

Stringent definitions regarding the target population and the permissible percentage of exclusions were established for countries participating in PISA. These are stated in detail in the PISA 2000 sampling manual and are summarised below.

The international desired target population for YITS comprised persons who were born in 1984 and were attending any form of schooling in Canada. Thus Canadian offshore schools and Canadian residents who were attending other schools outside Canada were not in the target population. For YITS alone, the ideal target population would also have included persons in this age group who were not attending any form of schooling. However, most of the student lists provided by sampled schools were created in the fall of 1999, that is, before persons born in 1984 reached the legal dropout age of 16.

The national desired target population would ideally be the same as the international desired target population, but countries could request approval to exclude certain geographic areas or political or language groups, for example, under special circumstances. In Canada, schools in the northern territories and on Indian reserves were excluded.

⁴ Organisation for Economic Co-operation and Development

⁵ See PISA technical report or PISA sampling manual for a detailed account of sample design proposed for all participating countries. These are available from the OECD PISA website, www.pisa.oecd.org.

The national defined survey population corresponded to the national desired target population with the following groups excluded:

- School-level exclusions
 - Schools impractical to survey because they were: 1) geographically inaccessible; or 2) of extremely small size; or 3) of a type for which administration of the PISA assessment within the school would not be feasible. There was a requirement that such exclusions represent less than 0.5 percent of the national desired target population.
 - Schools providing instruction only to students of a type that could be excluded according to the guidelines below (for example, blind students). Those exclusions were to represent less than 2 percent of the national desired target population.
- Student-level exclusions:
 - Within participating schools, students selected in the sample could be excluded if: 1) they were assessed to be emotionally or mentally unable to follow the instructions of the cognitive skills tests; or 2) they were permanently physically unable to perform in the PISA testing situation ; or 3) they had received less than one year of instruction in the language of the test

Note that exclusions of all types were to represent in total less than 5 % of the national desired target population.

9.2 Sampling Frame

The sampling frame was created from a list of schools provided by each of the ten provinces included in the national desired target population. The specifications sent by Statistics Canada to the provincial co-ordinators indicated the lists should include every school for which the 1998/99 enrolment included at least one student born in 1983. The frame therefore relates to 15-year-olds in the school year preceding that of the main survey. It was not feasible to obtain 1999/2000 school lists in time for the survey.

The main source of information used to evaluate the school lists was a school enrolment file and administrative data Statistics Canada receives from:

- provincial ministries of education
- federal government departments (Department of National Defence and Indian and Northern Affairs Canada (INAC))
- individual schools, depending on the type of school and the province.

At the time, the most recent enrolment files pertained to the 1997/98 school year. To the extent possible, the school lists from the provinces were matched against the enrolment and administrative files, primarily to check for coverage at the school level. However, this process was less successful in provinces such as Quebec where a large-scale restructuring of the school system had occurred, resulting in changes to school and school-board identifiers. It was also more difficult to assess the coverage of schools with small enrolment counts of 15-year-olds, since these were more likely than larger schools to change their in-scope status from one school year to the next.

9.3 Stratification

The PISA documentation refers to two types of stratification possible: explicit and implicit. Explicit stratification consists of building separate school lists, or sampling frames, according to the set of explicit stratification variables under consideration. Implicit stratification consists essentially of sorting the schools within each explicit stratum by a set of implicit stratification variables. This type of stratification is a very simple way of ensuring a strictly proportional sample allocation of schools across all implicit strata. It can also lead to improved reliability of survey estimates, provided that the implicit stratification variables being considered are correlated with

PISA achievement (at the school level). Guidelines were provided by Westat on how to go about choosing stratification variables.

For estimation purposes, schools on the frame were first stratified by province and in the provinces of Nova Scotia, New Brunswick, Quebec, Ontario and Manitoba, also by language of instruction, thus creating 15 super-strata. Within the province-language classes schools were further stratified by enrolment size, where enrolment refers to the number of 15-year-olds in the school. These final design strata are referred to as the explicit strata.

An enrolment size of 35 was the target cluster size (TCS) prescribed for PISA. This initially became a stratum boundary to facilitate the application of different school sample selection methods for large and small schools. After discussing the draft with Westat and reviewing the treatment for small schools proposed for PISA⁶, the design was revised to:

- Move schools of size 35 to the stratum of large schools (to be consistent with the PISA sampling guidelines)
- Reduce the size exclusion to schools with 2 or fewer students
- Create a new stratum of size 3 to 5 students, permitting the option of an allocation equivalent to half that of proportional allocation
- Replace stratum defined as having 6 to 35 students with two strata: 6 to 16 and 17 to 34, which allowed us to apply within each province/language super-stratum the PISA stratification guidelines for small schools (enrolment less than TCS), moderately small schools (enrolment between TCS/2 and TCS) and very small schools (enrolment less than TCS/2).

The preliminary size strata were used for every super-stratum in the allocation process up to the point of determining a base school sample size, i.e. the required sample size assuming all selected schools would still be in scope for collection.

Final size strata for small schools

A census of schools and students was taken in P.E.I., Nova Scotia French and Manitoba French, so for sampling purposes, no size stratification was required. Among super-strata without a census:

- Strata of size 3 to 5 with a base school sample of less than 4 schools under reduced allocation were collapsed with the adjacent size 6 to 16 strata. The size 3 to 5 stratum was kept only for Newfoundland, Manitoba English and Alberta and in these super-strata; each of the size 6 to 16 and 17 to 34 strata also had a sample of least 4 schools.
- Among the remaining super-strata, if either of the size strata 3 to 16 or 17 to 34 had a base allocation of less than 4 schools, the two strata were collapsed. This applied to the New Brunswick English, New Brunswick French, Quebec French and Ontario English super-strata.

Final size strata for large schools

The stratification for large schools was determined by sample size requirements for each super-stratum and by the distribution of the sizes of large schools. Table 9.1 summarizes the process. To obtain large enough sample sizes and still try to retain the maximum sample size of 35 students per school, the sampling rates among large schools were very high.

- In 9 super-strata large schools were grouped into 2 size strata defined by the ranges $[35, L_s]$ and $[L_s + 1, \infty)$ within super-stratum s , either to separate PPS sampled schools from the take-all stratum of the largest schools, or in the case of the New Brunswick English and French super-strata, to create two

6 See Section 5.7 of the PISA sampling manual

take-all strata, and from the largest schools, select student samples larger than 35 students and proportional to the size of the school.

- Among the other 6 super-strata (Newfoundland, P.E.I., Nova Scotia French and English, Ontario English and Manitoba French) all had only one stratum of large schools, and all but Ontario sampled large schools at 100%. In the three smallest super-strata, i.e. P.E.I., Nova Scotia French and Manitoba French, a census was required at the student level as well.

Table 9.1: Stratification and allocation for large schools

Super-strata	Size strata	Sampling	
		Schools	Students
P.E.I., Nova Scotia French, Manitoba French	≥ 35	census	census
Newfoundland, Nova Scotia English	≥ 35	census	35 per school
New Brunswick English and French	35 to L_s $\geq L_s + 1$	census census	35 per school proportional to school size
Quebec English and French, Ontario French, Manitoba English, Saskatchewan, Alberta, British Columbia	35 to L_s $\geq L_s + 1$	sample census	35 per school 35 per school
Ontario English	≥ 35	sample	35 per school

Implicit strata

To create implicit strata within each explicit stratum, schools were classified by indicator variables for public/private schools and urban/rural class. Implicit strata were used in the systematic sample selection of schools and also in the weighting process.

9.4 Sample Allocation

The sample size for YITS was determined in several steps. Criteria concerning the precision of estimates fixed a base sample size for each super-stratum, which was then allocated to preliminary size strata proportional to the frame enrolment. The base allocation was revised as preliminary stratum boundaries were modified to avoid excessively small samples and to accommodate very high sampling rates among large schools. Finally, to account for sampled schools that would be classified as out-of-scope once contacted, the revised base allocation in some strata was inflated, resulting in the final sample size of schools and an expected sample size of students. The major steps in this process are presented below.

Base sample size

Data quality constraints by province for YITS and by province-language classes for PISA were the key criteria applied to determine the base sample size. More specifically, for each super-stratum the base sample size had to provide a coefficient of variation (CV) no greater than 16.5% for a PISA characteristic found in 0.1 or more of the super-stratum population, under a set of assumptions for the response rate, the design effect and the item response theory (IRT) factor. Similarly, to determine sample sizes that would satisfy estimation requirements for YITS characteristics, the base sample size for each province had to provide a CV no greater than 16.5% at each of five cycles for both of the following:

- Estimates of proportions of 0.1 or more among the domain of non-leavers in the target population, based on historical leaver rate estimates from other surveys
- Estimates of proportions of 0.3 or more among the domain of leavers in the target population

For the YITS components, these calculations also depended on assumed values for the design effect and the response rate at each of 5 cycles.

Finally, the base sample size for each preliminary stratum was determined by the larger of the sizes calculated for each of PISA and YITS.

Preliminary stratum boundaries were modified to avoid very small sample sizes in strata of small schools and to obtain the required base sample sizes among large schools, as noted in the section on stratification.

Final sample size

Two adjustments to the base school sample size in each stratum determined the final school sample size. These adjustments, which were applied multiplicatively to the base sample, were meant to compensate for sampled schools that on contact would be identified as ineligible, due to the type of school or null enrolment of the target population in the 1999/2000 school year. The guidelines described below were implemented for this process, although it was impossible to avoid an element of subjectivity in the final choice of the inflation factors for each stratum.

Adjustment for schools of an excluded type:

Most provinces, with the possible exception of British Columbia, did not provide frame information to identify schools that were one of the types to be excluded according to the PISA sampling criteria. Limited information from comparisons of the school lists provided by the provinces and older Statistics Canada enrolment files created from administrative sources suggested that the incidence of excluded schools on the frame varied from one province to another. The percentage increase in the base sample for all provinces excluding Quebec was set taking into account these comparisons and also using the incidence of excluded schools in British Columbia as a guideline. For the province of Quebec, the incidence of schools for which all students were flagged as <<Enfants handicapés ou en difficulté d'acquisition et d'apprentissage>> (EHDA) was used as a guideline for the proportion of schools that might be types to exclude. The national school sample size was increased by 3.0% for this factor. Stratum increases varied from 0% (for most large-school strata) to 33.8% for Quebec French small schools.

Adjustment for schools with null enrolment:

To get some idea of the transition of schools from in-scope in one school year to out-of-scope the subsequent year, tabulations based on the 1996/97 and 1997/98 Statistics Canada enrolment files were examined, although these were not available for all provinces. The national school sample size was increased by 1.5% for this factor. Stratum increases varied from 0% (for most large-school strata) to a cap of 10% for small-school strata in several super-strata. Although the administrative files indicated a very high incidence of schools changing to the out-of-scope status in some strata, corresponding increases in the YITS sample size would not have been feasible.

In the end, a total sample of 1,242 schools was selected, with an expected student sample of 38,757 students. Note that table 9.2 shows 1,241 as being in the sample. The difference is explained by one school that was split between the two school years 1998/1999 and 1999/2000.

Table 9.2: Sample Summary Allocation

Province	Language	Size Stratum	Final school sample	Student sampling rate	School sampling rate	
Newfoundland		3 to 5	5	0.190	0.238	
		6 to 16	17	0.349	0.395	
		17 to 34	18	0.356	0.400	
		35+	69	0.364	1.000	
			109	0.360	0.612	
P.E.I.		3 to 34	14	1.000	1.000	
		35+	14	1.000	1.000	
			28	1.000	1.000	
Nova Scotia	English	3 to 16	15	0.271	0.313	
		17 to 34	11	0.278	0.306	
		35+	84	0.276	1.000	
			110	0.276	0.655	
	French	3 to 34	3	1.000	1.000	
		35+	4	1.000	1.000	
			7	1.000	1.000	
	Both		117	0.291	0.669	
	New Brunswick	English	3 to 34	11	0.360	0.440
			35 to 140	25	0.504	1.000
141+			19	0.283	1.000	
			55	0.342	0.797	
French		3 to 34	10	0.421	0.526	
		35 to 100	6	0.579	1.000	
		101+	12	0.371	1.000	
		28	0.396	0.757		
Both			83	0.360	0.783	
Quebec		English	3 to 16	12	0.189	0.226
	17 to 34		9	0.205	0.231	
	35 to 175		26	0.192	0.500	
	176+		15	0.166	1.000	
		62	0.184	0.390		
	French	3 to 34	11	0.053	0.073	
		35 to 600	104	0.048	0.249	
		601+	4	0.049	1.000	
		119	0.048	0.208		
	Both		181	0.062	0.247	
Ontario	English	3 to 34	5	0.042	0.042	
		35+	146	0.036	0.209	
			151	0.036	0.185	

Province	Language	Size Stratum	Final school sample	Student sampling rate	School sampling rate
Ontario	French	3 to 16	4	0.333	0.333
		17 to 34	5	0.238	0.238
		35 to 85	16	0.380	0.615
		86+	23	0.247	1.000
			48	0.283	0.585
	Both		199	0.045	0.222
Manitoba	English	3 to 5	8	0.107	0.143
		6 to 16	14	0.218	0.255
		17 to 34	15	0.217	0.250
		35 to 105	34	0.300	0.586
		106+	41	0.172	1.000
			112	0.211	0.415
	French	3+	9	1.000	1.000
	Both		121	0.228	0.434
Saskatchewan		3 to 16	32	0.231	0.239
		17 to 34	24	0.232	0.242
		35 to 95	36	0.347	0.600
		96+	39	0.176	1.000
			131	0.229	0.395
Alberta		3 to 5	9	0.048	0.062
		6 to 16	21	0.085	0.104
		17 to 34	16	0.088	0.101
		35 to 380	67	0.089	0.309
		381+	20	0.072	1.000
		133	0.084	0.179	
B.C.		3 to 16	16	0.084	0.090
		17 to 34	7	0.092	0.108
		35 to 390	108	0.081	0.393
		391+	8	0.080	1.000
		139	0.081	0.264	
Canada Total			1,241	0.099	0.310

9.5 Sample Selections

The methodology adopted for PISA included an initial sample of schools as well as up to two replacement schools per initial school.

Initial school sample

Prior to sampling, within explicit strata schools were first sorted by implicit stratum (defined by public/private and rural/urban variables). Within implicit strata, schools were sorted by enrolment size, alternating in ascending/descending order for consecutive implicit strata. Within each explicit stratum, a systematic sample of schools was selected, with equal probabilities in the small-school strata and the take-all strata of large schools and with PPS in the other school strata, using enrolment as a size variable.

Replacement schools

With strict rules specified for designating the replacements for each school, the PISA consortium preferred this method of achieving an acceptable response pool to the alternative of merely inflating the initial sample size. Replacements were allowed to be contacted only if the initial school refused. From the initial sample, schools designated as exclusions were not replaced.

For Canada, the method for selecting replacement schools was modified slightly from that described in the PISA sampling manual, in order to select replacements within the same implicit stratum where possible and of course to contend with the high sampling rate.

Every sampled school was contacted to ask if it would participate in YITS. As expected, some of the schools in the initial sample were out of scope for the survey, either because they had not been identified as eligible for exclusion on the frame or because they had fewer than three students born in 1984 enrolled for the 1999/2000 school year. Other schools in the initial sample were in-scope but refused to participate. For some of these, replacement schools were asked to participate.

Student level

For every sampled school that agreed to participate in YITS a list was obtained comprising students born in 1984 who were enrolled for the 1999/2000 school year. The format and exact vintage of the lists varied by province and among schools within some provinces. From the initial lists received, a file of students sorted by date of birth was created, from which an equal-probability systematic sample of students was selected.

In the small-school strata all students in a sampled school were selected. In strata of large schools a sample of 35 students was selected, with the exceptions previously noted in Table 9.1 in section 9.3. Among the sample of students selected, those who, in the judgement of the school administrator, met the PISA criteria for exclusion, were no longer attending the school, or were not actually born in 1984 were subsequently assigned an exclusion code and were dropped from the collection activities.

On receipt of the student lists, some schools were found to have a 1999/2000 enrolment outside the size range of the stratum to which the school had been assigned. For these “stratum jumpers” the sample size of students selected was determined by the updated enrolment of the school. For example, a school in size 17 to 34 strata with a frame enrolment of 32 and an updated enrolment of 65 would have a sample of 35 students selected. Some schools with an updated enrolment greater than 2 students did not participate because of special situations. For example, if the number of eligible students in the sample was less than 3, the school was withdrawn as exclusion. A second situation arose in several schools for which there were 3 or more eligible students in the sample, but because some of them were chronic truants (i.e. close to being drop-outs), fewer

than three students would have been likely to participate in the survey, so the school was withdrawn and was designated as a refusal. It was too late to contact replacement schools for these cases.

The stratum of largest schools in each of the New Brunswick super-strata required an additional step in the sampling process. Once the student lists were received student sample sizes proportional to the updated total enrolment were calculated for each school.

10.0 Response and Non-response

In any survey, there exist 2 types of non-response: total non-response occurs when a selected unit does not answer any questions and partial or item non-response occurs when a selected unit answers enough of the questions, but not all, to be considered a respondent. This next section presents rules for identifying which units should be considered respondents. The issue of partial non-response will be addressed in section 10.2.

10.1 Definition of a Respondent

There were many potential options on how to define a respondent, each with consequences on data quality, weighting and variance estimation. Data were collected from schools, students and parents so non-response could occur at many levels. Furthermore, there were 3 different survey vehicles for students to complete (PISA cognitive test, PISA background questionnaire and YITS questionnaire). Also, an additional source of non-response was present for Ontario students as data for them was collected under the Statistics Act requiring parental consent to share student data with a third party, including the PISA consortium. Finally, for the parent questionnaire, because of a data sharing agreement with HRSDC, some of the respondents would be dropped. The following summarize the rules for defining respondent for each of the components. Note that the official PISA response rates are based on criteria somewhat different than those below, which were adopted by PISA to determine which students would appear on the final microdata file.

School: A school was considered to have participated in the survey if at least 25% of the sampled eligible students were assessed. Otherwise, the school was considered to be a non-respondent.

Student: A student was considered a YITS student respondent if either of the following criteria was met:

1. The student attended at least one of the two 60 minute test sessions which assessed reading, mathematical and scientific proficiency.
- OR
2. The student attended the session where the PISA student questionnaire was administered (which was designed to collect information about the student's family, home environment, reading habits, school and everyday activities) and they provided a response to either the father's or the mother's occupation question.

Note that YITS students were considered to be respondents as long as they satisfied PISA criteria for being a respondent. This rule was used to simplify the treatment of non-response at the weighting stage. This means that students that participated in PISA but did not answer the YITS Student questionnaire are on the final released files but do not have any YITS data in them. The small number of such units was the main reason for accepting the PISA criteria.

Parent: The minimum data requirement for a questionnaire to be kept as a responding unit was the presence of data on occupation or the highest completed level of education, for the responding parent or spouse.

10.2 Response Rates

All of the response rates provided in this section are unweighted and were computed using the following approach. The following formula was applied regardless of whether the responding unit was a school, a student or a parent. The numerator consists of all original sampled units that fall in the target population and participated in the study. The denominator consists of all units in the original sample minus those units found to be excluded or ineligible at the time of collection. For example, a sampled student who was 14 years-old in 1984 would not

be eligible and would not contribute in the calculation of the response rate. The same is true for a sampled school that is confirmed to be a school for children with learning disabilities.

10.2.1 School Response Rate

Table 10.1 summarizes by province the response rates at the school level. Of the initial 1,242 sampled schools, 83 were excluded because they were identified as being out of scope for the survey (e.g. special needs school). For schools that refused to participate, replacement schools had been identified at the sampling stage to substitute for those refusals. There may have been some refusals for which a replacement school had not been identified, because of high sampling rates. Also, some schools refused to have a replacement school participate. In total, 32 replacement schools were used. The inclusion of those schools does not affect the school response rates significantly, given that there are so few of them. Note that OECD treated such schools differently in the calculation of response rates so counts given here may differ slightly from counts provided in official PISA documentation. Overall, before replacement schools were included, the school response rate at the Canada level was 93.6%. If replacement schools are considered as regular respondents, the rate climbs to 96.4%. Note that column 3 in the table includes initial and replacement schools and both columns 4 and 5 are restricted to the initial sample of schools.

Table 10.1: School response rates

Province	Number of Schools Sampled	Number of Schools that Participated	Number of Schools that Refused	Number of Schools Excluded	Number of Replacement Schools
Newfoundland	109	99	3	7	0
Prince Edward Island	28	27	0	1	0
Nova Scotia	117	111	5	1	0
New Brunswick	84	67	1	16	0
Quebec	181	165	4	12	0
Ontario	199	182	8	9	27
Manitoba	121	106	4	11	1
Saskatchewan	131	117	10	4	4
Alberta	133	120	2	11	0
British Columbia	139	123	5	11	0
TOTAL	1242	1117	42	83	32

10.2.2 Student Response Rate

Table 10.2 gives response rates at the student level for YITS. The table shows the number of respondents for the PISA students based on the criteria defined in section 10.1. Excluded and ineligible students from the initial sampled list of students are also given. Ineligible students include students who were not age-eligible (i.e. never should have appeared on the list received from the school) or were no longer attending the school. Excluded students consist of students who were age-eligible and were attending the school but were not able to do the PISA tests (for example special education students or those not able to speak the language). Note that special education programs may also include so-called gifted students. Note that a significant portion of the student non-response (27.6%) comes from Ontario because of an issue of non-consent specific to that province. For the province of Ontario only, parents had to sign a consent form in order for the students to participate in the PISA study. The parental consent form was required to permit the student's data to be shared with a third party. A student without a consent form could still participate in the survey. Any student that did not have consent was considered to be a non-respondent. In total, 630 Ontario students were dropped because of this constraint. For the YITS Student questionnaire, we have already mentioned that the same definition as PISA was used. The table shows that 357 students responded to PISA but not to YITS. Those records were still kept and will have no data for the YITS student variables. Note also that there were a few students who did not meet the criterion of a PISA respondent but had completed at least part of a YITS questionnaire. These records were counted as non-respondents for both PISA and YITS.

