Microdata User Guide

National Longitudinal Survey of Children and Youth

Cycle 3

September 1998 to June 1999

Statistics Canada Statistique Canada

Canada

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Chapter 1 - Introduction

General Information

Purpose of this manual

This manual will assist National Longitudinal Survey of Children and Youth data users.

It's purpose is to:

< document data quality and other analytical issues regarding the NLSCY;
and,
< facilitate the manipulation of the micro data files.

National Longitudinal Survey of Children and Youth

The National Longitudinal Survey of Children and Youth (NLSCY) is a long-term study conducted in partnership by Human Resources Development Canada (HRDC) and Statistics Canada. The primary objective of the NLSCY is to monitor the development and well being of Canada's children as they grow from infancy to adulthood

Survey Population

The NLSCY is designed to follow a representative sample of Canadian children, aged newborn to 11 years, into adulthood, with data collection occurring at two-year intervals.

Collection Cycle

Each collection cycle used by NLSCY consists of a number of months sometimes over the period of two calendar years during which interviews with respondents are completed. Each cycle marks the beginning of the collection phase when the longitudinal survey respondents are followed up.

Collection Cycles

Cycle	Collection Start	Collection End
1	December 1994	April 1995
2	December 1996	April 1997
3	October 1998	June 1999

Objectives of the NLSCY	The objectives of the NLSCY are: ➢ To determine the prevalence of various risk and protective factors for children and youth. ➢ To understand how these factors, as well as life events, influence children's development. ➢ To make this information available for developing policies and programs that will help children and youth. ➢ Collect information on a wide variety of topics – biological, social, economic. ➢ Collect information about the environment in which the child is growing up – family, peers, school, community ➢ Information comes from different sources (parent, child, teacher) and from direct measures (PPVT, math/reading tests, etc.)
Data Release Strategy	Cycle 4 data will be released….??
Contact Person at Statistics Canada	All questions about the data set or its use should be directed to: Lecily Hunter, Project Manager NLSCY Special Surveys Division, Statistics Canada 7(C8) Jean Talon Building, Tunney's Pasture, Ottawa, Ontario K1A 0T6 Telephone:(613) 951-0597 Facsimile:(613) 951-7333 Internet: huntlec@statcan.ca Toll free #: 1-800-461-9050
Contact Person at Human Resources Development Canada	The contact person for Human Resources Development Canada is: Susan McKellar, NLSCY Project Coordinator Applied Research Branch, Human Resources Development Canada Place du Portage, Phase II, 165 Hôtel de Ville, Hull, Québec K1A 0J2 Telephone:(819) 953-8101 Facsimile:(819) 953-8868 Internet: susan.mckellar@spg.org

Chapter 2 – Survey Methodology

Definition of the NLSCY Population	The NLSCY survey population consists of two sample groups. They are the: ➢ longitudinal sample, and ➢ cross-sectional sample.
Longitudinal Sample	The longitudinal sample consists of different cohorts. The first cohort consists of the children who were sampled in Cycle 1 at age 0 -11; these children will be followed until they are 25 years of age. The second cohort consists of children who were sampled in Cycle 2 at age 0 - 1; these children will be followed until they are 5 years of age. The third cohort consists of children who were sampled in Cycle 3 at age 0 - 1; these children will be followed until they are 7 years of age (possibly 9 years of age). The longitudinal sample is also used for cross-sectional purposes to cover specific age groups.
Cross-sectional Sample	From the Cycle 3 file, we can produce cross-sectional estimates for ages 0-15 years. A large sample of 5 year olds was included in Cycle 3 to allow for reliable provincial estimates of this age group.
Non-response and missing information	With each cycle there are respondents for which we are unable to collect information. Based on interviewer notes from previous cycles we determine hard-core non-respondents, exclude them from the sample and do not attempt to trace them. In most longitudinal surveys, only respondents to the first cohort are followed and interviewed. However, a number of surveys including the NLSCY try to re-contact people from the initial cohort, even if they missed one or more waves of interview. In Cycle 3 and Cycle 4, an attempt was made to re-interview people who responded to Cycle 1 but not Cycle 2 or 3.