Table 10.2: YITS student response rates

Province	NFLD	PEI	NS	NB	QC	ON	MN	SK	AB	BC	TOTAL
Total initially sampled	2812	2003	3619	3534	5344	6187	3296	3234	3445	4094	37568
Students Excluded	180	92	166	141	154	343	150	100	100	158	1584
Students Ineligible	77	67	133	92	166	287	191	163	208	325	1709
Total to be surveyed	2555	1844	3320	3301	5024	5557	2955	2971	3137	3611	34275
Students Participated in PISA	2281	1632	2930	2963	4497	4290	2599	2716	2742	3037	29687
Students Participated in PISA and YITS	2250	1597	2892	2909	4450	4258	2569	2698	2714	2993	29330
% Non Response	10.7%	11.5%	11.7%	10.2%	10.5%	22.8%	12.0%	8.6%	12.6%	15.9%	13.4%
% of Total Non Response	6.0%	4.6%	8.5%	7.4%	11.5%	27.6%	7.8%	5.6%	8.6%	12.5%	100.0%

10.2.3 Parent Response Rate

Only parents of the 29,330 students who completed a YITS Student questionnaire were required to complete a telephone interview. The following table (Table 10.3) shows response rates for the parents. A handful of parents responded to the Parent questionnaire even though their 15-year-old child did not participate in the PISA study. Those questionnaires were later discarded. Finally, all of the parents who agreed to participate in the survey were asked whether or not they agreed to share their data with HRSDC. Those who refused the data sharing agreement were subsequently dropped from further processing. There were 498 such parent non-sharers.

Table 10.3: YITS Parent Response Rates

Province	NFLD	PEI	NS	NB	QC	ON	MN	SK	AB	BC	TOTAL
Non Respondents	149	109	261	308	418	381	299	257	267	320	2769
Respondents	2101	1488	2631	2601	4032	3877	2270	2441	2447	2673	26561
TOTAL	2250	1597	2892	2909	4450	4258	2569	2698	2714	2993	29330
Response rate	93.4%	93.2%	91.0%	89.4%	90.6%	91.1%	88.4%	90.5%	90.2%	89.3%	90.6%
non-sharers	25	10	20	37	35	79	81	74	117	20	498
% of non-sharers	1.2%	0.7%	0.8%	1.4%	0.9%	2.0%	3.6%	3.0%	4.8%	0.7%	1.9%

10.3 Partial Non-Response Rates

This section addresses the issue of item non-response. This occurs when a person agrees to participate in the survey but does not respond to all of the questions that apply to his/her situation. This can occur for various reasons. Examples of such reasons include an unwillingness to answer sensitive questions, respondent fatigue, accidentally skipping part of the questionnaire or operational difficulties. Partial non-response for parent income variables will be addressed in section 11.0. on data quality. Partial non-response rates are summarized below by section of the questionnaire, since variables within a section tend to share a common subject matter and/or are being used together for deriving variables about the same subject matter. By nature of the survey, some questions are only applicable to a subset of respondents. The rates given in this section are calculated as the ratio of records with missing information divided by the total number of records for which the question is applicable. Only variables that are applicable to more than 50% of the respondents were included in the analysis. The purpose of this section is to warn users on what can be expected in terms of overall partial non-response. If such information is needed for only one variable at a time, the code book should be consulted. In the following summary, a value for a given variable is considered as item non-response for a specific respondent if the value is missing or not stated or if the respondent refused or did not know the answer to the question.

10.3.1 Item Non-Response - YITS Student Questionnaire

Table 10.4 summarizes item non-response for the YITS Student questionnaire. In general, item non-response does not appear to be a significant problem, although there are a few questions for which the rate exceeds 25%. The question where students are asked how many hours a week they worked at all of their jobs (YSG15A) had an unusually high non-response rate of 30.1%. Note that these rates do not include income variables and derived variables which are usually dependent on more than one question and could therefore have slightly higher non-response rates.

Table 10.4 : Partial non-response for YITS Student questionnaire

Section	Number of variables	Minimum item non-response rate (%)	Maximum item non-response rate (%)	Mean item non-response rate (%)	Median item non-response rate (%)	variable(s) with maximum item non-response rate
A School experiences	43	1.4	6.6	2.6	2.6	YSA10
B Attendance	1	4.0	4.0	4.0	4.0	YSB1
C Activities	10	2.0	6.5	4.0	3.6	YSC2C
D Relationships	16	2.3	2.7	2.6	2.6	YSD2H
E Events	9	2.3	4.8	3.2	2.5	YSE6
F Volunteer activities	15	3.0	16.4	10.2	16.4	YSF3A-H
G Work	56	4.2	30.1	9.8	10.0	YSG15A
H Money	4	4.7	8.5	6.2	5.9	YSH1B
I How do you feel	17	4.5	5.2	4.8	4.7	YSI2D
J Using your skills	61	5.8	6.6	6.1	6.2	YSJ1E1-5
K Courses	41	6.7	25.7	11.7	7.7	YSK5

10.3.2 Item Non- Response - YITS Parent questionnaire

Table 10.5 (which is similar to Table 10.4) is given below for the Parent questionnaire variables. Again, income and derived variables are excluded from the rates. Overall, item non-response is lower for the Parent questionnaire than it is for the students, with most variables having less than 1% missing data. The question where parents are asked about the month in which their spouse started working at their current job (PF48A) has the highest overall non-response rate at 22.6%.

Table 10.5: Partial non-response for YITS Parent questionnaire

Section	Number of variables	Minimum item non-response rate	Maximum item non-response rate	Mean item non-response rate	Median item non-response rate	variable(s) with maximum item non-response rate
A family background	12	0.0	1.4	0.7	0.6	PA5P3
B School experiences	68	0.04	9.6	0.9	0.4	PB12E
C Custody history	10	0.01	0.6	0.3	0.3	PDVC9A
D Language & ethnicity	14	0.06	1.2	0.4	0.3	PD3P31
E Parent's education	4	0.07	3.7	1.7	1.5	PE2C
F Current activity	24	0.27	22.6	2.7	1.3	PF48A

11.0 Data Quality

11.1 Frame

A sample is selected from a frame which essentially consists of an exhaustive list of all units in the target population. If the frame does not contain all the units in the target population then there is under-coverage. If the frame contains units that are not in the target population, there is over-coverage. As discussed in section 9.1, some exclusions to the desired national target population were permitted, so long as those exclusions did not represent more than 5% of the national desired target population. Table 11.1 summarizes all the school and student exclusions and the impact they had on the frame. It illustrates Canada's effort to comply with the exclusion guidelines. These figures indicate that the survey population (i.e. national defined target population) covered approximately 99.4% of the national desired target population and 96.5% of the national population of persons born in 1984 (whether enrolled in school or not). The figures in the sampling form assume no within-school exclusions based on the individual student, but this type of exclusion was estimated from the survey results and was included in the PISA international report and the so-called Pan-Canadian PISA report. As indicated above, schools on Indian reserves and in the northern territories were excluded, as were various types of schools for which it would have been infeasible to administer the survey, either because of the nature of the programs (for example, programs offering courses only at night or by correspondence) or the characteristics of the students instructed at those schools (for example, schools for the blind or deaf).

In Canada a large proportion of schools with students in the PISA target population in fact had very small enrolments of 15-year-olds and the exclusion of these schools became a concern. On the school frame, among eligible schools (and those that would have been eligible for YITS if size were not a concern), 22.4% were in the size category of 1 to 5 students. However, the enrolled 15-year-olds in these small schools represented a mere 0.6% of the target population. The prevalence of these small schools had implications for the sampling plan, because they are expensive to survey, and it was expected they would be more likely to become out-of-scope for the survey year by virtue of a null enrolment of persons in the target population. Although the PISA sampling procedures entailed the selection of replacement sample schools, they were to be used only for refusals among the initial sample of schools rather than to replace sampled schools that became ineligible. After consultation with Westat and the survey manager, it was concluded that schools with fewer than 3 students could be excluded.

Table 11.1: PISA Sampling Form 2-3

	Students		Data Sources			
	No.	%				
Total national population of 15 year olds:	403803		Census Projection Counts 1999			
Total national population of 15 year olds enrolled in educational institutions:	396660		Enrolment aggregated from the provincial databases of 1998/99			
Population Omitted	4635	1.17%				
Territories (Yukon, NorthWest, Nunavut)	1722	0.43%	Census Projection Counts 1999			
Schools on Federal Indian Reservations	2913	0.67%	Enrolment provided by Indian and Northern Affairs Canada (1997/98)			
Total enrolment in the national desired target population:	392025	98.83%				
Percentage of coverage in the national desired target population						
	Students			Schools		
	No.	%	Cum %	No.	%	Cum %
National desired target population	392025	100.00%		4716	100.00%	
SCHOOL LEVEL EXCLUSION	2035	0.52%		669	14.19%	
Operationally infeasible	1179	0.37%		35	0.74%	
Distance education (computers)	114	0.03%	0.03%	16	0.34%	0.34%
Distance education (mail)	654	0.17%	0.20%	9	0.19%	0.53%
Youth custody	36	0.01%	0.21%	10	0.21%	0.74%
Home-schooled	375	0.10%	0.30%	0	0.00%	0.74%
Small school stratum						
Distribution by estimated enrolment						
1	412	0.11%	0.41%	412	8.74%	9.48%
2	444	0.11%	0.52%	222	4.71%	14.19%
3	498	0.13%	0.65%	166	3.52%	17.71%
4	464	0.12%	0.76%	116	2.46%	20.17%
5	630	0.16%	0.93%	126	2.67%	22.84%
6	558	0.14%	1.07%	93	1.97%	24.81%
7	637	0.16%	1.23%	91	1.93%	26.74%
8	520	0.13%	1.36%	65	1.38%	28.12%
9	648	0.17%	1.53%	72	1.53%	29.64%
WITHIN-SCHOOL EXCLUSION						
Schools with all students not physically/mentally capable	171	0.04%		28	0.59%	
Visually or hearing impaired	137	0.03%	0.55%	16	0.34%	14.53%
Long-term PRP	29	0.01%	0.56%	11	0.23%	14.76%
Institutional	5	0.00%	0.56%	1	0.02%	14.78%
Total enrolment in national defined target population:	389819	99.44%		4019	85.22%	

One of the key variables used in the sample design was the enrolment count information received from various sources. Enrolment was used not only as criteria to include/exclude schools from the frame but also in deriving the stratification.

Two of the provinces, Ontario and Saskatchewan, which represent approximately 38% and 4%, respectively, of the national desired target population, were able to provide school lists with enrolment counts only by grade, rather than by year of birth. The lists contained separate counts of grade 9 and grade 10 students for each school. For these two provinces, enrolment counts of 15 year-olds for the frame were estimated from linear regression models relating the enrolment of 15 year-olds to enrolment of grade 9 students and grade 10 students⁷ The models were based on data from the Statistics Canada school enrolment file. Among secondary schools including grades 9 and 10 in Ontario and Saskatchewan the most common grade ranges are respectively 9 to 13 and 7 to 12. Thus, as indicated in Table 11.2, the coverage of students born in 1983 by schools with grade 9 and/or grade 10 students in 1998/99 was expected to be about 98% in each of these two provinces.

Table 11.2: 1996 Census distribution of persons born in 1983 by grade during 1998/99

Province	Grade (%)					
	9	10	9-10	7-12	9-13	7-13
Ontario	16.1	74.4	90.5		97.7	98.0
Saskatchewan	22.4	61.8	84.2	99.3		

A province-level comparison of the national desired target population on the frame versus population projections from the Census suggests that coverage rates at the student level exceeded 97% for all provinces except Ontario (94.9%).⁸

Table 11.3: Frame enrolment and projected 15-year-old population, by province

Province	Population ⁹	Frame enrolment	
		Count	% of population
Newfoundland	8,115	8,309	102.4
P.E.I.	2,039	1,978	97.0
Nova Scotia	12,589	12,294	97.7
New Brunswick	10,107	10,373	102.6
Quebec	90,615	89,014	98.2
Ontario	152,944	145,091	94.9
Manitoba	15,117	14,822	98.0
Saskatchewan	15,076	14,912	98.9
Alberta	43,262	42,257	97.7
British Columbia	52,488	52,600	100.2
Total	402,352	391,650	97.3

There was also concern that exclusions defined by the type of school were not universally identifiable on the frame. The school lists received from the provinces did not all contain cases from the full spectrum of schools Statistics Canada named in the specifications. This may have been due to the absence of 15 year-olds in certain types of schools in some provinces; however, it may also indicate under-coverage. In the case of Quebec, the list identified schools for which the entire enrolment consisted of special students (i.e. EHDAA students), but there was no additional information to qualify the type of school.

⁷ This approach was also applied to model enrolment counts by age for private schools in Nova Scotia.

⁸ The population projections are based on 1996 Census projected counts for the December 1999 Labour Force Survey. These counts exclude the population in northern and remote areas and on Indian reserves.

⁹ Population counts in table 11.3 differ from counts given in PISA sampling form 2 and 3. The count of 403,803 in the sampling form is based on 1991 Census projected counts created in April 1999, and this count includes the territories. The count of 402,352 in table 11.3 is a projection for the December 1999 population in the 10 provinces based on the 1996 Census.

The lack of detail regarding type of school pointed to a risk that some schools eligible for exclusion would be identified as such only after the sample of schools was selected and student lists were requested from those schools. (This would occur either when the provincial coordinator saw the list of sampled schools or when he or she contacted the sampled schools individually.) This was undesirable because it could cause significant reductions in the effective sample size.

The last item in the list of school-level exclusions pertains to under-coverage due to schools changing their status from out-of-scope in the school year on which the frame is based (i.e. 1998/99 for most provinces) to in-scope in the survey school year (1999/2000). This phenomenon likely will occur more frequently among schools with small enrolment, but it can also arise when new schools are opened or existing schools change programs.

Once data collection was completed at the school level, a more accurate count of enrolment within schools was obtained. The differences between the frame enrolment and final enrolment counts were compared and the results are summarized in tables 11.4, 11.5 and 11.6.

Table 11.4: Mean absolute relative difference by Province

Province	mean percentage
Newfoundland	26.0
PEI	28.7
Nova Scotia	39.6
New Brunswick	13.0
Quebec	11.4
Ontario	15.3
Manitoba	18.5
Saskatchewan	22.7
Alberta	17.9
B.C.	13.9

As we can see, the modeled enrolment applied for Ontario and Saskatchewan did no worse than some of the other provinces. Nova Scotia was the province where discrepancies between the two sources were the most significant. In fact, 6 of the 10 schools with largest absolute relative difference between the two variables came from Nova Scotia.

Because enrolment was used as a stratification variable and because of the impact of stratification on weighting and consequently variance estimation, it is of interest to see how many of the responding schools would actually change strata based on the updated enrolment. Table 11.5 summarizes the results by province.

Table 11.5: Percentage of schools that fall out of their designated size stratum by province

Province	# of Schools	# of Schools that Changed	%
NFLD	99	25	25.3
PEI	27	1	3.7
NS	111	21	18.9
NB	67	1	1.5
QC	165	13	7.9
ON	182	9	4.9
MN	106	21	19.8
SK	117	26	22.2
AB	120	27	22.5
BC	123	7	5.7
TOTAL	1117	151	

Note that schools with low enrolment counts had a greater chance of falling outside of their designated size stratum than schools with large enrolment counts because of the way the size stratum were defined. As a result the percentage of schools that fall out of their designated size stratum when using the enrolment count at the time the sample was taken was examined by school size. For the purpose of this next table, “small” refers to schools where 34 or fewer students were enrolled, “medium” is used when between 35 and 100 students were enrolled and “large” applies when more than 100 students were enrolled.

Table 11.6: Percentage of schools that changed size

Size	# of Schools	# of Schools that Changed	%
Small	236	90	59.6
Medium	261	41	27.2
Large	620	20	13.2
TOTAL	1117	151	

Comparing to Census Totals

When dealing with survey data, the sum of the final sample weights for a particular domain of the population will give an estimate of the population size for that domain. These totals were estimated for the gender and province domains and then compared to known population counts obtained from census 2001 data for those same domains. Because a census count of 15-year-olds born in 1984 would include individuals that are not part of the target population (e.g. home schooled children, special needs students), the estimated totals based on the YITS weights should be less than the census totals. The results are shown in Table 11.7. Overall, it is estimated that YITS covers close to 87% of all 15 years-olds in the population. Note that the sum of the weights differs from the

total enrolment in the national defined target population given in PISA Sampling Forms 2-3 (Table 11.1) because some of the sampled students ended up out of scope for the survey.

Table 11.7: Census counts by province

PROV	Census	YITS	coverage
NFLD	8,115	6,947	85.6%
PEI	2,039	1,844	90.4%
NS	12,589	11,157	88.6%
NB	10,107	9,167	90.7%
QC	90,615	80,538	88.9%
ON	152,944	130,112	85.1%
MN	15,117	12,887	85.2%
SK	15,076	13,639	90.5%
AB	43,262	36,560	84.5%
BC	52,488	45,597	86.9%
total	402,352	348,448	86.6%

11.2 Measuring Sampling Error

The estimates derived from this survey are based on a sample of schools and students. Somewhat different figures might have been obtained if a complete census had been taken using the same questionnaire, interviewers, supervisors, processing methods, etc. The difference between the estimates obtained from the sample and the results from a complete count taken under similar conditions is called the sampling error of the estimate.

Since it is an unavoidable fact that estimates from a sample survey are subject to sampling error, sound statistical practice calls for researchers to provide users with some indication of the magnitude of this sampling error. This section of the documentation outlines the measures of sampling error which Statistics Canada commonly uses and which it urges users producing estimates from this microdata file to use. The basis for measuring the potential size of sampling errors is the standard error of the estimates derived from survey results. However, because of the large variety of estimates that can be produced from a survey, the standard error of an estimate is usually expressed relative to the estimate to which it pertains. This resulting measure, known as the coefficient of variation (CV) of an estimate, is obtained by expressing the standard error of the estimate as a percentage of the estimate. Much of the work on the sample design for YITS focused on the desire to obtain reliable estimates of key variables at super-stratum level (see section 9.4). For future cycles, there is also a desire to produce reliable provincial estimates for key characteristics of student leavers and non-leavers. This cannot be assessed in cycle 1 as all sampled students were currently in school. The following results relate to the first of these survey objectives. In order to be able to produce reliable estimates for 5 cycles of these students, one would expect CVs for cycle 1 to be well below the maximum allowable targeted CV. For the purpose of analyzing the overall quality of the estimates, the coefficients of variation for a number of key student and parent variables were computed for each super-strata (province by language) and the results are summarized in the Tables 11.7a), b) and c) and 11.8 a), b) and c). All characteristics tabulated were for proportions of respondents who fall within a given category. If a question did not apply to the whole population, the proportion was estimated for the subset of the population to which the question applies. The YITS student variables used in the analysis are the following:

A10:	Do you expect to stay in school until you graduate from high school?
A11-YSDV_A11:	Derived variable: What is the highest level of education you would like to get?
D2A:	Think about your closest friends. How many of these friends ... think completing high school is very important? Response categories: none, some, most, all.
D2D:	Think about your closest friends. How many of these friends ... are planning to further their education or training after leaving high school? Response categories: none, some, most, all.
G2A:	Did you ever do any work ... for pay for an employer (such as at a store or restaurant)?
G2B:	Did you ever do any work ... for pay at an odd job (such as babysitting or mowing a neighbour's lawn)?
G2C:	Did you ever do any work ... on your family's farm or in your family's business (with or without pay)?
G11A:	Since the beginning of this school year, have you done any work ... for pay for an employer (such as at a store or restaurant)?
G11B:	Since the beginning of this school year, have you done any work ... for pay at an odd job (such as babysitting or mowing a neighbour's lawn)?
G11C:	Since the beginning of this school year, have you done any work ... on your family's farm or in your family's business (with or without pay)?
L2 -YSDV_L2:	Derived variable: What is your approximate overall mark this year?

Tables 11.7 a) to c) summarize the CVs computed for all of those estimates. The first table presents the CVs for all the estimates where the estimated proportion falls between 10% and 20% whereas the second table presents results for proportions that fall in the 20% to 30% range. Finally, the third table summarizes all estimates where the estimated proportion is greater than 30%. The results are broken down this way because of the fact that the CV is very dependent on the estimate itself. The lower the estimated proportion, the more likely the CV will be large simply because the denominator in the calculation of the CV is the estimate itself. This phenomenon can be observed in the tables. The CVs in table 11.7a) are on average slightly higher than the ones in table 11.7b), which in turn are slightly higher than the ones in table 11.7c). However, in almost all cases we see that the CV is below the 16.5% upper limit set at the sample design stage. In fact, very few CVs are higher than 10%. This is expected as the design of the sample aims for CVs below the 16.5% range for five cycles of the survey. Sample attrition will surely affect future cycles of the survey, leading to fewer usable records in estimation and consequently larger sampling errors. Note that the CVs tend to be larger for French students in Nova Scotia and Manitoba. Although the sampling fraction of schools and students for those two super strata was very high, the replication method used to compute the sampling errors assumes the sample was selected with replacement. This will have the effect of over estimating the sampling error for strata where the sampling fraction was high. See section 13 for more detail on the estimation of sampling variance.

Table 11.7a): Summary of CVs for student variables with $10\% \leq p < 20\%$

Super strata	10% ≤ estimate of p < 20%			
	Min CV	Max CV	Mean CV	# variables
NFLD both	4.9	6.8	5.8	6
PEI both	6.2	6.4	6.3	3
NS English	5.5	5.8	5.6	3
NS French	13.8	18.4	16.1	5
NB English	5.9	6.5	6.2	3
NB French	6.6	8	7.1	4
QC English	7.1	8.7	8.1	4
QC French	4.7	7.2	6.2	6
ON English	4.4	6.4	5.4	5
ON French	7.5	10.4	9.3	5
MN English	5	5.7	5.4	3
MN French	14.2	19	16.6	2
SK both	5	5.4	5.2	2
AB both	5.2	6	5.6	3
BC both	4.8	7.4	5.9	4

Table 11.7b): Summary of CVs for student variables with $20\% \leq p < 30\%$

Super strata	20% ≤ estimate of p < 30%			
	Min CV	Max CV	Mean CV	# variables
NFLD both	3.8	4.9	4.2	5
PEI both	3.8	4.9	4.3	6
NS English	3.9	4.7	4.3	8
NS French	11.1	12.1	11.7	5
NB English	3.8	5	4.3	8
NB French	4.7	5.3	5	4
QC English	4.7	8.8	6.3	4
QC French	3.7	4.5	4.1	4
ON English	3.1	4.6	3.8	3
ON French	6.3	7.8	7	3
MN English	3.6	5.5	4.5	6
MN French	9.9	11.9	10.9	5
SK both	3.5	4.3	3.9	5
AB both	3.8	4.7	4.3	5
BC both	3.3	4.5	3.8	6

Table 11.7c): Summary of CVs for student variables with $p \geq 30\%$

Super strata	estimate of $p \geq 30\%$			
	Min CV	Max CV	Mean CV	# variables
NFLD both	0.7	3.9	2.4	13
PEI both	0.7	3.6	2.5	15
NS English	0.6	2.7	2.1	13
NS French	2	10.2	6.4	14
NB English	0.8	3.1	2.3	13
NB French	0.9	4.4	3.1	15
QC English	1	6.5	3.9	17
QC French	1	4.4	2.6	16
ON English	0.5	3.4	2.5	17
ON French	0.9	5.3	3.9	17
MN English	0.7	3.8	2.7	15
MN French	1.9	9.5	6.3	15
SK both	0.6	3.4	2.3	16
AB both	0.6	4.8	2.8	17
BC both	0.6	3.6	2.5	15

The YITS parent variables used in the analysis were the following:

- A3** What is your marital status?
- A4P2** Relationship of respondent to child
- A4P3** Relationship of spouse/partner of respondent to child
- A5P2** Sex of respondent
- B21a** How important is it to you that {child} graduates from high school?
- B21b** How important is it to you that {child} gets more education after high school?
- D2P1** In what country was this person born? (child)
- D2P2** In what country was this person born? (respondent)
- D2P3** In what country was this person born? (spouse/partner of respondent)
- D7P1** Language that this person first learned (child)
- D7P2** Language that this person first learned (respondent)
- D7P3** Language that this person first learned (spouse/partner of respondent)
- E1C** HIGHEST LEVEL of education completed (respondent)
- E2C** HIGHEST LEVEL education partner completed (spouse/partner of respondent)
- F1** Current main activity example working (respondent)
- F31** spouse main activity example working (spouse/partner of respondent)

The results observed for the parent data were similar to those observed for the student data. Overall, the CVs appear to be slightly higher than the student CVs. This is likely due to the fact that the number of usable parent records was fewer than the number of student records because of additional non-response at the parent level. See **section 10**, for response rates for the various components.

Table 11.8a): Summary of CVs for parent variables with $10\% \leq p < 20\%$

Super strata	10% ≤ estimate of p < 20%			
	Min CV	Max CV	Mean CV	# variables
NFLD both	6.1	6.2	6.1	2
PEI both	5.9	8.2	6.7	6
NS English	5.5	7.8	6.8	7
NS French	15.3	22.5	18.4	8
NB English	5.6	8.4	7.1	8
NB French	7.4	10.1	8.7	6
QC English	6.1	12.5	9.2	11
QC French	5.1	16.8	8.1	11
ON English	4.4	9.4	7	8
ON French	7.2	16.7	11.2	8
MN English	4.8	7.8	6.5	10
MN French	14.7	20.4	17.2	10
SK both	4.6	8.6	6.5	8
AB both	5.5	11	7.3	13
BC both	4.3	9.5	6.7	8

Table 11.8b): Summary of CVs for parent variables with $20\% \leq p < 30\%$

Super strata	20% ≤ estimate of p < 30%			
	Min CV	Max CV	Mean CV	# variables
NFLD both	4.6	6.1	5.1	6
PEI both	4.2	5.3	4.6	6
NS English	3.7	5.5	4.4	6
NS French	12.2	13	12.4	4
NB English	4.3	4.7	4.5	4
NB French	5.3	6.5	5.9	7
QC English	5.6	10.6	7.4	6
QC French	3.3	6.2	4.1	6
ON English	3.7	7.6	4.8	8
ON French	6.4	7.5	7	7
MN English	4.3	6.1	5.3	8
MN French	10.7	14	12.5	6
SK both	3.5	5.5	4.4	4
AB both	3.4	4.9	4.1	7
BC both	3.7	7.5	4.7	9

Table 11.8c): Summary of CVs for parent variables with $p \geq 30\%$

Super strata	estimate of $p \geq 30\%$			
	Min CV	Max CV	Mean CV	# variables
NFLD both	0.1	4.6	1.5	18
PEI both	0.3	3.2	1.1	16
NS English	0.2	3.6	1.2	16
NS French	0.5	10.3	4.3	18
NB English	0.2	3.9	1.4	17
NB French	0.2	5	1.4	16
QC English	0.3	9.7	3.2	18
QC French	0.4	3.6	1.5	16
ON English	0.2	6.5	2.2	17
ON French	0.6	5.8	2	16
MN English	0.3	2.1	1.3	15
MN French	0.7	5.3	2.5	15
SK both	0.3	5.2	1.5	17
AB both	0.3	2.4	1.3	15
BC both	0.3	6.3	2.4	18

11.3 Income Imputation Rates

A few data quality issues regarding the imputation process for parent income outlined in section 8.0 surfaced. First, the quality of the income variables utilized in the imputation process was assessed before the final imputation run was conducted. During this assessment, outlying observations and anomalies were identified. A number of these outlying observations were in turn traced back to errors in the data capture process. As a result, outlying observations were identified in a systematic manner using the sigma gap method procedure and the corresponding questionnaires were examined so any data capture errors could be corrected. It was observed that as the severity of the outlying observations decreased so did the data capture error rate. We were therefore confident that the majority of influential data capture errors were corrected. Due to time constraints, a full scale study of the data capture process for the parent questionnaire was not conducted.

Secondly, the imputation rates in some subgroups were significantly high. The rates that follow are broken down by imputation class. In some cases over 30% of the data were imputed. Caution should be used when using these data as estimated CVs do not take into account the fact that imputation occurred. As a result, CVs will be underestimated for the imputation effect, but overestimated with respect to the actual without-replacement sampling of Primary Sampling Units (PSUs).

Table 11.9: Imputation rates for parent income data

Imputation class	Total number of records	Imputation rate
Single parent	4,074	25.8%
Couples where spouse needs imputation	15,383	8.0%
Couples where respondent needs imputation	14,797	4.4%
Couples where both the respondent and the spouse need imputation	20,683	31.2%

12.0 Weighting

Students included in the final PISA sample are not all equally representative of the full student population, even though random sampling of schools and students is used to select the sample. To account for this, survey weights must be incorporated into the analysis, so that biased national results are not produced.

Because the sample design for YITS was implemented by Westat as part of the international study, the weighting of the student data was done by Westat. Therefore the weighting strategy described below was derived by Westat. See the PISA 2000 Technical Report for a detailed description of the weighting. Because this approach was used for all countries participating in PISA, Statistics Canada examined this and alternative weighting approaches for the YITS student data.

Although some of those alternative strategies did show promise, there was also justification for using PISA's approach. The only difference in the calculation of PISA and YITS student weights is in the way non-consent cases for Ontario students were treated. While data for these students were omitted from the PISA database, information on their characteristics should be used to create an 'adjusted' YITS weight. However in order to avoid inconsistencies between replicating results using only PISA data and results obtained from using both YITS and PISA data, it was decided that only the PISA-derived final student weights would be included on the microdata file. The YITS approach for non-consent students is described here strictly because it was used in the creation of the final parent weights and the YITS weights were the weights used in the creation of the YITS scales. (See **Section 14.0**).

12.1 Base Weight

The initial weight (before any non-response adjustments were made) for each student was computed based on the probability of selection of schools in the sample and the probability of selection of students within each school. This base weight was then adjusted to account for various forms of non-response. In total, 3 adjustments were made to obtain a final student weight. An additional 3 adjustments were then made in order to obtain final parent weights. It should be noted that it was not possible to do any post-stratification due to the fact that no control totals were available for our target population. We are targeting students who were attending school in Canada within a given year, not just students who were born within a given year which means we were unable to use Census totals.

12.2 Final Student Weights

1- School non-response adjustment

In order to adjust for the fact that those schools that decline to participate are not replaced by a replacement school, and are not in general typical of the schools in the sample as a whole, school-level non-response adjustments were made. Several groups of somewhat similar schools were formed and within each group the weights of the responding schools were adjusted to compensate for the missing schools. The non-response adjustment groups were created using the implicit stratification variables public/private and urban/rural.

2- Student non-response adjustment

At the student level, adjustment groups for those who were eligible but declined to participate were formed using the schools. Therefore, in most cases student nonrespondents would be represented by students from the same school.

3- Ontario non-consent adjustment

The data collection process was unique in Ontario. Students in Ontario were required to provide a signed parental consent form permitting their data to be shared. As a result the PISA data, for those students who did not have parental consent, could not be sent to the Australian Council for Education Research (ACER) and Westat for processing resulting in no data for these respondents. Exploratory data analysis revealed that there were differences among students who provided a signed parental consent form and those that did not. For this reason, a separate adjustment was made in the YITS weighting process. Some of the variables used for this adjustment include type of school (public/private), scores in PISA skills assessment, parents' participation in parent component and family structure. As noted already, the final PISA weights do not include this special adjustment for non-consent cases. PISA treated these cases in the same manner as they treated student non-response in step 2 above.

12.3 Final Parent Weights

The next three adjustments were applied to obtain a final parent weight only.

12.3.1 YITS Student Questionnaire Component Adjustment

A non-response adjustment was made to account for the PISA student respondents who did not complete a YITS Student questionnaire. This adjustment was necessary to account for the fact that a parent was only contacted to do the YITS Parent questionnaire if a student completed a YITS Student questionnaire. As a result parents of students who did not complete a YITS Student questionnaire were not given the opportunity to respond. In total there were 357 PISA student respondents who did not complete a YITS Student questionnaire. As a result the YITS component non-response rate was approximately 1%. The analysis conducted revealed that almost all of the students that did not fill out a YITS Student questionnaire attended public schools. It was also observed that as the reading ability scale of a student increased so did the tendency to respond. These variables were therefore used in adjusting the weights.

12.3.2 YITS Parent Non-response Adjustment

The YITS parent non-response was approximately 10%. Family structure, index of wealth and reading ability of the student were all found to have a significant impact on a parent's decision to respond to the survey and were therefore used in this weight adjustment. Index of family wealth was derived from student's reports on items such as the availability in their home of a dishwasher, a room of their own, educational software, link to the internet, television sets, motor cars, and number of bathrooms in the home.

12.3.3 YITS Parent Non-sharer Adjustment

Section H of the YITS Parent questionnaire contains a data sharing question (H7a) in which respondents were asked if they were willing to share their data with Human Resources and Skills Development Canada (HRSDC). Respondents who were unwilling to share did not have their data included on the released data file.

Approximately 2% of parent respondents refused to share their data. As a result the requirement of a non-sharing adjustment was explored. The distribution of non-sharers by province was not evenly distributed. Alberta had the largest number of non-sharers (23%) whereas Prince Edward Island has the least number of non-sharers (2%).

The non-sharing weighting response groups were created using the variable G3 of the parent questionnaire when there were a sufficient number of observations in the non-sharing group. This question inquires as to whether the household income is greater than or less than \$40,000. It also serves as an indicator as to whether or not the individual components in section G were completed or not.

The following Table 12.1 summarizes the six non-response adjustments computed, the non-response rates and variables used in the adjustments.

Table 12.1: Non-response adjustments

Adjustment	Rate	Variables Used in Adjustment
1. School Non-response*	4%	Implicit stratification variables (Urban/Public, Urban/Private, Rural/Public, Rural/Private)
2. Student Non-response*	13%	School
3. Non-consent for Ontario students	6%	Public/Private PISA skills assessment scores Response to parent questionnaire
4. YITS Student questionnaire Component Non-response	1%	Public/Private Reading Ability Scale
5. Parent Non-Response	9%	Family structure Non Nuclear x Index of Family Wealth Nuclear x Reading Ability Scale
6. Parent Non-Sharer adjustment	2%	Income Component G3

* Due to the integration of PISA with YITS and the fact that no other options were clearly superior for YITS, the first two weighting adjustments were adopted from PISA's weighting strategy.

12.4 Weights for the Mathematics and Science Components of PISA

As previously mentioned, the main topic being covered by PISA 2000 was reading assessment of the target population. As a result, the reading ability of all sampled students was assessed. However, only 5 of the 9 exam booklets assessed mathematics and science. Math and science were each covered in a different subset of 5 booklets – 2 of the 9 booklets covered both math and science. This changes the probability that a student would get the mathematics and science tests and therefore changes the weights. Note that a separate weight is required for math and science since students did not necessarily get tested for both. These weights should only

be used when analyzing data from the PISA math and science tests. The final weights for math and science were computed as follows:

Final student mathematics weight =

- 0 if student wasn't tested for math (record will not be in the math microdata file)
- Final student weight obtained in 9.2 above multiplied by 9/5 if student was tested

Final student science weight =

- 0 if student wasn't tested for science (record will not be in science microdata file)
- Final student weight obtained in 9.2 above multiplied by 9/5 if student was tested

12.5 File Structure and Summary of Weights

The following table summarizes the YITS file structure as well as all of the weights users may wish to use in their analysis of PISA and YITS data. In total there are 10 possible weights. For every component, there exists a final weight as well as a set of 1000 Bootstrap weights that should be used for variance estimation. A sample allocation table 9.2 (Sample Summary) can be found under Section 9.4

Table 12.2 Cycle 1 Microdata Files, YITS 2000 Reading Cohort (15 year-old)

File name	Content	Respondents on file		Weight	Replicate weights ¹⁰
		Description	Number		
Merged Files					
Reading (full sample)					
PISAR	<ul style="list-style-type: none"> • PISA reading scores and levels • PISA Student context questionnaire variables • YITS School questionnaire variables 	One record for every student respondent	29,687	W_FSTUWT	W_FSTR1- W_FSTR80 (BRR, Fay's factor 0.5)
PISAYR	<ul style="list-style-type: none"> • PISA reading scores and levels • PISA Student context questionnaire variables • YITS School questionnaire variables • YITS Student questionnaire variables 	One record for every student respondent (357 have no YITS student data)	29,687	W_FSTUWT	BPSR1- BPSR1000
PISAYPR	<ul style="list-style-type: none"> • PISA reading scores and levels • PISA Student context questionnaire variables • YITS School questionnaire variables • YITS Student questionnaire variables • YITS Parent questionnaire variables 	One record for every student respondent for whom there are YITS student and parent questionnaire data	26,063	W_YPR	BPR1-BPR1000

10 Unless stated otherwise, the replicate weights on the microdata files are bootstrap weights.

File name	Content	Respondents on file		Weight	Replicate weights ¹¹
		Description	Number		
Mathematics (sub-sample)¹²					
PISAM	<ul style="list-style-type: none"> • PISA math scores • PISA Student context questionnaire variables • YITS School questionnaire variables 	One record for every student respondent in the math sub-sample (206 have no YITS student data)	16,489	W_FSTUWT	W_FSTR1-W_FSTR80 (BRR, Fay's factor 0.5)
PISAYM	<ul style="list-style-type: none"> • PISA math scores • PISA Student context questionnaire variables • YITS School questionnaire variables • YITS Student questionnaire variables 	One record for every student respondent in the math sub-sample (206 have no YITS student data)	16,489	W_FSTUWT	BPSM1-BPSM1000
PISAYPM	<ul style="list-style-type: none"> • PISA math scores • PISA Student context questionnaire variables • YITS School questionnaire variables • YITS Student questionnaire variables • YITS Parent questionnaire variables 	One record for every student respondent in the math sub-sample for whom there are YITS student and parent questionnaire data	14,485	W_YPM	BPM1-BPM1000
Science (sub-sample)¹³					
PISAS	<ul style="list-style-type: none"> • PISA science scores • PISA Student context questionnaire variables • YITS School questionnaire variables 	One record for every student respondent in the science sub-sample (188 have no YITS student data)	16,488	W_FSTUWT	W_FSTR1-W_FSTR80 (BRR, Fay's factor 0.5)
PISAYS	<ul style="list-style-type: none"> • PISA science scores • PISA Student context questionnaire variables • YITS School questionnaire variables • YITS Student questionnaire variables 	One record for every student respondent in the science sub-sample (188 have no YITS student data)	16,488	W_FSTUWT	BPSS1-BPSS1000
PISAYPS	<ul style="list-style-type: none"> • PISA science scores • PISA Student context questionnaire variables • YITS School questionnaire variables • YITS Student questionnaire variables • YITS Parent questionnaire 	One record for every student respondent in the science sub-sample for whom there are YITS student and parent questionnaire data	14,475	W_YPS	BPS1-BPS1000

¹¹ Unless stated otherwise, the replicate weights on the microdata files are bootstrap weights.

¹²The files for the mathematics and science domains also carry some of the reading achievement variables, specifically; the reading levels derived from the plausible value scores and the reading score variables created using weighted likelihood estimation.

File name	Content	Respondents on file		Weight	Replicate weights ¹³
		Description	Number		
Individual Files					
YITSS	YITS Student questionnaire variables	One record for every student respondent (357 have no YITS student data)	29,687	W_FSTUWT	BPSR1-BPSR1000
YITSP	YITS Parent questionnaire variables	One record for every student respondent for whom there are YITS Student and Parent questionnaire data	26,063	W_YPR	BPR1-BPR1000
SCHOOL	YITS school questionnaire variables	One record for every school with student respondents (5 have no data from the School questionnaire) ¹⁴	1,117	WNRSCHBW	None

13 Unless stated otherwise, the replicate weights on the microdata files are bootstrap weights.

14 Of the 1,117 Canadian schools classified as PISA respondents by virtue of the level of student participation, five do not have school questionnaire data on the microdata files. The principals at two of these schools did not complete the questionnaire, while the remaining three refused to share the school questionnaire data with a third party.

13.0 Variance Estimation

13.1 Definitions of Types of Estimates: Categorical versus Quantitative

Before discussing how the YITS Reading Cohort data can be tabulated and analysed, it is useful to describe the two main types of point estimates of population characteristics which can be generated from the microdata file for the YITS Reading Cohort.

Categorical Estimates

Categorical estimates are estimates of the number, or percentage of the surveyed population possessing certain characteristics or falling into some defined category. An estimate of the number of persons possessing a certain characteristic may also be referred to as an estimate of an aggregate.

Examples of Categorical Questions – School Questionnaire:

Q3: Is your school a public or private school?

R: Public school / Private school (*in both cases there are definitions provided for the response categories*)

Examples of Categorical Questions – Parent Questionnaire:

F2: Regardless of the number of hours worked, have you worked at a job or a business in the past 12 months?

R: Yes/No

F13: At this job are/were you...

R: A paid employee / self-employed / an unpaid worker in your family's farm or family's business

Examples of Categorical Questions – YITS Students Questionnaire:

B1: During this school year, have you been absent or missed school for a period of 2 or more weeks in a row?

R: Yes/No

B3: The last time you were absent for 2 or more weeks this school year, why were you away? (Mark all that apply).

R: I was sick or injured/family trip/school trip or exchange/school was closed.../Another reason, tell us.

Quantitative Estimates

Quantitative estimates are estimates of totals or of means, medians and other measures of central tendency of quantities based upon some or all of the members of the surveyed population. They also specifically involve estimates of the form X/Y where X is an estimate of surveyed population quantity total and Y is an estimate of the number of persons in the surveyed population contributing to that total quantity.

13.2 Tabulation of Categorical Estimates

Estimates of the number of people with a certain characteristic can be obtained from the microdata file by summing the final weights of all records possessing the characteristic(s) of interest. Proportions and ratios of the form X/Y are obtained by:

- (a) summing the final weights of records having the characteristic of interest for the numerator (X)
- (b) summing the final weights of records having the characteristic of interest for the denominator (Y), then
- (c) dividing estimate (a) by estimate (b); (X/Y)

13.3 Tabulation of Quantitative Estimates

Estimates of quantities can be obtained from the microdata file by multiplying the value of the variable of interest by the final weight for each record, then summing this quantity over all records of interest. For example, to obtain an estimate of the total number of employees supervised by person 1 in the parent questionnaire for those who supervised employees, multiply the value reported in PF15 (# of employees supervised by the final weight for the record), then sum this value over all records with PF14=1 (supervise employees).

To obtain a weighted average of the form X/Y , the numerator (X) is calculated as for a quantitative estimate and the denominator (Y) is calculated as for a categorical estimate. For example, to estimate the average number of employees supervised by person 1 in the parent questionnaire for those who supervised employees:

- (a) estimate the total number of employees as described above,
- (b) estimate the number of people in this category by summing the final weights of all records with PF14=1, then
- (c) divide estimate (a) by estimate (b).*) (X/Y) .

YITS is a probabilistic survey, meaning that a sample has been selected to represent the target population. A given variability is inherent to the sample selection, which would be different if a different sample would have been selected. This variability is known as the sampling error, as described in **section 11.2**. The variance of an estimate is a good indicator of the quality of the indicator. An estimate with a high variance is considered unreliable. In order to quantify a large variance, a relative measure of the variability is used, namely the coefficient of variation (CV). The coefficient of variation is defined as the ratio of the square root of the variance over the estimate. The square root of the variance is also known as the standard deviation. The coefficient of variation, as opposed to the variance, allows the analyst to compare estimates of different magnitude or estimates measured in different units on a common scale. As a result, it is possible to assess the quality of any estimates with the CV. Also, the variance or the CV is required for statistical tests such as hypothesis tests, which determine if two estimates are statistically different from one another. Consequently, variance or CV calculation is mandatory. Note however that one situation in which the CV is not useful is for variables with a population mean of 0. This applies to the YITS engagement scales, for example. In such cases the standard error or a confidence interval should be used instead of the CV.

Due to the complexity of the YITS sample design, it is almost impossible to derive an exact formula to calculate the variance of estimates. That is why a re-sampling technique was chosen. For the Reading Cohort (15 year-old), the bootstrap re-sampling method was used. This technique is popular among surveys with a large number of strata and multiple PSUs per stratum. Unlike the Jackknife method the bootstrap does not suffer from inconsistent estimates for population estimates such as percentiles.

It should be noted that Westat opted to use the Balanced Repeated Replication (BRR) method for variance estimation in the international study. Although that method may have been optimal for most countries

participating in PISA, Canada was different because of the YITS portion of the study which dictated a much larger sample than PISA recommended. This made the implementation of the BRR method a less attractive option for Canada. Nonetheless, numerous studies were done to compare the BRR and Bootstrap method and similar results should be observed using either method. The bootstrap, with PSUs identified as per the design, would be expected to give more stable estimates of the variance than the BRR based on fewer degrees of freedom associated with the variance units and variance strata. This might result in quite different estimates of variance for a specific characteristic, especially for a small domain.

The idea behind the bootstrap method, as with any other replication method, is to select random sub-samples from the full sample in such a way that each of the sub-samples (or replicates) follows the same design as the full sample. The final weights for units in each replicate are recalculated, following the same weighting steps used for the full sample (see **section 9.0**). These bootstrap weights are used to calculate a population estimate for each replicate. The variance among the replicate estimates for a given characteristic is an estimate of the sampling variance of the full-sample population estimate.

A total of 1,000 replicates were created for each component of YITS. The naming convention of these Bootstrap weights on the various data files are included in Table 12.2 Cycle 1 microdata files, YITS 2000 Reading Cohort (15-year-old), under the column labelled “Replicate Weights”.

Each replicate was formed by sampling independently within each stratum. If there were n PSUs in a stratum, $(n-1)$ were selected by simple random sampling with replacement. While sampling with replacement to create the bootstrap samples is a departure from the full-sample design for the YITS, this is a common practice in large surveys with small first-stage sampling fractions because it greatly simplifies the variance estimation process at the expense of overestimating the true variance slightly. For super-strata where the sampling fraction was very high, the estimated sampling variance may be significantly overestimated.

SAS and SPSS macros have been developed to calculate the variance using the Bootstrap weights. Variance calculation using these macros can be time consuming to a new user but these macros have been developed in such a way that they are easy to use. The researcher must have access to the macros, to the data files and to the Bootstrap weight files. Access to these tools is possible in the Statistics Canada Data Research Centers (RDC). Also, detailed documentation on how to use these SAS or SPSS macros is available in the RDCs.

14.0 YITS Scales

Some of the concepts assessed in YITS cycle 1 are most appropriately measured through the use of a scale. For the YITS 15-year-old Reading Cohort, various scales were used. A High School Engagement Scale was created which is similar to the one created for the 18-20 year-old cohort. This scale uses items from both the YITS-Student and PISA-Student questionnaires. Other scales formed for this cohort use only items from the YITS-Student questionnaire. These include mastery, social support, academic self-efficacy, and self-esteem. Using data from the YITS-parent questionnaire, three parenting practices scales (nurturance, rejection-oriented parenting and monitoring) were formed. For more theoretical details about any of the mathematical/statistical concepts discussed in this chapter, please see the Statistics Canada technical document *Analysis of Scales for YITS Cycle 1 Main Survey* which should be available in the fall of 2005.

In PISA, various scales were also created. These include standardized student achievement scales as well as scales which reflect the student's attitudes on such topics as enjoyment of reading, teacher-student relations, and the adequacy of school resources (PISA Survey Overview Guide). The PISA achievement scores provide a measure in the domains of reading, math, and science. These PISA scales are distinct from the attitude scales formed by YITS. Please refer to the Manual for the PISA 2000 Database (Users Guide), for more information on PISA.

This chapter is divided into ten sections:

- **14.1 Defining Scales and Their Uses:** introduces the user to a scale, provides a justification for scaling and describes the type of scaling applied within YITS.
- **14.2 Scale Development:** discusses the theoretical procedure that the YITS team used to form the scales.
- **14.3 The High School Engagement Scale:** introduces the user to the concept of school engagement as well as to the High School Engagement Scale and its subscales and sub-subscales. This section also provides justification for the creation of a High School Engagement Scale.
- **14.4 Analysis of the High School Engagement Scale:** discusses the analysis involved in the formation and testing of the High School Engagement Scale. This involved applying the methodology introduced in section 14.2 to the theoretical model discussed in section 14.3. The results of the analysis are broken into several components: testing model validity, estimating scores, testing scale reliability and testing scale validity.
- **14.5 to 14.9:** For the other five scales calculated in the YITS 15-year-old Reading Cohort, discussion of the concept and the results of the analysis are combined into one section for each scale.
- **14.10 References:** contains a list of the references cited or consulted within the previous nine sections.

14.1 Defining Scales and Their Uses

14.1.1 What is a Scale?

For the purposes of social science research, a scale is a type of composite measure consisting of several items (questions) that share an empirical or logical structure. A scale can be regarded as a set of possible scores for combining answers to a group of questions. The term scale is also used within the context of this chapter to refer to the theoretical concept upon which the scales are derived.

14.1.2 Why Use a Scale?

The use of scales in data analysis allows researchers to estimate a measure of a particular underlying (latent) concept when the items measuring the concept are put together. A scale is created by assigning scores to patterns of responses that enable the analyst to assess the relative weakness or strength of each indicator. The use of scales is advantageous in that scales can demonstrate the intensity of the relationships that may exist among concepts.

For each factor (concept) measured by a scale, a latent score value is estimated for each individual surveyed within the sample of eligible respondents. This estimated score is based upon appropriate combinations of a number of responses to a group of survey questions (items). The score for a particular factor may be used to order individuals with reference to the factor or to illustrate differences between individuals or groups with respect to that factor.

A scale has a higher level of reliability (see section 14.2.4) than do individual items. Indeed, a scale increases in reliability as the number of items contained within it increases. An item can contain information about the construct being measured (signal) and confounding variance due to measurement error and information uniquely associated with that item (noise). Using a scale helps to reduce the effects of noise and increases the amount of information available for analysis. Therefore, a multiple-item scale provides more information to analysts than does a single item. Scales are useful in social science research because they facilitate the efficient reduction of large amounts of data into manageable and meaningful sources of information for the analyst.

14.1.3 What Type of Scales are Used in YITS?

All of the various scales used in the YITS 15-year-old Reading Cohort, and in the YITS 18-20 year-old Cohort are modeled after the Likert Scale (Likert, 1932). This type of scale is valued for the ordinality of its multiple response categories. This allows researchers to compare the relative strength of agreement of survey respondents to any particular item. For example, a particular question with four categories may require respondents to express their views on an issue from four ordinal scale values such as 1 (strongly disagree), 2 (disagree), 3 (agree) and 4 (strongly agree).

A Likert-type scale is a highly reliable tool for rank-ordering people when attempting to measure attitudes or opinions that they hold on a topic. It is one of the most commonly used and most easily recognizable formats in the area of questionnaire design. Likert scales can have any number of categories. Indeed, the more categories provided to a respondent, the more precise the distinction between the categories and the more information available to distinguish between respondents on the measured construct. However, in practice, respondents may not be able to respond meaningfully when there are too many categories given to them. Moreover, there is additional burden to the respondent in terms of the time required to make such fine distinctions. The application of scale-type questions is an inexact science; their use is somewhat subjective. The number of item categories should be chosen based upon situation-specific judgment including knowledge of the item content, the underlying scale construct and the respondents. Scales need not have the same number of item categories for all of the items in the scale.

In many of the items that make up the various YITS scales, an item category representing a neutral response such as “*neither agree nor disagree*” or “*sometimes*” has been excluded from the categories available to the respondent. Many of the questions asked in YITS scales deal with topics that are not often considered by respondents; thus, respondents could have tended toward a neutral response, which would have reduced the variability in responses to each item and therefore would have reduced the utility of the scale.

Removing the neutral category, in this case, makes it more likely that the scale will detect tendencies of respondents, with respect to an item, even if these tendencies are slight. Some experts in questionnaire design

feel that if a respondent does not know whether they are leaning to the positive or the negative end of a statement that he or she should indicate a response of “*don’t know*”. Other experts, however, think that the neutral response category is necessary for those respondents who truly do not have an opinion on the statement presented to them. The theory and design of survey scale items is discussed in more detail in *Survey Research Methods* (Fowler, 1995).

If one chooses to use a previously constructed scale in a survey, then it is important to consider whether this scale addresses the issues that the survey is attempting to measure. This is especially important in research domains where there are debates within the social science literature as to what the concept should measure. One such discussion occurs when there are many different scales that have varying degrees of specificity and/or focus upon particular aspects of a concept. Although differences between global measures towards a concept and measures of specific attitudes or facets of a concept are often overlooked in research, their measures and their behaviours are not necessarily equivalent (Rosenberg et al., 1995).

14.1.4 Response Biases

The systematic tendency for participants to respond to rating items independent of their content (what the item is designed to measure) is referred to as response bias. This tendency is also referred to as a response set or as a response style depending upon the context. A response set is a temporary reaction to a situational demand. These demands can include time pressure or expected public disclosure. Bias could also result from context issues such as the format of the item or the nature of previous items in the questionnaire. If an individual displays bias consistently over time and situations, then this bias is regarded as his or her response style (Paulhus, 1991, p. 17).

14.1.5 Negative and Positive Questions

It is recommended that both negatively and positively worded questions be included in widely-used rating scales within the discipline of psychology in order to reduce a variety of response biases including acquiescence¹⁵ (Marsh, 1996). This is done under the working assumption that positively and negatively worded items represent the same concept.

Sometimes, however, factor analytic techniques (section 14.2.1) indicate different separate factors resulting from the positive and negative worded questions. The crucial question that must be answered in these cases is whether this distinction between the positively and negatively worded item factors is in fact substantively meaningful. Alternatively, it is possible that this distinction is merely an artefact of a person’s response style (Paulhus, 1991, p. 48). These two explanations have quite different implications; however, distinguishing between them can be difficult (Marsh, 1996).

14.2 Scale Development

To gain a better understanding of the school engagement process, the YITS team designed a school engagement scale. It should be noted that the school engagement scale developed for YITS might be a different construct than that which has been applied by PISA. Documentation on PISA’s high school engagement model and international comparisons of school engagement using PISA’s model can be found at www.pisa.oecd.org. Many studies have attempted to define and estimate the rates of school leavers and determine variables that correlate with school-leaving. Furthermore, various reports have been written that detail intervention strategies to encourage school leavers to return or that encourage older students to remain in school. However, few studies

¹⁵ Acquiescence is the tendency to agree rather than disagree with item statements (Paulhus, 1991, p. 46). Some individuals referred to as “*yea-sayer*”, tend to agree with statements whereas other individuals referred to as “*naysayers*” tend to disagree with statements.

are based upon a systematic understanding of the development process that leads to a student's withdrawal from school (Finn, 1989).

There were three main steps in the development of the scales. The first step was to use linear factor analysis to investigate if the underlying theoretical structure of items and subscales was supported by the data (section 14.2.1). Assuming that the theoretical structure was valid, the second step in development was to estimate the scale scores using an item response theory (IRT) model (section 14.2.2). Finally, reliability and validity checks were performed on the estimated scores (section 14.2.3 and section 14.2.4). The general procedures that were adopted for each of these steps are described below.

14.2.1 Investigation of Model Validity

Factor Analysis: Strategy

Factor analysis was used to determine whether the theoretical construct of the scale was supported by the data. Factor analysis is also one way to help achieve the goals of an item analysis. Item analysis is the verification that items are related to their proposed constructs and that the strength of these relationships are adequate for measurement purposes (Gorsuch, 1997).

According to Comrey and Lee, the goal of a factor analysis is to isolate constructs that have a greater intrinsic value for the purpose of describing the functional relationships between the variables in the field. However, all sets of variables are not equally good in representing this relationship. Moreover, there is not necessarily only one "correct" concept or "real" factor for a given domain of interest (Comrey and Lee, 1992, p. 245).

The relationship of each variable to each of the factors, referred to as the loading on a factor, provides a way for the analyst to quantitatively assess how an item interacts with other items. The strength of these loadings on different factors indicates to the analyst whether an item is related to none of the proposed factors, to only one of the factors or to more than one factor (multiple loadings). The greater the level of loading of a variable on a factor, the greater the amount of overlapping (common) variance¹⁶ between a data variable and a factor and the more an item is a pure measure of this factor.

Items most clearly associated with only one factor can become part of a scale for the construct underlying that factor. Items not strongly associated with any of the factors can be dropped from further analysis. Items can be strongly associated with more than one factor. These items may indicate a relationship between the factors on which the loadings occurred, in which case many items should load on more than one factor and the multiple loadings can be explained mathematically. Alternately, they may indicate the presence of an unknown or confounding factor that is related to the proposed factors. When this is the case the item or items in question should be dropped from the scale.

A question that often arises when examining factor loadings is how high the correlation between an item and a factor must be before the item is considered "significant". Although no formal test to determine significance has been developed, Comrey and Lee provide a benchmark to use in interpreting variable-factor correlations¹⁷ (Comrey and Lee, 1992, p. 243). They base their benchmark upon an examination of the percentage of variance of the item common to the factor (See Table 14.1).

Table 14.1 Scale of Variable-Factor Correlations

¹⁶ The variance in responses to any particular item can be described by two main components: the specific variance and the common variance. Specific variance represents the differences between people related to the unique characteristics of the item. Common variance, or communality, refers to differences that can be explained by the common factor related to all items in a scale.

¹⁷ Orthogonal factor loadings or structure coefficients

Loading	Percentage of Variance Explained	Quality of Loading
Above 0.71	Above 50	Excellent
Above 0.63	Above 40	Very Good
Above 0.55	Above 30	Good
Above 0.45	Above 20	Fair
Above 0.32	Above 10	Poor
Below 0.32	Inconsequential	Trivial (not to be interpreted).

Examining factor loadings is not in and of itself sufficient for factor interpretation. A full explanation of a factor requires a theoretical understanding of why the items fit together and how the identified factor or factors relates to other previously identified factor structures within the domain of interest.

Factor Analysis: Procedures

The following is a summary of the procedures used in the factor analysis for each scale.

For the YITS data, consideration was given to the effect of the language of interview on responses. Any changes in the presentation of items may introduce substantial bias in responses (Fowler, 1995, p.74). In this case, the bias may affect the responses due to imprecise translations. This problem could create potentially different interpretations of the question. This, in turn, may lead to different response patterns on a question between those respondents who were administered the questionnaire in English and those who were administered it in French.

To examine the possibility of translation bias, the data was first divided up into two samples according to the language of questionnaire administration: English and French. Comparison of the results from each linguistic sample was undertaken. Greater dissimilarities between the results would indicate a greater translation bias.

The data from both the English and the French samples were further randomly split into two half-samples. The first half-sample for both the French and the English sample was considered as a test sample and the second half-sample was regarded as a verification sample. The verification sample was used to independently confirm the structure identified in the first half-sample.

A principal component based factor analysis was carried out separately on each linguistic half-sample to determine how many factors should be extracted from the data. Factor loadings of each variable were compared between the half-samples and across language. Loadings were examined under a rotation of the factor loadings when the concept had two or more factors associated with it. A rotation involves a shift in the coordinate axis of the loadings matrix. When it is not easy to interpret a loading, a more readily interpretable solution may be obtained from a rotation. Under a rotation, one would hope to obtain a pattern of factor loading such that a variable loads highly on one factor and has only low to moderate loadings on the other factor or factors.

For every factor analysis presented within this document, the value of the items for each respondent was multiplied by the respondent's normalized weight in order to obtain a design-consistent estimate of the variance-covariance matrix. A normalized weight was calculated by dividing a respondent's survey weight (see **sections 12.0 through 12.5** for a discussion on weighting in YITS) by the average weight of all eligible respondents in the sample. Thus, in theory, the sum of the normalized weights is equal to the sample size of the eligible respondents.

Within a questionnaire, some questions are positively oriented such as *I got along well with teachers*. Other questions are negatively oriented such as *Learning in class was useless*. In order for the effects on a scale of

negatively orientated items not to cancel out the effects of positively oriented items, the negative items were reoriented to make them positive. Letting k be the number of categories for a particular item, a positively oriented item is obtained from a negatively oriented one by subtracting the value of the item from $k + 1((k+1) - \text{item value})$. On a four point scale, if a respondent indicated a value of 2 on a negatively oriented question, then the positively oriented response value would be 3 ($3 = 5-2$). This reorientation has to be done before the score is calculated in order to properly estimate the scale item internal consistency (Cronbach's alpha) and to estimate scale scores (See **section 14.2.3** for a discussion of Cronbach's alpha).

In addition to the estimated scores, the items for each scale are included on the micro data file. This will allow researchers to consider alternate factor structures. The original values, before any reversal of values took place, have been retained for all of these items.

14.2.2 Estimation of the Scores

The results from the factor analysis were used to determine what items loaded onto each factor (**section 14.2.1**). Once the factor structures were analyzed and the items to be included in each factor were verified, the next step was to estimate the respondent's latent construct score for each factor. Two approaches were investigated, factor scores, a linear composition based upon the linear factor loadings developed under the factor analysis framework (the standard classical method) and non-linear maximum likelihood estimation based upon item response theory (IRT). Both methods were examined using normalized survey weights. Weights were incorporated into the analysis processes in order to derive design-consistent point estimates of the scores. PISA weights were used with adjustments made to these weights in order to take into account specific student level non-response patterns. (See **section 12.1**).

Factor analysis requires that the scale test data have the property of interval or ratio data. However, some people argue that the test data only have the properties of ordinal data. Whether psychological test scores should be considered ordinal or interval data is a subject of some debate within the social science community (Crocker and Algina, 1986, pp. 61-63). Generally, it is agreed that if it can be demonstrated that the scores produce more useful information when they are treated as interval data, then they should be treated as such. On the other hand, if treating the data as interval level measurement does not improve, or actually decreases, their usefulness, only the rank-order information should be used (Crocker and Algina, 1986, p. 61).

IRT is able to control better for the ordinal nature of the data than is factor analysis. The software program PARSCALE (Muraki and Bock, 1997) was applied to calculate the IRT scores and the estimates of the score's measurement errors. Scores released for YITS scales were based on an IRT approach.

The IRT scores and their respective standard errors were estimated using weighted maximum likelihood (see Warm, 1989) and applying a generalized partial credit model. The generalized partial credit model is an extension of the two parameter logistic distribution to polytomous (categorical) data (Muraki, 1997). For estimating IRT scores, the population distribution of the scores was specified to have a mean of zero and a standard deviation of one. Once standardized, the respondent's estimated score, in this case, can be interpreted as the number of standard deviations of the population of interest above (if positive) or below (if negative) the mean.

A response pattern of mostly extreme positives (i.e., strongly agree to all positively-worded questions and strongly disagree to all negatively worded questions) is most likely to have been produced by an individual with a highly positive standard score. Conversely, a response pattern of mostly extreme negative values is most likely to have been produced by an individual with a highly negative score. A typical mix of responses (few extreme responses) is likely produced by an individual who has a score on the scale of around zero. A response pattern that results from choosing the option that is the most extreme, in most cases, may be due to an internal bias by

the respondent towards extreme responses or it may indicate a strong opinion by the respondent on the subject (Paulhus, 1991, p. 49).

14.2.3 Scale Reliability

Reliability, when discussing scales, refers to the accuracy, dependability, consistency or repeatability of score results. More technically, it refers to the degree to which the scores are free from measurement errors. It can be interpreted as a holistic measure of the accuracy of a scale, in that it describes the proportion of the population variance in scores that can be explained by the population variance in the underlying construct. Two measures of reliability are commonly used in examining scales: Cronbach's Alpha and the Index of Reliability.

Cronbach's Alpha and its Interpretation

Cronbach's alpha is a measure of the internal consistency of the items within a factor. It is based upon the average covariance of items within the factor and assumes that the items within a factor are positively correlated with each other.

Cronbach's alpha has several interpretations. It is theoretically related to the correlation between the scale being used and all other possible scales containing the same number of items that could be constructed from a hypothetical universe of items that measure the same characteristic of interest. With this measure, the analyst is able to obtain the expected relationship between the scale that was used and all other possible scales that measure the same concept. Since Cronbach's alpha can be interpreted as a coefficient of determination, its values range from 0 to 1. Cronbach's alpha can be regarded as a lower bound on reliability; the true reliability of the scale is at least as high as the value of reliability calculated using this measure.

One common misconception about Cronbach's alpha is that a relatively high alpha value for a factor indicates that the administered test items are unidimensional (the items represent one common underlying factor). Indeed, as “[Cronbach's] alpha is a function of item covariance, and high covariance between items can be the result of more than one common factor, [Cronbach's] alpha should not be interpreted as a measure of the test's unidimensionality” (Crocker and Algina, 1986, p. 142).

Index of Reliability

While Cronbach's alpha estimates the reliability as the internal consistency of a scale's items, a more accurate estimate of reliability is the index of reliability, η which incorporates the IRT characteristics of each item. Similar to Cronbach's alpha, values of this index closer to 1 indicate a greater accuracy and denote better measurement properties of the scale (Crocker and Algina, 1986, p. 352).

$$\eta_j = \sqrt{1 - \frac{\sigma^2_{E_j}}{\sigma^2_j}} \quad (14.1).$$

For a given scale j , $\sigma^2_{E_j}$ is the weighted average measurement variance across the sample, and σ^2_j is the estimated variance of all scores in scale j . Although the value of η_j obtained will be similar in magnitude to that of Cronbach's alpha, it is a more accurate measure of the reliability of the final scores that have been produced.

14.2.4 Testing Scale Validity

In order to assess whether the estimated scale scores behave according to the theoretically proposed conception of the model, validity tests were performed on the scales. The validation process checks to see if the construct appears to be the same as it is commonly defined. This is despite modifications that may be made to the number or wording of items in the scale for operational constraints. These tests involve evaluating the proposed scales or subscales by comparing their estimated scores on the scales to scores on other relevant scales or to the values of other relevant variables (criterion validity). They can also involve the comparison of different identifiable groups of respondents on the scale of interest (known-group validity). It can also be important to show that a scale does not have high correlation with attitudes that it is not designed to measure (discriminant validity). Testing for scale validity involves knowledge of the subject matter involved in the analysis and in particular, which variables or scales are expected to be related or not related to the scale of interest and the form that this relationship is expected to take. Within the YITS 15-year-old cohort, only criterion and known group validity tests were performed on the scales.

14.3 The High School Engagement Scale

14.3.1 Why is there interest in a School Engagement Model?

One of the most prevalent problems for educators today is the emotional, intellectual and physical withdrawal of students from formal schooling (Voelkl, 1996). A student's engagement, or involvement with school, has been linked to academic achievement and to the probability of the student graduating from high school. In addition, "as children grow, this social, emotional and intellectual withdrawal, when accompanied by low grades, is associated with several serious problems including truancy [and] juvenile delinquency" (Voelkl, 1996). Research indicates that children and youth who are engaged with school are more likely to achieve success and become school graduates (Voelkl, 1997, 1995). Nevertheless, there have been very few efforts to define and study the concepts of school engagement formally (Finn, 1993).

Ensuring that Canadian youth remain in and succeed at school is a high priority for many groups within Canada including parents, educators, other youth workers and different levels of government. "[youth] who have the needed skills and knowledge will be better equipped to succeed as global trade expands and as economic opportunities open [whereas] youth who have dropped out of high school ... do not yet possess the skills and knowledge to effectively compete in the labour market" (Bowlby and McMullen, 2002). As school engagement plays a large role in keeping youth in school, and remaining in school helps youth to meet their full potential as citizens and as workers, it is important to identify and try to understand the factors that influence a youth's engagement in school.

14.3.2 What is the YITS High School Engagement Scale?

To gain a better understanding of the school engagement process, the YITS team designed a school engagement scale. School engagement is an important issue likely starting in a student's early school years and continuing throughout a student's entire academic career (Finn, 1993); (Voelkl, 1996). The High School Engagement Scale administered to the YITS Reading Cohort measured engagement for the student's present school year. The engagement questions focused on this current year since the memory of feelings related to that year would be the strongest. Moreover, students have likely changed schools several times throughout their academic career. These students might have had very different school-related experiences at different institutions and even in different academic years at the same institution. Since the type of experiences that a student receives may differ depending upon the year of focus, the student's response to the items may also be different depending upon the questionnaire's timeframe. It should also be observed that although there were

some 15-year-old student respondents in the sample for whom their current grade was a grade less than high school, the vast majority of the sampled students (approximately 98 %) were in high school.

Two sets of attributes may place a student at risk for educational difficulties—status risk factors and behavioural risk factors. Status risk factors are demographical and historical characteristics of the students whereas behavioural risk factors are a series of actions and activities that, if not manifested by the youth, will decrease the likelihood that successful school outcomes will be achieved (Finn, 1993). While both of these types of risk factors are important, the YITS High School Engagement Scale focuses upon examining behavioural factors.

The High School Engagement scale is composed of the Academic Engagement and Social Engagement subscales. The Academic Engagement subscale is further divided up into participation and identification subscales. In developing a scale for a concept such as school engagement, the items to test and the scale structure are usually created based upon a theoretical model and/or previous research.

For the YITS 15-year-old Reading Cohort and for the upcoming YITS Mathematics Cohort, an adapted version of items developed by Jeremy Finn for assessing the academic participation of young adolescents is included (Finn, 1993). Also included in the scale are selected items from Kristin Voelkl's Identification with School Scale that covers academic and social identification. She refers to these concepts as school identification (Voelkl, 1996). To these scales, a few additional items were added¹⁸ to more adequately represent the concepts proposed in the theoretical model. Using these items, the YITS team adapted the model and definitions of school engagement provided in Norris et al (1998).

¹⁸Valuable advice regarding the items chosen for assessing school engagement and related concepts was also given by Peter Dietsche, Director of Humber Research Network, Humber College, Ontario; the late Sid Gilbert, Professor, Department of Sociology and Anthropology, University of Guelph, Ontario; and Herb O'Heron, association of Universities and Colleges of Canada.

14.3.3 Structural Model of High School Engagement

A theoretical construction of the School Engagement Model follows below.

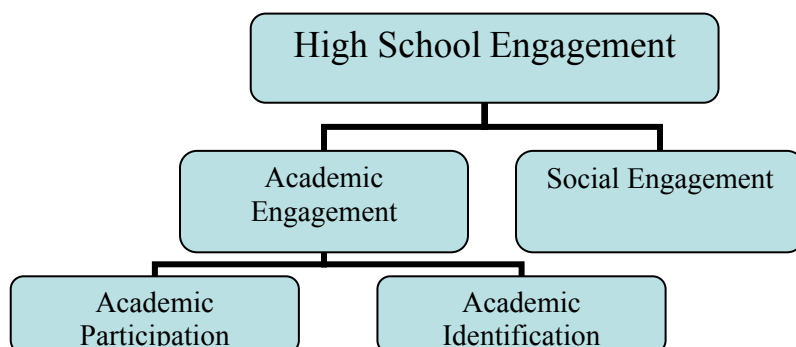


Figure 14 Model of High School Engagement for the YITS Reading Cohort (15-year-old)

14.3.4 Description of School Engagement

Academic Engagement

A student's academic engagement is defined as their identification with and behavioural involvement (participation) in the academic aspects of school. Academic aspects of school include the students' dealings with teachers, curricula, and the school governance. Academic Engagement is broken down into two parts: Academic Participation and Academic Identification.

Academic Participation

Finn (1989) identifies a four-part taxonomy to academic participation. The first three levels are the focus of YITS. The first and most basic level of this classification system is the acquiescence to the need to attend school, to be prepared and to respond to directions and questions. This level is all that is expected of students in the primary grades. Yet, it remains important throughout a student's career. However, even some level on participation behaviours will be resisted by some students.

Level two participation behaviour involves students demonstrating initiative-taking behaviours. These actions can include a student asking questions of and having a dialogue with the teacher as well as a student displaying enthusiasm for school by spending extra time in the classroom before, during or after school or by doing more class work or homework than is required. This enthusiasm may eventually translate into participation in school-related clubs, and into community activities such as science fairs and internships. For those students who experience academic difficulty, "help seeking behaviour" is regarded as an important set of initiative-taking behaviours. The decision by a student to obtain help is affected by both his/her recognition of a learning difficulty and his/her desire to overcome it. It is also influenced by a student's perception of the response of the helper and other classmates to help-seeking behaviour on other occasions.

The third level of behaviours involves participation in the social, extracurricular, and athletic aspects of school life in addition to or as a substitute for extensive participation in academic work.

While some work has shown that there is a weak relationship between school warmth (how students perceive their academic environment) and academic achievement, recent work has found this relationship to be insignificant after the effects of participation were eliminated (Voelkl, 1995). Thus, while a warm and supportive classroom environment is important to a student's development, this importance may result from creating an environment where participation is encouraged.

The failure to participate in classroom activities and the expression of anti-participatory behaviours are collectively referred to as non-participation. Finn (1993) cites many studies that have found links between participation and school performance. Non-participatory behaviours can be classified into two forms a) failing to take advantage of constructive strategies for learning, b) engaging in negative behaviours that impede learning.

Academic Identification

Identification is used by social scientists in various ways. Nevertheless, the concept always has as its core the idea of an "affinity target" (a subject of attachment). While the term identification often signifies attachment with another person, it can also be used to describe the relationship that exists between a person and an institution such as a school. "A person comes to identify with a place or structure that represents certain expectations, values, beliefs, and practices" (Voelkl, 1997). During a youth's childhood and adolescent years, when schooling has a predominant role in his or her everyday life, school may become central to the youth's self-view.

Personal adjustment by the individual to the institution can be reflected in the attitudes that a student demonstrates towards the school such as academic motivation, comfort in school and the exhibition of acceptable or unacceptable personal and social behaviours in the classroom. Students who have a higher identification with school are expected to have a higher level of academic achievement and a greater persistence throughout the grades. By contrast, those students who do not identify with school may be predisposed to a pattern of negative school behaviour and to eventual withdrawal from school (Voelkl, 1997).

Within the YITS Reading Cohort, the focus of attention is on two components of identification, valuing and belonging. Belonging refers both to a sense of fit between the students' perceived needs and the offerings of the school and to a student's perception that they are in an environment where they are cared about and respected. Researchers suggest that a sense of belonging to a school increases the expectations of success for a student through enhancing the idea that one has the necessary skills and the available social resources to overcome difficulties and succeed in school. It also increases a student's belief in the value of their academic work (Goodenow, 1993). Valuing refers to a student's appreciation of success in school-relevant goals and to a student's endorsement of the goals of education in general¹⁹ and of academics in particular (Voelkl, 1997).

A student who fails to identify with school is expected to have a lack of valuing for the school and a lack of feelings of belonging to the school. Voelkl (1996) characterizes the emotional state represented by a student who disidentifies with school as follows:

The student [who] does not feel a sense of belonging or of valuing school, does not feel like an accepted member, has little or no sense of 'fitting in', does not feel comfortable or adequate, fails to incorporate school into his or her self-definition, may feel anger or hostility towards school, would rather be in a setting other than school, has little feeling of commitment to school, and may be distrustful and suspicious of the institution and those who represent it.

¹⁹ These goals are the value of school as a social institution and as a tool for personal advancement.

Lack of identification can be regarded as being congruent with alienation from school (see **Mastery section 14.8**). The social isolation and the normlessness aspects of alienation most closely parallel the belonging and valuing aspects of identification (Finn, 1989).

While belonging, or its absence, likely influences motivation and participation in school for most adolescents, its effects should be especially important for those students at the low end of the identification scores and less important for those students at the high end. This is because students at the low end are at greater risk of becoming school leavers (Voelkl, 1997).

Academic Participation and Academic Identification Relationship

Academic identification can be regarded as the extent to which a student has bonded with his or her school and substantively amalgamated the connection with this institution into his or her self-concept and lifestyle. Students' endorsement of the academic environment, indicated through their feelings of identification and participation in the classroom, is part of a cycle that affects academic achievement. This is a behaviour-attitude relationship. "In particular, students who develop a sense of identification with school are likely to experience greater education gains, expressly as a consequence of active participation in the classroom and in school generally" (Voelkl, 1996). By contrast, it has been found that student's lack of identification in school is "partially a function of the degree of academic success experienced in school and partially a function of the degree to which [youth] participate in classroom learning activities" (Voelkl, 1997). Thus academic identification is a fundamental part of the process through which academic participation manifests itself.

Social Engagement

Social Engagement is defined as the identification with and behavioural involvement in the social aspects of school (the school social life). It involves both a feeling of belonging to the school's social environment and a sense of fit between the individual and the school. This connection reflects the extent to which students feel personally accepted, respected, included and supported by others in the school's social environment.

Social Engagement is influenced by a student's personal traits as well as situational factors within the school environment. Social aspects are informal, out-of-classroom interests and activities associated with the school. These include students' relationships with peers, their extracurricular activities and their contact with teachers outside of the classroom. YITS mainly focused upon attempting to measure the social belonging aspect of social engagement.

14.4 Analysis of High School Engagement Scale

The main steps in the development of the scales presented in **section 14.2** were applied to the high school engagement model illustrated in section 14.3.3 and discussed in **section 14.3.4**. Analysis of the YITS 15-year-old Reading Cohort data revealed that the data supported three factors: Academic Participation (AP), Academic Identification (AI) and Social Engagement (SE). Seven items loaded on the Academic Participation sub-subscale, fifteen items loaded on the Academic Identification sub-subscale and nine items loaded on the Social Engagement subscale.

14.4.1 Testing Model Validity

The 56 items that were hypothesized to define the concept of high school engagement were administered to a sample of 29330, 15-year-olds from the respondents in cycle 1 of PISA 2000. Because of the school-based sampling frame (see **section 9.2** for a discussion of the sampling frame) all respondents to the YITS Reading

Cohort (15-year-old) were eligible to receive the school engagement questions. The questions that form this scale come from both the YITS-Student and the PISA-Student questionnaires.

This sample was split by language of questionnaire administration: English and French. Both the English and French sub-samples were then further split into two random samples and a factor analysis procedure was implemented to determine which factors were supported by the data.

Several items were inconsistent among the subpopulations (see Table 14.2 below). The YITS team decided to drop these items rather than have separate school engagement scales for the French and the English respondents. Once these items were dropped, the results across sub-samples and across languages were similar. This was an indication of the scale remaining stable across different samples and populations. Hence the analysis was repeated using all eligible respondents. This resulted in a three-factor model – Academic Participation (YSHACPS1), Academic Identification (YSHACIS1) and Social Engagement (YSHSOES1). – having seven items, fifteen items and nine items respectively.

Finn (1993) proposed that his academic identification sub-subscale broke into two components - belonging and valuing. Voelkl (1995), when using similar questions to those of Finn (1993), also found evidence of a split into two components. However, on comparing the two factor solution (with valuing and belonging as separate dimensions) and the one factor solution (identification), Voelkl concluded that the one factor solution fit the data just as well as the two factor model did. Using the data collected in cycle one of the YITS Reading Cohort data, the YITS team was unable to find a clear split for many items between the belonging and valuing components of identification. For this reason, the YITS team decided to retain only the overall academic identification sub-subscale.

Items Dropped from Further Analysis

Twenty-five items were dropped from the academic identification, academic participation sub-subscales and the social engagement subscale for a variety of reasons discussed below. If an item had a factor loading above 0.40, it was considered to load strongly enough to keep it in the final scale. When an item had loadings that were between 0.32 and 0.40, the item was kept if the YITS team felt that it contributed strongly to the concept being measured.

Table 14.2 Items Dropped from High School Engagement Scale

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Justification for dropping Item
YITS-Student	A8a	YSA8a	I pay attention to the teacher.	Loaded strongly on both the academic identification and academic participation factors. Taking a conservative approach, this variable was dropped.
YITS-Student	A8c	YSA8c	I participate actively in class discussions.	Did not load strongly on any of the factors.
YITS-Student	A8d	YSA8d	When I don't understand something, I ask the teacher to explain it.	
YITS-Student	A8e	YSA8e	For my courses, I do more than just the required work.	Loaded strongly on both the academic participation and academic identification factors. Taking a conservative approach, these variables were dropped.
YITS-Student	A8f	YSA8f	When school work is very difficult, I stop trying.	
YITS-Student	A8g	YSA8g	I do as little work as possible; I just want to get by.	
YITS-Student	A8h	YSA8h	I have trouble keeping up with the amount of homework.	Did not load strongly on any of the factors for the French sample.
YITS-Student	A9a	YSA9a	I feel proud to be part of my school.	Loaded on both academic identification and on the social engagement dimensions. Taking a conservative approach, this variable was dropped.
YITS-Student	A9b	YSA9b	I am treated with as much respect as other students in my class.	This item loaded moderately on both academic identification and social engagement, in the English sample (although loading clearly as social in the French sample).
YITS-Student	A9c	YSA9c	The only time I get attention at school is when I cause trouble.	Did load moderately weakly for the English sample but loaded poorly on the French sample.
YITS-Student	A9d	YSA9d	I like to participate in many activities at my school	Loaded somewhere between poorly and fairly strongly on social engagement. Taking a conservative approach, this variable was dropped.
YITS-Student	A9i	YSA9i	There are teachers or other adults in my school whom I can talk to if I have a problem.	This item did not load on social engagement and as the location of its loading did not correspond to the expectations for this item by the YITS team, it was dropped. A preliminary investigation indicated that this item did load on academic identification
YITS-Student	A10	YSA10	Do you expect to stay in school until you graduate?	The vast majority (93 %) of respondents to this question indicated yes. Therefore there was very little item discrimination available making the item useless for factor analysis.

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Justification for dropping Item
YITS-Student	A11	DV_A11	What is the highest level of education you would like to get	Loaded fairly strongly on the academic participation sub-subscale as opposed to the expected (academic identification) sub-subscale in the English sub-sample. However, loaded as academic identification in the French sample. Due to the inconsistency in loading of this item, it was dropped.
YITS-Student	C3	YSC3	Since September, how many total hours each week do you usually spend participating in school clubs, teams or other school-based extracurricular activities?	Did not load on Social Engagement as expected and loaded weakly on all factors. It is possible that had there been more social engagement questions related to social participation that the questions A9d and C3 would have loaded on a social participation dimension.
YITS-Student	K1a	YSK1a	Getting a good job later in life depends on my success in school now.	Loaded differently on the English and French scales. In addition these variables were loading more to the academic participation sub-subscale as opposed to the expected academic identification sub-subscale.
YITS-Student	K1b	YSK1b	I will need to go to college or university to achieve what I want to in life.	
YITS-Student	K1e	YSK1e	I think I would enjoy going to college or University.	
PISA – Student	Q29a	ST29Q01	How many times in the previous two full weeks did you miss school?	Did not load strongly on any of the factors
PISA – Student	Q29c	ST29Q03	How many times in the previous two full weeks did you skip classes?	
PISA – Student	Q29b	ST29Q02	How many times in the previous two full weeks did you arrive late for school?	Loaded somewhere between poorly and fairly strongly on the academic participation sub-subscale. In addition this variable was highly correlated to A7. Thus, only one of A7 and Q29b needed to be kept. A7 had more categories and thus more discrimination between the categories. Therefore, it was kept.
PISA – Student	Q31h	ST31Q08	I often feel bored.	Although it loaded strongly as academic identification, for the English sample, it did not load clearly on any factor in the French sample
PISA – Student	Q32b	ST32Q02	I do my homework while watching television.	These items did not load strongly on any of the factors.
PISA – Student	Q32d	ST32Q04	I finish my homework at school.	
PISA – Student	Q32e	ST32Q05	My teachers make useful comments on my homework.	Although this item loaded strongly as academic participation in the English sample, it did not load strongly on the French sample

The items retained for each factor, their description and their factor loadings are provided in the following tables.

Table 14.3 Academic Participation Items Description and Loadings²⁰

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Factor Loadings
YITS – Student	A6	YSA6	Hours on homework outside of class.	0.78
YITS – Student	A7	YSA7	Number of times I skipped class.	0.33
YITS – Student	A8B	YSA8B	I complete my assignments.	0.56
PISA – Student	Q32a	ST32Q01	I complete my homework on time.	0.59
PISA – Student	Q33a	ST33Q01	Homework and study time each week on English.	0.74
PISA – Student	Q33b	ST33Q02	Homework and study time each week on Mathematics.	0.76
PISA – Student	Q33c	ST33Q03	Homework and study time each week on Science.	0.75

Table 14.4 Academic Identification Items Description and Loadings

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Factor Loadings
YITS – Student	A8I	YSA8I	I get along with teachers.	0.62
YITS – Student	A8J	YSA8J	I am interested in what I am learning in class.	0.63
YITS – Student	A9E	YSA9E	School is one of the most important things in my life.	0.47
YITS – Student	A9F	YSA9F	Many of the things we learn in class are useless.	0.54
YITS – Student	A9G	YSA9G	Most of my teachers don't really care about me.	0.67
YITS – Student	A9H	YSA9H	Most of the time, I would like to be any place other than school.	0.57
YITS – Student	A9J	YSA9J	Most of what I learn in school will be useful when I get a job.	0.54
YITS – Student	A9L	YSA9L	School is often a waste of time.	0.60
YITS – Student	A9M	YSA9M	School is more important than most people think.	0.46
YITS – Student	A9N	YSA9N	Most of my teachers do a good job at teaching.	0.67
PISA – Student	Q30c	ST30Q03	Most of my teachers really listen to what I have to say.	0.67
PISA – Student	Q30d	ST30Q04	If I need extra help, I will receive it from my teachers.	0.57
PISA – Student	Q30e	ST30Q05	Most of my teachers treat me fairly.	0.65
PISA – Student	Q31g	ST31Q07	My school is a place I do not want to go.	0.40
PISA – Student	Q32f	ST32Q06	I am given interesting homework.	0.50

²⁰ The loadings presented for all following scales presented within this chapter, unless otherwise stated, are from the combined factor analysis on all eligible respondents.

Table 14.5 Social Engagement Items Description and Loadings

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Factor Loadings
YITS – Student	A9K	YSA9K	People at school are interested in what I have to say.	0.46
YITS – Student	A9O	YSA9O	I have friends at school whom I can talk to about personal things.	0.50
YITS – Student	A9P	YSA9P	I have friends at school who can help me with school work, if needed.	0.46
PISA – Student	Q31a	ST31Q01	My school is a place where I feel like an outsider (or left out of things).	0.76
PISA – Student	Q31b	ST31Q02	My school is a place where I make friends easily.	0.75
PISA – Student	Q31c	ST31Q03	My school is a place where I feel like I belong.	0.78
PISA – Student	Q31d	ST31Q04	My school is a place where I feel awkward and out of place.	0.74
PISA – Student	Q31e	ST31Q05	My school is a place where the students seem to like me.	0.68
PISA – Student	Q31f	ST31Q06	My school is a place where I feel lonely.	0.74

A disproportionately large number of the items retained for the AP sub-subscale focused upon homework (5 out of 7). As a result, the latent concept which the YITS team referred to as AP may be biased towards activities involving homework over other academic-related activities.

The factor loading for the items on all three subscales were similar in magnitude. According to the Comrey and Lee benchmark for rating scale loadings (**section 14.2.1**); the loadings for the Social Engagement subscale with values from 0.46 to 0.78, range from fair to excellent. The loadings for the AP sub-subscale, with values from 0.33 to 0.78, range from poor to very good. The loadings for the Academic Identification sub-subscale, with values from 0.40 to 0.67, range from poor to very good.

14.4.2 Estimating Scores

Scores on the two subscales of Academic Engagement (Academic Participation and Academic Identification) and the Social Engagement score were estimated using item response theory by the program PARSCALE (Muraki and Bock, 1997). An estimated score was obtained for most respondents.

By taking a simple average of the scores of the AP and AI sub-subscales, an Academic Engagement (YSHACES1) subscale was formed. The Social Engagement (SE) subscale was averaged with the scores from our newly formed Academic Engagement subscale to form an overall measure of high school engagement (YSHSCES1). The measurement variances of the scores for each respondent on the AP (YSHACPE1) and AI (YSHACIE1) sub-subscales as well as on the Academic (YSHACEE1) and Social subscales (YSHSOEE1) and the overall High School engagement scale (YSHSCEE1) were also estimated and are included along with their respective scores on the YITS 15-year-old Reading Cohort YITS dataset.

Due to a few respondents not answering any of the questions upon which the subscale was based, a number of scores were unobtainable. Overall, 364 cases for the AP sub-subscale, 360 cases for the AI sub-subscale and 369 cases for the SE subscale were not derived for this reason. Three-hundred and fifty-seven (357) of the non-responders to AI, AP, and SE did not respond to any of the questions in the YITS-Student questionnaire. These students did respond to the PISA–Student questionnaire. In all of the cases of missing scores, the scores were assigned a value of 9.99999 and the standard error of the scores was assigned a value of 99.9999.

Three AP scores (id # 0122202020, 0029100820, 0066702520) calculated by PARSCALE were replaced by missing values. These students responded to all or almost all of the questions asked within the AP scale, with extremely negative ratings and ended up having an extremely low score. The standard error of these scores was much larger than that of the other scores.

When either of the two sub-subscales that made up the Academic Engagement subscale was not calculated, the score of the respondent on the Academic Engagement subscale was set to missing. There were 367 cases where this happened. If either the Social Engagement subscale score was not calculated or the Academic Engagement subscale score was set to missing, then the High School Engagement scale score was also set to missing. Four-hundred and seven cases (407) were assigned missing scores for the overall School Engagement Scale.

Setting the composite measures to missing was necessary because including the estimated score from only one of the two sub-subscales that made up the Academic Engagement subscale would bias the results of secondary analyses. For these students, the Academic Engagement subscale would be wrongly estimated as either academic participation or academic identification, neither of which is fully conceptually interchangeable with academic engagement. A similar argument holds true for using only one of either the Academic or Social Engagement subscales to form overall the High-School Engagement scale.

14.4.3 Scale Reliability

Two common measures of reliability, Cronbach’s alpha and the index of reliability were estimated.

Table 14.6 High School Engagement Scale Reliability Measures

High School Engagement subscales	Index of Reliability	Cronbach’s alpha
Academic Participation	0.95	0.81
Academic Identification	0.96	0.87
Social Engagement	0.94	0.83
Academic Engagement	0.97	-----
School Engagement	0.96	-----

The magnitude of the reliability indices of the AP and AI sub-subscales and the SE subscale are very close. Thus, the accuracy of the measurements is about the same for all three subscales. Researchers should use these reliability estimates and the standard errors of the scores provided with the micro data file to determine whether or not these subscales are reliable enough for their purposes.

14.4.4 Testing Scale Validity

Based upon previous research, the variables listed below are expected to have a relationship with the AP, AI sub-subscales and/or with the SE subscales. The direction of the correlation and the strength of the relationship between the variable and the subscale are also provided. The rightmost column provides examples where previous researchers and experts have found or proposed similar relationships between the construct and the test items. The direction of the correlation and the strength of the relationship between the variable and the subscale are also provided. For these scales, a medium correlation is considered to be 0.15 to 0.30, and a high correlation is considered to be 0.30 and above. These correlations indicate that the construct being measured in the YITS questionnaire is similar to the construct as it has been defined by previous research and theory.

Table 14.7 Academic Participation Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	----- (scale)	YSHCES1 (Self-Esteem Scale).	See Self-Esteem section	High	Positive	(Finn, 1993)
YITS – Student	----- (scale)	YSHSFFS1 (Self-Efficacy Scale).	See Self-Efficacy section	High	Positive	(Finn, 1993)
YITS – Student	----- (scale)	YSHMASS1 (mastery scale)	See Mastery section	High	Positive	(Finn, 1993).
YITS – Student	D2a – D2j	YSD2a – YSD2j	Peer Influence Questions	Students tend to associate with peers who they feel are like themselves or with whom they feel that they have similar traits. Thus, asking about the actions and/or opinions of close friends is a proxy for asking about student's behaviours and opinions. Which because of confidentiality issues, PISA was unable to ask of the students.		
YITS – Student	D2a	YSD2a	My closest friends think completing HS is very important	High	Positive	Those students who have close friends who value finishing HS, are more likely to value finishing and thus will participate academically (Finn & Rock, 1997)
YITS – Student	D2b	YSD2b	My closest friends skip classes once a week or more	Medium	Negative	(Voelkl, 1995)
YITS – Student	D2d	YSD2d	My closest friends are planning to further their education after leaving HS	High	Positive	(Voelkl, 1995)
YITS – Student	D2e	YSD2e	My closest friends have a reputation for causing trouble	High	Negative	Students who have close friends who engage in delinquent behaviours are likely to engage in delinquent behaviours themselves. These type of students are less likely to participate academically (Goodenow, 1993)
YITS – Student	D2g	YSD2g	My closest friends think it's okay to work hard at school	High	Positive	(Goodenow, 1993)
YITS – Student	E1d	YSE1d	Caused trouble at school and had to talk with the school principal or other administrator?	High	Positive	(Finn, 1993)
YITS – Student	K1e	YSK1e	I think I would enjoy going to college or university.	High	Positive	(Finn, 1993)
YITS – Student	K1g	YSK1g	I'm smart enough to do well at university.	High	Positive	Students who feel like they have the capacity to succeed academically are more likely to participate academically.
YITS – Student	K1h	YSK1h	I'm smart enough to do well in college.	Medium	Positive	
YITS – Student	----- (dv).	YSDV_L2	Self-Reported Overall Grade	High	Negative	(Finn, 1993). The negative direction of the correlation occurs because the categories in questions
YITS – Student	----- (dv).	YSDV_L5	Self-Reported Math Grade	High	Negative	

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	---- (dv).	YSDV_L8	Self-Reported Science Grade	High	Negative	related to student's grades were ranked from high grades to low grades whereas the AP –sub-subscale values go from low to high (high being more AP).
YITS – Student	---- (dv).	YSDV_L11	Self-Reported English Grade	High	Negative	
PISA – Student	Q30a	ST30Q01	Students get along with teachers.	Medium	Positive	(Voelkl, 1996)
PISA – Student	Q35f	ST35Q06	For me, reading is a waste of time	High	Negative	(Finn, 1993)
PISA – Student	---- (scale).	WLEREAD (PISA scale)	PISA Reading Ability score	High	Positive	(Finn, 1993)

Table 14.8 Academic Identification Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	----- (scale)	YSHSFFS1 (Self-efficacy scale)	See Self-Efficacy section	High	Positive	(Voelkl, 1995)
YITS – Student	-----		See Mastery section	High	Positive	(Voelkl, 1997)
YITS – Student	A9b	YSA9b	I am treated with as much respect as other students in my class.	High	Positive	(Voelkl, 1996)
YITS – Student	D2a – D2j	YSD2a – YSD2j	Peer Influence Questions	Students tend to associate with peers who they feel are like themselves or with whom they feel that they have similar traits. Thus, asking about close friends actions and/or opinions is a proxy for asking about student's behaviours and opinions. Because of confidentiality issues, the YITS questionnaire was unable to ask these questions directly of the students.		
YITS – Student	D2a	YSD2a	How many of your closest friends think completing high school is very important?	High	Positive	(Voelkl, 1997)
YITS – Student	D2b	YSD2b	How many of your closest friends skip classes once a week or more?	Medium	Negative	Students who do not identify with school (that is, they don't feel they belong there and they don't value it) don't go to school as they don't see the point. (Voelkl, 1996).
YITS – Student	D2e	YSD2e	How many of your closest friends have a reputation for causing trouble?	High	Negative	Sociologists have pointed to forms of dis-identification as possible precursors to adverse behaviour, including juvenile delinquency. Social control theorists have hypothesized that offensive acts are less likely to occur when the individual is attached to an institution (Voelkl, 1995)

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	D2g	YSD2g	How many of your closest friends think it is okay to work hard at school?	High	Negative	(Voelkl, 1997)
YITS – Student	E1d	YSE1d	How often have you caused trouble at school and had to talk with the school principal or other administrator?	High	Positive	(Voelkl, 1997)
YITS – Student	K1e	YSK1e	I think I would enjoy going to college or university.	High	Positive	Students who believe that they have the ability to do well in post-secondary education are more likely to identify with education
YITS – Student	K1g	YSK1g	I'm smart enough to do well in university.	High	Positive	
YITS – Student	K1h	YSK1h	I'm smart enough to do well in college.	High	Positive	
YITS – Student	K1j	YSK1j	No matter how much education I get, I will most likely end up with a low-paying job.	High	Negative	(Voelkl, 1997)
YITS – Student	----- (dv)	DV_L2	Self-Reported Overall Grade	High	Negative	(Voelkl, 1996)
YITS – Student	----- (dv)	DV_L5	Self-Reported Math Grade	High	Negative	
YITS – Student	----- (dv)	DV_L8	Self-Reported Science Grade	High	Negative	
YITS – Student	----- (dv)	DV_L11	Self-Reported English Grade	Medium	Negative	
PISA – Student	Q29b	ST29Q02	How many times in the last two weeks did you skip classes?	High	Negative	(Voelkl, 1995)
PISA – Student	Q35a	ST35Q01	I read only if I have to?	High	Negative	(Voelkl, 1995)
PISA – Student	Q35f	ST35Q06	For me, reading is a waste of time?	High	Negative	
PISA – Student	Q35i	ST35Q09	I cannot sit still and read for more than a few minutes.	High	Negative	(Voelkl, 1995)
PISA-Student	----- (scale)	TEACHSUP (Pisa Scale)	Teacher Support	High	Positive	(Goodenow, 1993)

Table 14.9 Social Engagement Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	---- (scale)	YSHSEFS1 (Self-Esteem scale)	See Self-Esteem Section	High	Positive	(Fullarton, 2002)
YITS – Student	----- (scale)	YSHMASS1 (Mastery Scale)	See Mastery Section	High	Positive	(Finn, 1993)
YITS – Student	----- (scale)	YSHSUPS1 (Social Support Scale)	See Social Support Section	High	Positive	The factors contributing to strong community involvement at both the community and individual level also promote school engagement (Smith et al. , 1998)
YITS – Student	---- (scale)	YSHSACIS1 (Academic Identification sub-sub-scale)	See School Engagement Section	High	Positive	(Voelkl, 1995)
YITS – Student	A9B	YSA9B	I am treated with as much respect as other students in my class.	High	Positive	(Smith et al, 1998)
YITS – Student	D2A	YSD2A	Do your closest friends think completing high school is very important?	Medium	Positive	(Goodenow,, 1993)
YITS – Student	K1D	YSK1D	I think I will always have a boring job.	Medium	Negative	(Fullarton, 2002)
YITS – Student	K1F	YSK1F	I think that my job opportunities will be limited by discrimination.	Medium	Negative	
YITS – Student	K1J	YSK1J	No matter how much education I get, I will most likely end up with a low-paying job.	Medium	Negative	
YITS – Student	K1G	YSK1G	I'm smart enough to do well in university.	Medium	Positive	(Finn, 1993)
YITS – Student	K1H	YSK1H	I'm smart enough to do well in college.	Medium	Positive	
PISA – Student	Q31g	ST31Q07	My school is a place where I do not want to go.	High	Negative	(Voelkl, 1996)
PISA – Student	---- (scale)	STUDREL (Pisa Scale)	Teacher-Student Relationship (PISA scale) See PISA user's guide	Medium	Positive	(Voelkl, 1995)

14.5 Self-Efficacy Scale

14.5.1 Description of Self-Efficacy Scale

The self-efficacy scale employed in YITS was adapted from Pintrich and De Groot (1986). However, the questions in it were modified by the YITS team and the concept measured may be subtly different. With this scale, the YITS team attempted to assess a student’s academic self-efficacy. The YITS team defines academic self-efficacy as the student’s competence and confidence in performance of class work as perceived by the student. This concept should be distinguished from global self-efficacy or mastery which is the belief that one has control over one’s own destiny (see **Mastery section 14.8**).

14.5.2 Testing Model Validity

The items that make up this factor, their description and their factor loadings are provided below. No substantive difference was found in the loadings between the French and English samples.

Table 14.10 Academic Self-Efficacy Items - Description and Loadings.

Source	Item Code Codebook	Item Code Questionnaire	Item Description	Factor Loading
YITS – Student	YSA8K	A8K	Certain I can understand the most difficult material presented in texts	0.85
YITS – Student	YSA8L	A8L	Confident I can understand the most complex material presented by the teacher	0.88
YITS – Student	YSA8M	A8M	Confident I can do an excellent job on assignments and tests	0.86
YITS – Student	YSA8N	A8N	Certain I can master the skills being taught	0.85

According to the Comrey and Lee benchmark for rating scale loadings (section 14.2.1); the loadings for the Academic Self-Efficacy scale with values from 0.85 to 0.88 are all excellent items.

14.5.3 Estimating Scores

This scale scores have the code YSHSFFS1 on the dataset and their standard error has the code YSHSFFE1. Due to a few respondents not answering any of the questions upon which the scale was based, the score could not be estimated for 654 respondents. Three-hundred and fifty-seven of the non-responders to the academic self-efficacy scale are total non-responders to YITS-Student questionnaire. These students did not respond to the YITS-Student questionnaire, but they did respond to at least part of the PISA Assessment. In all of these cases of missing scores, the scores were assigned a value of 9.99999 and the standard error of the scores was assigned a value of 99.9999.

14.5.4 Scale Reliability

Two common measures of reliability, Cronbach’s alpha and the index of reliability were estimated. The value of Cronbach’s alpha for the items in the Self-efficacy scale is 0.88 and the index of reliability is 0.96. Researchers should use this reliability estimate and the standard errors of the scores provided with the micro data file to determine whether or not this scale is reliable enough for their purposes.

14.5.5 Testing Scale Validity

Based upon previous research, the variables listed below are expected to have a relationship with the Academic Self-Efficacy Scale. The direction of the correlation and the strength of the relationship between the variable and the scale are also provided. The rightmost column provides examples where previous researchers and experts have found or proposed similar relationships between the construct and the test items or where the concept being measured in the scale is clearly similar to the concept being measured in the test item. These correlations indicate that the construct being measured in the YITS questionnaire is similar to the construct as it has been defined by previous research and theory. For the Academic Self-Efficacy Scale, those items which had a correlation above 0.30 were considered to have a high correlation and those items that had a correlation above 0.15 but below 0.30 were considered to have a medium correlation.

Table 14.11 Academic Self-Efficacy Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	---- (scale)	YSHACIS1	See School Engagement Section	High	Positive	Students who have incorporated academics into their self-concept are expected to have higher school motivation (Voelkl, 1997)
YITS – Student	K1g	YSK1G	I'm smart enough to do well in university.	High	Positive	Students who have confidence that they have the ability to succeed in post-secondary education are expected to have higher academic self-efficacy as these are measures of academic confidence.
YITS – Student	K1h	YSK1H	I'm smart enough to do well in college.	High	Positive	
YITS – Student	----- (dv)	DV_L2	Self-Reported Overall Grade	High	Negative	(Finn, 1989) Since students marks are scored from high to low whereas the self-efficacy questions are scored from low to high the correlation is negative.
YITS – Student	----- (dv)	DV_L5	Self-Reported Math Grade	High	Negative	
YITS – Student	----- (dv)	DV_L8	Self-Reported Science Grade	High	Negative	
YITS – Student	----- (dv)	DV_L11	Self-Reported English Grade	Medium	Negative	
PISA-Student	Q35D	ST35Q04	I find it hard to finish books.	Medium	Negative	Students who do not have high confidence in their reading abilities are expected to score low on academic self-efficacy since it measures confidence and motivation.
PISA-Student	Q35I	ST35Q09	I cannot sit still and read for more than a few minutes	Medium	Negative	
PISA-Student	----- (scale)	WLEREAD (Pisa Scale)	PISA reading ability score	High	Positive	Students who have the motivation and confidence that they can expect to perform well on standardized achievement tests are more likely to in fact score well (Pintrinch and De Groot, 1986).

14.6 Social Support Scale

14.6.1 Description of Social Support Scale

Most conceptualizations of support include the following ideas: emotional sustenance, self-esteem building, provision of information and feedback and tangible assistance (Russell and Cutrona, 1987). A number of different social support measures have been developed. These measures differ widely and on multiple dimensions on how they model social support. These instruments differ on whether they assess: 1) structure or the function of support; 2) subjective or objective support; 3) availability or adequacy of support; 4) individual structures or functions or global indices; 5) several individual structures; 6) the role of people available to provide support or simply whether support is available; 7) the number of people available to provide support or merely the availability of support (irrespective of the number of people) (Cohen and Syme, 1985, p. 15).

While social support does not have a unique concept or an empirical concept, it is still widely used by researchers. “The term [social support] connotes enough that it has proved fruitful even in the absence of denotation” (House and Kahn, 1985, p. 84). It has been suggested the reason for this usage is that even without a single concept, it captures a common theme in many seemingly diverse phenomena.

Social support is a concept that may help in the interpretation of the differences observed in people’s responses to common problems. Conditions that create distress in some people do not seem to affect others. Researchers theorize that factors exist that can mediate between difficult life conditions and outcomes. Social support is one of these coping mechanisms. Social support can work to bolster self-esteem and mastery against hardship (Pearlin, 1985, p. 57).

The central goal of the social support model proposed by Carolyn Cutrona and Daniel Russell is to understand the processes through which interpersonal relationships enhance or retain both psychological and physiological well-being. The objective of the measure for YITS was to determine the availability of social supports, via friends, family and other sources for the youth. The social support scale used in YITS is a modified version of the Social Provisions Scale developed by Russell and Cutrona. It was based upon similar modifications to the scale adapted for the Canadian NLSCY (Microdata User Guide (2003)).²¹

The aspects of social support measured in YITS include three aspects of the original model and are classified under the broad category of assistance-related provisions. They are reliable alliance (the assurance that others can be counted upon for practical help), attachment (emotional closeness) and guidance (advice or information). These aspects are most directly related to problem-solving within the context of stress. Two items were proposed to measure each of these aspects for a total of six items.

14.6.2 Model Validity

No strong differences were found between the factor loadings on the English and the French samples and all of the proposed items were kept. The items that make up the factor, their description and their factor loadings are provided below.

21 Statistics Canada Microdata User Guide (2003) – *National Longitudinal Survey of Children and Youth – Cycle 4*. Statistics Canada

Table 14.12 Social Support Items Description and Loadings

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Factor Loadings
YITS – Student	D1A	YSD1A	If something went wrong, no one would help me	0.64
YITS – Student	D1B	YSD1B	I have family and friends who help me feel safe, secure and happy	0.76
YITS – Student	D1C	YSD1C	There is someone I trust whom I would turn to for advice if I were having problems	0.81
YITS – Student	D1D	YSD1D	There is no one I feel comfortable talking about problems with	0.75
YITS – Student	D1E	YSD1E	There is no one I feel close to	0.75
YITS – Student	D1F	YSD1F	There are people I can count on in times of trouble	0.77

According to the Comrey and Lee benchmark for rating scale loadings (section 14.2.1); the loadings for the Social Support scale with values from 0.64 to 0.81, range from very good to excellent.

14.6.3 Estimating Scores

This scale scores have the code YSHSUPS1 on the dataset and their standard error has the code YSHSUPE1. Due to a few respondents not answering any of the questions upon which the scale was based, the score could not be estimated for 613 respondents. Three-hundred and fifty-seven of the non-responders to the Social Support Scale are total non-responders to YITS-Student questionnaire. These students did not respond to YITS-Student questionnaire, but they did respond to at least part of the PISA Assessment. In all of the cases of missing scores, the scores were assigned a value of 9.99999 and the standard error of the scores was assigned a value of 99.9999.

14.6.4 Scale Reliability

Two common measures of reliability, Cronbach’s alpha and the index of reliability were estimated. The value of Cronbach’s alpha for the items in the Social Support scale is 0.84 and the index of reliability is 0.92. Researchers should use these reliability estimates and the standard errors of the scores provided with the micro data file to determine whether or not this scale is reliable enough for their purposes.

14.6.5 Testing Scale Validity

With social support scales, it is particularly important to demonstrate that one is actually measuring social support and not some other related personality measure. This is demonstrated by discriminant validity. In particular, one wishes to demonstrate that the support model that is proposed is not highly correlated with such measures as social anxiety, personal competence, and social desirability (Cohen and Syme, 1985, p. 14). Using this scale, Cutrona and Russell (1987) assessed discriminant validity and determined that social support does measure a concept that is distinct from these other measures. Hence, the Social Provisions Scale does contribute to the description of the concept of psychological distress in a way that is different than these related variables. However, it is also necessary as displayed in table 14.13 to demonstrate that the social support scale used for YITS is correlated to other relevant scales or variables (using criterion-based validity).

Based upon previous research, the variables listed below are expected to have a relationship with the Social Support Scale. The rightmost column provides examples where previous researchers and experts have found or proposed similar relationships between the construct and the test items or where the concept being measured in the scale is clearly similar to the concept being measured in the test item. The direction of the correlation and the strength of the relationship between the variable and the scale are also provided. These correlations indicate that the construct being measured in the YITS questionnaire is similar to the construct as it has been defined by previous research and theory. For the Academic Self-efficacy Scale, those items which had a correlation above 0.30 were considered to have a high correlation and those items that had a correlation above 0.15 but below 0.30 were considered to have a medium correlation.

Table 14.13 Social Support Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS Student	-- (scale)	YSHSOES1 (Social engagement sub-scale)	See High School Engagement section	High	Positive	Students who believe that they have someone to turn to when they need help are expected to have better sense of fit between themselves and their school social environment (Voelkl, 1997).
YITS Student	-- (scale)	YSHSFES1 (Self-Esteem scale)	See Self-Esteem Section	High	Positive	Cutrona and Russell (1987) argue social support is expected to buffer a person against low self-esteem
YITS Student	A5b	YSA5b	At my school, it's difficult to make new friends.	High	Negative	Youth who perceive that it is difficult to make friends at school likely do not have as strong a support network at school.
YITS Student	A9i	YSA9i	There are teachers or other adults in my school whom I can talk to if I have a problem.	High	Positive	Students who perceive that there are people within the school environment who are available to help and are interested in them are expected to have higher social support.
YITS Student	A9k	YSA9k	People at school are interested in what I have to say.	High	Positive	
PISA Student	Q19f	ST19Q06	Do your parents spend time just talking with you	High	Positive	This question is measuring the frequency of a socially supportive act talking to parent.
PISA Student	Q31g	ST31Q07	My school is a place where I don't want to go.	Medium	Negative	Students who do not want to be at school likely perceive school as an unsupportive environment lacking in warmth (Voelkl, 1996).
YITS Student	---- (scale)	YSHACIS1 (Academic Identification sub-sub-scale)	See High School Engagement section	High	Positive	Student who perceive that they belong to school are more likely to feel supported. Goodenow notes that one aspect of specific relevance to education is "student's sense of belonging in the classroom. This is the extent to which students feel accepted, respected included and supported by others in the school social environment (Goodenow, 1993).

14.7 Self-Esteem Scale

14.7.1 Description of Self-Esteem and the Self-Esteem Scale

At its most basic level, self-esteem can be described as an attitude – the evaluative component of a sense of self. Recent work has expanded this definition to include specific details about different self-evaluation components that form global self-esteem. At a higher conceptual level, one can regard self-esteem as coming from perceived discrepancies between a person's actual and ideal self. At a more complex level, self-esteem can be considered to be a person's attitude towards the incongruity between one's sense of actual and ideal self. Self-esteem serves an adaptive and self-protective role which includes protecting an individual against environmental stressors. Self-esteem is assumed to act as a trait – that is, its levels remain relatively constant over time within individuals (Blascovich and Tomaka, 1991, p. 116).

Different measurement approaches have been suggested in the psychological literature as to the measurement specificity required in studying the concept of self-esteem. Some researchers have created scales which attempt to assess general or global self-esteem whereas other researchers suggest that forming scales that examine specific measures of self-esteem (facets of self) is the best approach (Blascovich and Tomaka, 1991, p. 117).

Both global self-esteem and specific self-esteem are important. However, they are important for different reasons and are relevant in different ways (Rosenberg et al., 1995). Specific self-esteem is judgmental and evaluative in nature. Thus, specific self-esteem scales are most relevant to assessing measures of behaviour. Global self-esteem is strongly affective. Therefore, global self-esteem scales are most appropriate for measuring psychological well-being. It is noted that global and specific self-esteem may mediate the effects of each other (Rosenberg et al., 1995).

Many scales have been developed to measure self-esteem. These scales differ in the way that they measure self-esteem and also the age group for which the scale is appropriate. The self-esteem scale that was chosen for YITS is Morris Rosenberg's²² self-esteem scale (RSE) (Rosenberg, 1965, p.17). Rosenberg defines self-esteem as favourable or unfavourable attitudes towards self and proposes a series of ten questions to measure it. This scale is one of the most widely-used scales measuring self-esteem and it is the one to which developers of other self-esteem scales attempt convergence (Blascovich and Tomaka, 1991, p.121). RSE requires that respondents report feelings about self directly. Similar to other self-administered self-esteem scales, items in this scale may be susceptible to socially desirable²³ reporting as it is more desirable to present oneself as having high self-esteem than having low self-esteem. Within the context of YITS, RSE attempts to measure adolescents' global feelings of self-worth or self-acceptance.

Researchers should be cautioned that since RSE is a global self-esteem measure. Therefore, one may find correlations with behavioural outcomes such as academic performance are weak. It has been postulated that any correlation that can be found with behaviours is likely due to the effects of specific self-esteem acting upon global self-esteem (Rosenberg et al, 1995).

22 M. Rosenberg's family would like to be kept informed about how his Self-Esteem Scale has been used, including published research. Information should be sent to the following address:
The Morris Rosenberg Foundation, c/o Dept. of Sociology, University of Maryland, 2112 Art/Soc Building
College Park, MD 20742-1315.

23 Socially desirable responding or reporting is the propensity to provide answers that make the respondent look good (Paulhus, 1991, p. 21).

14.7.2 Results of Factor Analysis of Self-Esteem Scale

Several studies have demonstrated a one factor solution to the RSE. Rosenberg initially proposed a one-factor solution (Rosenberg, 1965, pp. 17-18). However, other studies have found two highly correlated factors (Blascovich and Tomaka, 1991, p. 122); (Shevlin, Bunting, Lewis, 1995); (Owens, 1994); (Rosenberg et al., 1995). This additional factor reflects the effect of the negatively worded questions. This suggests that these negative questions may measure a different concept than what is measured in the positively-oriented questions. Carmines and Zeller found two factors which they called positive and negative self-esteem (Carmines and Zeller, 1979, cited in Hagborg, 1996). These two factors have also been referred to as self-confidence and self-deprecation factors (Kohn and Schooler, 1983, cited in Gray-Little, Williams, and Hancock, 1997) as well as positive self-worth and self-deprecation (Owens, 1994).

As has been demonstrated from the literature, there is uncertainty as to whether this second-dimension is a noise dimension or a true dimension which correlates with global self-esteem (Marsh, 1996). In the YITS 15-year-old Reading Cohort data, evidence was also found of a relatively highly correlated²⁴ two factor solution with the positive items (I1A, I1B, I1D, I1F, I1G) loading on one factor and the negative items (I1C, I1E, I1H, I1I, I1J) loading on the other factor. The YITS-team decided to take a conservative approach and to consider this second factor to be a noise factor. The two factors were collapsed into one factor containing all the items, since the loadings are still strong under a one factor solution. Researchers are invited to try other latent structures and compare the results obtained under them with the results of the one dimensional solution.

14.7.3 Model Validity

All items that were proposed for this scale ended up loading on it. There were no substantive differences found in the factor loadings between the English and French samples. The items that make up this factor, their description and their factor loadings are provided below.

Table 14.14 Rosenberg Self-Esteem Scale Items Description and Loadings

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Factor Loading
YITS – Student	I1A	YSI1A	I am a person of worth, at least on equal basis with others	0.63
YITS – Student	I1B	YSI1B	I have a number of good qualities	0.72
YITS – Student	I1C	YSI1C	I tend to feel that I am a failure	0.76
YITS – Student	I1D	YSI1D	I am able to do things as well as most other people	0.66
YITS – Student	I1E	YSI1E	I do not have much to be proud of	0.68
YITS – Student	I1F	YSI1F	I have a positive attitude toward myself	0.58
YITS – Student	I1G	YSI1G	I am satisfied with myself	0.78
YITS – Student	I1H	YSI1H	I wish I could like myself more	0.58
YITS – Student	I1I	YSI1I	I certainly feel useless at times	0.68
YITS – Student	I1J	YSI1J	At times I think I am no good at all	0.73

According to the Comrey and Lee benchmark for rating scale loadings (section 14.2.1); the loadings for the Social Engagement subscale with values from 0.58 to 0.73, range from good to excellent.

24 The correlation of the two factors under an oblique (non-orthogonal) transformation was approximately 0.48.

14.7.4 Estimating Scores

This scale score has the code YSHSFES1 on the dataset. Its standard error has the code YSHSFE1. Due to a few respondents not answering any of the questions upon which the scale was based, the score could not be estimated for 1,273 respondents. Three-hundred and fifty-seven (357) of the non-responders to the RSE (Rosenberg’s self-esteem scale) are total non-responders to the YITS Student questionnaire. These students did respond to the PISA Student questionnaire. In all of the cases of missing scores, the scores were assigned a value of 9.99999 and the standard error of the scores was assigned a value of 99.9999.

14.7.5 Scale Reliability

Two common measures of reliability, Cronbach’s alpha and the index of reliability were estimated. The value of Cronbach’s alpha for the items in the RSE is 0.89 and the index of reliability is 0.96. Researchers should use these reliability estimates and the standard errors of the scores provided with the micro data file to determine whether or not this scale is reliable enough for their purposes.

14.7.6 Testing Scale Validity

Based upon previous research, the variables listed below are expected to have a relationship with RSE. The rightmost column provides examples where previous researchers and experts have found or proposed similar relationships between the construct and the test items. The direction of the correlation and the strength of the relationship between the variable and the subscale are also provided. These correlations indicate that the construct being measured in the YITS questionnaire is similar to the construct as it has been defined by previous research and theory.

For RSE, those items which had a correlation above 0.30 were considered to have a high correlation and those items that had a correlation above 0.15 but below 0.30 were considered to have a medium correlation.

Table 14.15 Self-Esteem Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	----- (scale)	YSHSOES1 (Social Engagement subscale).	See High School Engagement section	High	Positive	Students with low self-esteem are less likely to participate in informal peer groups within the school and if they do participate are less likely to assume positions of leadership (Rosenberg, 1965, Rosenberg, Schooler, and Schoenbach 1989).
YITS – Student	----- (scale)	YSHACIS1 (Academic Identification sub-subscale).	See High School Engagement section	High	Positive	(Owens 1994)
YITS – Student	----- (scale)	YSHSFFS1 (Self-Efficacy Scale).	See Self-Efficacy section	High	Positive	(Rosenberg et al., 1995)
YITS – Student	----- (scale)	YSHMASS1 (Mastery scale)	See Mastery section	High	Positive	Self-Esteem along with Mastery is part of general psychological resources (Pearlin & Schooler, 1978).
YITS –	K1d	YSK1d	I think I will	High	Negative	(Rosenberg, 1965, p. 236-238)

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
Student			always have a boring job.			
YITS – Student	K1f	YSK1f	I think that my job opportunities will be limited by discrimination	High	Negative	(Rosenberg, 1965, p. 68-72)
YITS – Student	K1g	YSK1g	I'm smart enough to do well in university.	High	Positive	Global Self-esteem deals with a sense of self-worth. Students who perceive that they have the intellectual capacity are likely to have high academic self-esteem and through that high overall self-esteem (Rosenberg et al., 1995).
YITS – Student	K1H	YSK1H	I'm smart enough to do well in college.	High	Positive	
YITS – Student	K1J	YSK1J	No matter how much education I get, I will most likely end up with a low-paying job.	High	Negative	(Rosenberg, 1965, 68-72)
YITS – Student	K1L	YSK1L	When I finish my schooling it will be hard to find a job.	High	Negative	(Rosenberg, 1965, 68-72)

14.8 Mastery Scale

14.8.1 Description of Mastery and the Mastery Scale

Different powerlessness (or mastery) scales have different focuses. Some powerlessness scales focus on the political, whereas others have a personal focus. Powerlessness scales also differ on the level of abstractness asked in their questions from highly concrete questions about life to more general statements (Seeman, 1991, p. 292).

The powerlessness scale chosen by YITS is based upon the work of Pearlin and Schooler (1978). This scale, referred to as the Mastery scale²⁵, assesses a feeling of powerlessness without reference to concrete life situations. Mastery can be defined as a measure that assesses “the extent to which one regards one’s life-chances as being under one’s own control in contrast to being fatalistically ruled” (Pearlin and Schooler, 1978). Hence, if one scores high on the mastery scale, one does not feel powerless.

The measurement of mastery consists of assessing one of the psychological resources of coping, the other two being self-esteem and self-denigration²⁶. These are the “personality characteristics that people draw upon to help them withstand threats posed by events and objects in their environment” (Pearlin and Schooler, 1978). These resources can be strong barriers to the consequences of social strain.

²⁵ An inspiration for this scale is the concept of locus of control (internal versus external control). The concepts of locus of control and powerlessness are quite similar (Seeman, 1983); (De Man, Labrèche-Gauthier, Leduc, 1991); (Seeman, 1991, p. 294). In fact, one’s attribution on a locus of control scale has been found to be a major predictor of the powerlessness aspect of alienation (De Man, Devisse, 1987).

²⁶ What Pearlin and Schooler (1978) refer to as self-denigration is really a latent dimension representing the negative items of Rosenberg’s self-esteem scale. See Self-Esteem (section 14.7) for a discussion of self-esteem including the dimensionality of Rosenberg’s self-esteem scale.

14.8.2 Testing Model Validity

The items that make up this factor, their descriptions and their factor loadings are provided below. No substantive difference was found in the loadings between the French and English samples.

Table 14.16 Mastery Item - Description and Loadings

Source	Item Code Codebook	Item Code Questionnaire	Item Description	Factor Loadings
YITS – Student	YSI2A	I2A	Sometimes I feel I'm being pushed around in life	0.59
YITS – Student	YSI2B	I2B	What happens to me in the future mostly depends on me	0.37
YITS – Student	YSI2C	I2C	There is really no way I can solve some of the problems I have	0.73
YITS – Student	YSI2D	I2D	There is little I can do to change many of the important things in my life	0.73
YITS – Student	YSI2E	I2E	I often feel helpless in dealing with the problems of life	0.78
YITS – Student	YSI2F	I2F	I have little control over the things that happen to me	0.74
YITS – Student	YSI2G	I2G	I can do just about anything I really set my mind to.	0.54

According to the Comrey and Lee benchmark for rating scale loadings (**section 14.2.1**); the loadings for the Self Mastery scale with values from 0.37 to 0.73, range from poor to excellent. While some evidence was found of a two factor solution, it was decided to accept the one-factor solution suggested in the literature since only two items (I2B, and I2G) loaded on the second factor. The loadings of the two positively worded questions are smaller than any of the other loadings. This may be because the factor is dominated by negatively worded items.

14.8.3 Estimating Scores

Since 1,381 respondents did not answer any of the questions upon which the Mastery scale (YSHSMAS1) was based, their score could not be obtained. Three-hundred and fifty-seven (357) of the non-responders to Mastery are total non-responders to the YITS-Student questionnaire. These students did respond to the PISA – Student questionnaire. In all of these cases of missing scores, the scale scores were assigned a value of 9.99999 and the standard error of the scores (YSHSMASE1) was assigned a value of 99.9999.

14.8.4 Scale Reliability

Two common measures of reliability, Cronbach's alpha and the index of reliability were estimated. The value of Cronbach's alpha for the items in the Self-esteem scale is 0.89 and the index of reliability is 0.93. Researchers should use these reliability estimates and the standard errors of the scores provided with the micro data file to determine whether or not this scale is reliable enough for their purposes.

14.8.5 Testing Scale Validity

Based upon previous research, the variables listed below are expected to have a relationship with the Mastery Scale. The rightmost column provides examples where previous researchers and experts have found or

proposed similar relationships between the construct and the test items. The direction of the correlation and the strength of the relationship between the variable and the subscale are also provided. These correlations indicate that the construct being measured in the YITS questionnaire is similar to the construct as it has been defined by previous research and theory or where the concept being measured in the scale is clearly similar to the concept being measured in the test item. For the Mastery scale, those items which had a correlation above 0.30 were considered to have a high correlation and those items that had a correlation above 0.15 but below 0.30 were considered to have medium correlation.

Table 14.17 Mastery Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	----- (scale)	YSHSACIS1 (Academic Identification sub-sub-scale)	See High School Engagement Section	High	Positive	Finn (1993) notes that Academic identification is associated with mastery.
YITS – Student	----- (scale)	YSHSFES1 (Self-Esteem scale)	See Self-Esteem Section	High	Positive	Self-Esteem and Mastery are both classified as general psychological aspects of coping (Pearlin, Schooler, 1978).
YITS – Student	----- (scale)	YSHSUPS1 (Social Support Scale)	See Social Support Section	High	Positive	Social Support acts as a buffer against low-mastery (Pearlin, Schooler, 1978).
YITS – Student	K1D	YSK1D	I think I will always have a boring job	High	Negative	Mastery deals with assessing the belief that life force's are under one's control. These questions assess the belief that one's career is under one's control.
YITS – Student	K1F	YSK1F	I think that my job opportunities will be limited by discrimination	High	Negative	
YITS – Student	K1J	YSK1J	No matter how much education I get, I will most likely end up with a low-paying job.	High	Negative	
YITS – Student	K1L	YSK1L	When I finish my schooling it will be hard to find a job.	High	Negative	

14.9 Parenting Practices Scales

14.9.1 Description of Parenting Practices Scales

Parents who are supportive of their youth's education, who are involved in their youth's school and who have a firm but responsive parenting style have a positive influence on their youth's achievement and educational attainment (*Youth in Transition Survey Project Overview – T-00-5E (September 2000)* (Ottawa: Human Resources Development Canada, 2000, Cat. No. MP32-30/00-5E/F)

As was done for the rest of the items on the YITS-parent questionnaire, the parenting style scale items were administered to the person most knowledgeable (PMK) of the YITS Reading Cohort respondents. This scale was taken from the Canadian NLSCY My Parents and Me Scale and implemented with modifications for the YITS population. The NLSCY items were taken from the Western Australian Child Health Survey (WACHS). The

scale was developed by Lempers et al (1989) as part of a larger investigation into the relationship between family hardship and stress. Lempers also helped in the development of the WACHS questions. The objective of the YITS Reading Cohort use of a parenting style scale was to measure the PMK's perception of his/her relationship with his/her child during the last six months before the survey was conducted.

Questions about parenting practices were administered to the PMK in the YITS Reading Cohort, as part of the YITS Parent questionnaire. However, the questions were administered to the youth in NLSCY²⁷, the WACHS surveys and in the survey conducted by Lempers et al (1989). There may be differences in the results obtained since a different population of respondents was examined (youth versus parent) and because the underlying concept assessed may be different in these two populations. There were two reasons why these parent practices questions were administered to the parents and not to the students in YITS: ensuring the confidentiality of the responses and reducing the length of the student questionnaire.

The parenting practices scales are designed to measure three facets of parenting: nurturance, inconsistent rejection-oriented discipline (rejection) and monitoring. These dimensions have been consistently identified as basic dimensions of parenting (Lempers et. al., 1989). The YITS-team defines a monitoring parent as one who believes that he or she is knowledgeable about his or her child's activities, whereabouts and friends. Nurturance is a convenient label to represent child-centered effective parenting practices such as nurturance, involvement, and positive reinforcement.

Unlike in high school engagement, where an overall high school engagement scale was created, which combined subscales (**section 14.4**), an overall parenting scale was not formed from the three subscales. Lempers et al (1989) did not form one, and there was no consensus among the YITS team as to what exactly an overall parenting practices scale would measure.

14.9.2 Testing Model Validity

As mentioned in **section 14.2.1**, it is possible to have differences in the concepts measured in the English and French samples. A large difference in the value of the means was noted between the two samples in the question B17E-nag child about little things. The YITS team determined that this was a systematic difference and was most likely due to a problem in the translation of the question. The French translation of the question was a more negatively oriented statement than that of the English original.

Due to this problem with the item B17e, it was not possible to calculate the factor loadings for the complete sample. Instead, the factor loadings for both the complete English and complete French samples have been presented.

The items that make up the parenting practices factors, their descriptions and their factors loadings are provided below. Because of the choice of questions for the monitoring scale, it should be noted that the concept of monitoring measured by YITS is different than the one measured by either NLSCY or by Lempers et al (1989).

One item B17K "Have a set time for the child to come home when he/she goes out?" did not load strongly on the Parent monitoring scale and was dropped. It is suspected that this item focuses more on the controlling aspect of monitoring and not on the general awareness of the child's life like the other selected items do.

²⁷ In cycle two of NLSCY, parents of the 11-12 year-old youth were administered the parental scale questions as well as the youth.

Evidence of a fourth factor was found when a factor analysis was run²⁸. What Lempers et al (1989) referred to as rejection-oriented behaviour seemed to split into two factors with items B17E, B17I and B17L loading on one factor and items B17B, B17H, B17L and B17N loading on the other factor. However, the YITS team was unable to explain exactly what this fourth factor was measuring. It could be a true dimension resulting from the population surveyed or it could be a noise dimension brought about by the choice of items used. For this reason and the fact that the three factor solution obtained did load reasonably well, the YITS team decided to take a conservative approach and use the three factor solution proposed by Lempers et al (1989).

Table 14.18 Nurturance Items - Description and Loadings

Source	Item Code Codebook	Item Code Questionnaire	Item Description	English- Factor Loading	French - Factor Loading
YITS – Parent	PB17C	B17C	Praise him/her	0.78	0.71
YITS – Parent	PB17F	B17F	Listen to child's ideas and opinions	0.57	0.62
YITS – Parent	PB17J	B17J	Make sure that child knows that he/she is appreciated	0.78	0.76
YITS – Parent	PB17M	B17M	Speak of good things that he/she does	0.80	0.78
YITS – Parent	PB17O	B17O	Seem proud of the things he/she does	0.71	0.60

Table 14.19 Rejection-Oriented Parenting Items - Description and Loadings

Source	Item Code Codebook	Item Code Questionnaire	Item Description	English - Factor Loading	French - Factor Loading
YITS – Parent	PB17B	B17B	Soon forget a rule that you have made	0.58	0.54
YITS – Parent	PB17E	B17E	Nag child about little things	0.60	0.56
YITS – Parent	PB17H	B17H	Keep rules only when it suits you	0.52	0.54
YITS – Parent	PB17I	B17I	Get angry and yell at him/her	0.59	0.56
YITS – Parent	PB17L	B17L	Threaten punishment more often than you use it?	0.71	0.67
YITS – Parent	PB17N	B17N	Enforce or do not enforce rules depending on your mood?	0.64	0.70

Table 14.20 Monitoring Items - Description and Loadings

Source	Item Code Codebook	Item Code Questionnaire	Item Description	English - Factor Loading	French - Factor Loading
YITS – Parent	PB17A	B17A	Know where child goes at night	0.75	0.71
YITS – Parent	PB17D	B17D	Know what child is doing when he/she goes out	0.77	0.71
YITS – Parent	PB17G	B17G	Know who child spends time with when he/she goes out	0.75	0.59

According to the Comrey and Lee benchmark for rating scale loadings (**section 14.2.1**), the loadings for the English nurturance scale with values from 0.57 to 0.8, range from good to excellent, for the English rejection

28 One possible view of these two factors is that the items B17B, B17H, B17L, B17N represent a factor dealing with a parent's rules of enforcement or discipline practices and that the items B17E, B17I and B17L represent another dimension of rejection-oriented behaviours.

scale, the loadings with values from 0.52 to 0.71 range from fair to very good, and the English monitoring scale with loadings from 0.75 to 0.77, are all excellent. The loadings for the French nurturance scale with values from 0.61 to 0.71, range from good to very good, for the French rejection scale, the loadings with values from 0.54 to 0.70 range from fair to very good, and the French monitoring scale with loadings from 0.59 to 0.77, range from good to excellent.

14.9.3 Estimating Scores

In order to handle the problem that arose due to the translation of B17E in IRT, the item was changed into two questions which the YITS team called **B17ee and B17ef**. B17ee was assigned the value of B17E for those respondents who were administered the English questionnaire. B17ef was assigned the value of B17E for those respondents who were administered the French questionnaire. In order to determine whether splitting B17E had an effect on the latent concept that was measured by the scale, the IRT scores calculated using this option were compared with the IRT scores obtained when this item was dropped from the scale. From an examination of the quantiles of the scores computed under both scenarios, it was determined that the results obtained from the two options were not very different. Thus, in order to reduce the variance of the scores due to noise (more items, less variance due to noise) and at the same time increase the variance explained by the concept, the YITS team decided to retain B17ee and B17ef and adopt the split option.

Thirteen (13) respondents did not receive a rejection scale score (PREJS1), eighteen (18) respondents did not receive a monitoring score (PMONS1), and twelve of these respondents did not receive a nurturance score (PNURS1) because they did not respond to any of the items that related to that particular facet of the parenting scale. In all of these cases of missing scores, the scale scores were assigned a value of 9.99999 and the standard error of the scores (PMONE1, PREJE1, PNURE1) was assigned a value of 99.9999.

The distribution of the estimated scores for parental monitoring is negatively skewed. That is, there is a long negative tail to the distribution. This skewness may impact some analyses that are not robust to violations of a normality assumption.

14.9.4 Scale Reliability

Two common measures of reliability, Cronbach's alpha and the index of reliability were estimated. The Cronbach's alpha was estimated for both the full French and the English data for each of monitoring, nurturance and rejection scales. The index of reliability since it is based upon the scores was calculated for the combined data for each of the three scales. The value of Cronbach's alpha for the items in the English rejection scale is 0.67 and the value of Cronbach's alpha for the items in the French rejection scale is 0.67. Similarly, the value of Cronbach's alpha for the items in the English nurturance and monitoring scales is 0.79 and 0.70 respectively. The value of Cronbach's alpha for the items in the French nurturance and monitoring scale is 0.78 and 0.63. The index of reliability for nurturance is 0.91, for monitoring is 0.72 and for rejection, 0.90. The magnitude of both the index of reliability and Cronbach's alpha for the monitoring aspect of parenting are relatively low. This is most likely due to the fact that only 3 items loaded on this scale. This small number does not allow for much differentiation between respondents. Researchers should use these reliability estimates and the standard errors of the scores provided with the micro data file to determine whether or not these scales are reliable enough for their purposes.

14.9.5 Testing Scale Validity

Based upon previous research, the variables listed below are expected to have a relationship with the Parenting Practices Scales. The rightmost column provides examples where previous researchers and experts have found or proposed similar relationships between the construct and the test items. The direction of the correlation and the strength of the relationship between the variable and the scale are also provided. These correlations indicate that the construct being measured in the YITS questionnaire is similar to the construct as it has been defined by previous research and theory.

Table 14.21 Monitoring Scale Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	A7	YSA7	How often have you cut or skipped a class without permission?	Medium	Negative	All of these questions measure delinquent behaviours of both the respondent and his or her closest friends. Since our monitoring scale seems to measure a positive relationship with the child (i.e. the parent is interested in and knows about the child life and friend) one should see a negative relationship between these items and the monitoring subscale. Thus, a parent who is more confident about his or her knowledge about his or her child's life should have a child that engages in delinquent behaviours less frequently. (Lempers, 1989)
YITS – Student	E1A	YSE1A	How often have you stayed out later than your parents or guardians said you could?	Medium	Negative	
YITS – Student	E1B	YSE1B	How often have you stayed out all night without permission?	Medium	Negative	
YITS – Student	E1D	YSE1D	How often have you caused trouble at school and had to talk with the school principal or other administrator?	Medium	Negative	
YITS – Student	E7	YSE7	How often do you smoke now?	High	Negative	
YITS – Student	D2F	YSD2F	How many of your closest friends smoke cigarettes?	Medium	Negative	
YITS – Parent	B13b	B13a_2	If since September, a teacher or other school official has contacted you because of problems with {child's behaviour}, how many times has this happened?	Medium	Positive	
YITS – Parent	B15a	PB15a	How often talked with {child} about his/her experiences at school?	Medium	Positive	These items are expected to have a positive relationship with the monitoring subscale because they measure the amount of time a parent spends with the child. A parent who spends more time with the child is more likely to know more about that child's life and thus score his or herself higher on the monitoring subscale (Lempers, 1989)
YITS – Parent	B15e	PB15e	How often spent time just talking with {child}?	Medium	Positive	
YITS – Parent	B15g	PB15g	How often did you do a fun activity with {child} like playing a sport or going to a movie?	Medium	Positive	
YITS – Parent	B18	PB18	How many of {child}'s close friends do you know by sight, and know their first and last names?	High	Positive	Both of these questions measure the parent's knowledge about people

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Parent	B19d	PB19d	How well do you know the parent of one or more of {child}'s classmates	Medium	Positive	in the child's life. Since the monitoring scale also measures a parent's knowledge about their child's life, we should expect these items and the monitoring scale to have a positive correlation (Lempers et al., 1989)

Table 14.22 Nurturance Scale Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – student	A7	YSA7	How often have you cut or skipped a class without permission?	Medium	Negative	A parent who scores highly on any of these items is one who spends a lot of time talking to the child or doing some other fun activity with the child. In addition, this parent is informed about the child's life. This type of parent should score highly on the nurturing subscale because a parent who pays a lot of attention to the child and spends a lot of time with that child is one who is more likely to show nurturing behaviour (Lempers et al., 1989)
YITS – student	---- (scale)	YSHACES1 (Academic Engagement Sub-scale)	See High School Engagement section	Medium	Positive	
YITS – student	D1B	YSD1B	I have family and friends who help me feel safe, secure and happy.	Medium	Positive	
YITS – parent	B15a	PB15a	How often have you talked with {child} about his/her experiences at school?	High	Positive	
YITS – parent	B15b	PB15b	How often have you talked with {child} about his/her future education or career options?	Medium	Positive	
YITS – parent	B15c	PB15c	How often have you discussed {child}'s school work with him/her?	High	Positive	
YITS – parent	B15d	PB15d	How often have you discussed current political or social issues with {child}?	Medium	Positive	
YITS – parent	B15e	PB15e	How often have you spent time just talking with {child}?	High	Positive	
YITS – parent	B15f	PB15f	How often have you visited relatives or family friends together?	Medium	Positive	
YITS – parent	B15g	PB15g	How often have you done a fun activity with {child} like playing a sport or going to a movie?	High	Positive	
YITS – parent	B18	PB18	How many of {child}'s close friends do you know by sight, and know their first and last names?	High	Positive	
YITS – parent	B19d	PB19d	How well do you know the parent of one or more of {child}'s classmates	Medium	Positive	
PISA – Student	19d	STQ1904	How often do your parents discuss with you how well you are doing at school?	Medium	Positive	
PISA- Student	Q19f	STQ1906	How often do your parents spent time just talking with you?	Medium	Positive	

Table 14.23 Rejection Scale Validity

Source	Item Code Questionnaire	Item Code Codebook	Item Description	Correlation Strength	Correlation Direction	Reference
YITS – Student	---- (scale)	YSHACES1 (Academic Engagement Sub-scale)	See High School Engagement section	Medium	Negative	Lempers notes that children of parent-oriented parents are likely to lack interest in school
YITS – Student	A7	YSA7	How often have you cut or skipped a class without permission?	Medium	Positive	These items measure delinquent behaviour. A child who has a parent who practices inconsistent, rejection-oriented discipline is more likely to engage in these behaviours (Lempers et al., 1989).
YITS – Student	E1A	YSE1A	How often have you stayed out later than your parents or guardians said you could?	Medium	Positive	
YITS – Student	E1D	YSE1D	How often have you caused trouble at school and had to talk with the school principal or other administrators?	Medium	Positive	
YITS – Student	----- (DV)	DV_L2	Over-all grade (derived variable)	Medium	Positive	Students who feel less rejected by their parents are expected to have higher grades (Lempers et al., 1989). The positive correlation results from the fact that student grades were recorded from highest to lowest.

The correlations between parents’ responses to scale items and the student’s responses to questions that one would expect to be correlated with these questions are not that high. Students may have a different opinion/perception on an issue such as parental style than their parents do (Smetana, 1995). For example, on the YITS Parent questionnaire, respondents were asked how much time do you spend talking to your child (question B15e) and on the PISA Student questionnaire respondents were asked how much time do you spend talking to your parents (question 19f). The parent and student responses to this very similar question were only weakly correlated. While it is widely recognized that parents affect the psychological development of their children, it may be that “ the processes of this influence are more contingent upon the child’s experience of [their] parents than upon the parents’ actual attitudes and behaviours [sic] ” (Gooden & Struble, 1990); (Aunola, Stattin, and Nurmi, 2000). Moreover, both students and parents may unconsciously respond according to social expectation (Gooden & Struble, 1990).

The benchmark established for designating a correlation value as high (above 0.20) or medium (above 0.15) is less for the parent scales because many of the correlations were derived using questions or scales obtained from the student-completed questionnaires. Moreover, even those correlations that used information directly from the parent questionnaire were not as high as correlations seen when validating other student scales (presented in previous sections). Perhaps the relationship between the parenting practices questions and the other related parenting questions is not as strong as the relationship between other scales and the items used for validating them examined within this user guide.

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15.0 Working with YITS Data Files

There are several data files available for YITS 2000. Depending on the research being done, the following tables identify which files to use.

15.1 Research Involving Examination of Reading Achievement

Researchers interested in examining reading achievement should refer to one of the following three files below. If the research includes only variables from the PISA student than researchers should use the data file entitled PISAR. If the research also includes variables from the YITS student questionnaire the data file PISAYR should be used for analysis. And finally if the research includes variables from the YITS parent questionnaire the data file PISAYPR should be used.

Table 15.1 PISA Reading Assessment (Full Sample)

File name	Content	Respondents on file		Weight	Replicate weights ²⁹
		Description	Number		
Merged Files					
Reading (full sample)					
PISAR	<ul style="list-style-type: none"> • PISA reading scores and levels • PISA student context questionnaire variables • YITS school questionnaire variables 	One record for every student respondent	29,687	W_FSTUWT	W_FSTR1- W_FSTR80 (BRR, Fay's factor 0.5)
PISAYR	<ul style="list-style-type: none"> • PISA reading scores and levels • PISA student context questionnaire variables • YITS school questionnaire variables • YITS Student questionnaire variables 	One record for every student respondent (357 have no YITS student data)	29,687	W_FSTUWT	BPSR1- BPSR1000
PISAYPR	<ul style="list-style-type: none"> • PISA reading scores and levels • PISA student context questionnaire variables • YITS school questionnaire variables • YITS Student questionnaire variables • YITS Parent questionnaire variables 	One record for every student respondent for whom there are YITS student and parent questionnaire data	26,063	W_YPR	BPR1-BPR1000

30 Unless stated otherwise, the replicate weights on the microdata files are bootstrap weights.

15.2 Research Involving Examination of Mathematics Achievement

Researchers interested in examining mathematics achievement should refer to one of the following three files below. If the research includes only variables from the PISA student than researchers should use the data file entitle PISAM. If the research also includes variables from the YITS student questionnaire the data file PISAYM should be used for analysis. And finally if the research includes variables from the YITS parent questionnaire the data file PISAYPM should be used.

Table 15.2 YITS Mathematics Assessment

File name	Content	Respondents on file		Weight	Replicate weights ³⁰
		Description	Number		
Mathematics (sub-sample)³¹					
PISAM	<ul style="list-style-type: none"> • PISA math scores • PISA student context questionnaire variables • YITS school questionnaire variables 	One record for every student respondent in the math sub-sample (206 have no YITS student data)	16,489	W_FSTUWT	W_FSTR1-W_FSTR80 (BRR, Fay's factor 0.5)
PISAYM	<ul style="list-style-type: none"> • PISA math scores • PISA student context questionnaire variables • YITS school questionnaire variables • YITS Student questionnaire variables 	One record for every student respondent in the math sub-sample (206 have no YITS student data)	16,489	W_FSTUWT	BPSM1-BPSM1000
PISAYPM	<ul style="list-style-type: none"> • PISA math scores • PISA student context questionnaire variables • YITS school questionnaire variables • YITS Student questionnaire variables • YITS Parent questionnaire variables 	One record for every student respondent in the math sub-sample for whom there are YITS student and parent questionnaire data	14,485	W_YPM	BPM1-BPM1000

³¹ Unless stated otherwise, the replicate weights on the microdata files are bootstrap weights.

³² The files for the mathematics and science domains also carry some of the reading achievement variables, specifically; the reading levels derived from the plausible value scores and the reading score variables created using weighted likelihood estimation.

15.3 Research involving Examination of Science Achievement

Researchers interested in examining science achievement should refer to one of the following three files below. If the research includes only variables from the PISA student than researchers should use the data file entitled PISAS. If the research also includes variables from the YITS student questionnaire the data file PISAYS should be used for analysis. And finally if the research includes variables from the YITS parent questionnaire the data file PISAYPS should be used.

Table 15.3 YITS Science Assessment

File name	Content	Respondents on file		Weight	Replicate weights
		Description	Number		
Science (sub-sample)³²					
PISAS	<ul style="list-style-type: none"> • PISA science scores • PISA student context questionnaire variables • YITS school questionnaire variables 	One record for every student respondent in the science sub-sample (188 have no YITS student data)	16,488	W_FSTUWT	W_FSTR1- W_FSTR80 (BRR, Fay's factor 0.5)
PISAYS	<ul style="list-style-type: none"> • PISA science scores • PISA student context questionnaire variables • YITS school questionnaire variables • YITS Student questionnaire variables 	One record for every student respondent in the science sub-sample (188 have no YITS student data)	16,488	W_FSTUWT	BPSS1- BPSS1000
PISAYPS	<ul style="list-style-type: none"> • PISA science scores • PISA student context questionnaire variables • YITS school questionnaire variables • YITS Student questionnaire variables • YITS parent 	One record for every student respondent in the science sub-sample for whom there are YITS student and parent questionnaire data	14,475	W_YPS	BPS1-BPS1000

32 The files for the mathematics and science domains also carry some of the reading achievement variables, specifically; the reading levels derived from the plausible value scores and the reading score variables created using weighted likelihood estimation.

15.4 Research Involving Only the YITS Instrument

If analysis is being done strictly on the YITS component of the YITS assessment, there are two files for analysis (below). If analysis only involves variables from the YITS student questionnaire, the file YITSS should be used. If analysis also involves variables from the YITS parent questionnaire, the data file YITSP should be used.

Table 15.4 YITS Student and Parent Questionnaire Variables

File name	Content	Respondents on file		Weight	Replicate weights
		Description	Number		
Individual Files					
YITSS	YITS Student questionnaire variables	One record for every student respondent (357 have no YITS student data)	29,687	W_FSTUWT	BPSR1-BPSR1000
YITSP	YITS Parent questionnaire variables	One record for every student respondent for whom there are YITS student and parent questionnaire data	26,063	W_YPR	BPR1-BPR1000

LINKS TO REFERENCE DOCUMENTS

For further information on PISA, please go to the website - www.pisa.oecd.org

The Statistics Canada website is:

<http://www.statcan.ca/english/concepts/index.htm>

Instructions on access:

Access the Survey "*Definitions, Data Sources and Methods*" under "*Survey Information*", either alphabetically or by subject:

Alphabetically

- Programme of International Assessment of Students (PISA)

- Youth in Transition Survey (YITS)

Subject

- Education (click on "surveys" and the list is alphabetical)

The project codes for PISA and YITS are in brackets.

Documentation Available:

Questionnaires:

PISA (5060)

- 15 year-old Student Questionnaire

- School Administrators Questionnaire (Canada, Ontario, Quebec)

YITS – 15 year-old Reading Cohort (5058)

- 15 year-old Reading Cohort Questionnaire (Canadian Longitudinal Youth in Transition Survey)

- Parent Questionnaire (Canadian Longitudinal Youth in Transition Survey)

Codebooks:

PISA (5060)

- Youth Codebook

- School Codebook

YITS (5058)

- Student Codebook

- Parent Codebook

PISA Project Overview (5060)

- Manual for the PISA 2000 Database

YITS Project Overview (5058 and 4435)

- Mapping Document with themes for subject matter for Cycle 1 – 15 year-olds and 18-20 year-olds. This spreadsheet provides the comparison of questions between each cohort of YITS, and will be updated for each occurring cycle of YITS.