Cycle 1	In Cycle 1, 22,831 children were interviewed. After sub-sampling, 16,903 respondents to Cycle 1 form the longitudinal cohort that will be followed until these respondents reach the age of 25. Close to 5,000 children used in the sample for Cycle 1 were selected from the National Population Health Survey (NPHS). That sample (5000 children) was given back to the NPHS. These 5000 children will remain part of NPHS and will not be followed and interviewed by NLSCY.
Cycle 2	Due to costs and response burden the sample for Cycle 2 was reduced. To try and decrease response burden for families that had more than 2 selected children, a sub-sample from Cycle 1 was taken to keep only two children per household for the Cycle 2 interviews.
Why use these children for Cycle 2 – Longitudinal	The siblings selected for Cycle 2 were part of a responding longitudinal household; this was an inexpensive way of adding children to the sample. It also allowed us to continue the comparisons of children within a family versus between families. These children are not considered longitudinal respondents (even though they live with a longitudinal family) because they were not eligible in Cycle 1. The new sample of children from the Labour Force Survey was included to ensure an unbiased sample in Cycle 2.

Cycle 3

Sample Size	In total 38, 035 children were sampled in Cycle 3. Of those sampled children 1,089 (3%) were out of scope either because the respondent had moved permanently outside of Canada or because the household did not contain a child who was eligible to complete the NLSCY. The sample size of the 1 and 5 year old children for Cycle 3 was increased from that used in previous cycles. This was due to the federal government's 1997 Speech of the Throne, which outlined the intent to have measures of the early years and the commitment to report on the measures. This enabled us to produce provincial estimates of "readiness to learn" for the 5 year old children.
Cycle 3 –Cross-sectional Sample of Children **0-11 Months**	Children from the age group of 0 to 11 months were taken from the LFS sample. Unlike Cycle 2, no siblings of the longitudinal cohort were selected. 2086 households representing 2,123 children were added to the NLSCY sample in Cycle 3. Seven households were selected for the LFS sample but were excluded from the NLSCY sample since these households were already in our sample (37 households had twins). It should be noted that these children were sampled to ensure that they would be 0-11 months old at the time of the interview and that collection work for this component began in October 1998 and ended in July 1999.

Chapter 3 – Response Rates

Response Rates at Child Level

Since the child is the unit of analysis, response rates are presented at the child level rather than the household level. In many cases there may be more than one child per household, consequently there may be data obtained for one child but not for another in the same household.

Computer Generated Response Codes

On the computer each household represents a case and status codes are automatically given to the case each time an interviewer enters it. Within each case are components - for example there each child has it's own component. Consequently, it's possible to have one household with different response codes for each component. Complete information may be available for one child but not another, in this case a "partial" or "non-response" code would appear for one child component while a "fully complete" response code appears for the other. At the household level this case would have a "partial" response code".

As the panel ages, a larger proportion of the sample will come from the early years cohort in which only one child per household is selected. Thus, the response rates at the household and at the person level should gradually become very similar.

Table 1: Overall Child Level Response Rates, NLSCY Cycle 3

	Number	%	Longitudinal Cohort (A)*	%	Other (N,T)	%
Sample	38035		16718		21317	
Not eligible	1089		144		945	
Eligible	36946	100%	16574	100%	20372	100%
Full	32097	87%	14677	89%	17420	86%
Partial	254	1%	103	1%	151	1%
Refusal	2328	6%	1203	7%	1125	6%
Unable to trace	1182	3%	228	1%	954	5%
Other non-response	1085	3%	363	2%	722	3%

* includes longitudinal respondents who did not respond in Cycle 2.

Response Rates Cycle 3 Non-Response	As a percentage of all eligible children, a response rate of 88% was achieved with 87% of cases being fully completed and 1% of cases being partially completed. In 3% of cases, non-responses occurred because the respondent no longer resided at the address or phone number on file and attempts to trace their current location were unsuccessful. In 6% of cases, households refused to participate and in 3% of cases other non-responses occurred. Examples of other non-responses include unable to interview due to unusual circumstances (i.e. death in the family, illness), the household was absent during the collection period, and unable to interview due to language problems.
Responding Sample by Age and Province	In total 31,194 children were retained on the final data file. The following two tables present the responding sample by province and age group.

Table 2 - Province and Sample Size

Province	Responding Sample Size
Newfoundland	1612
PEI	948
Nova Scotia	2019
New Brunswick	1956
Quebec	6298
Ontario	8658
Manitoba	2254
Saskatchewan	2307
Alberta	3125
British Columbia	2817
TOTAL	31194

Table 3 - Age of Child and Responding Sample Size

Age	Responding Sample Size	Age	Responding Sample Size
0	1736	8	1381
1	6391	9	940
2	1589	10	1238
3	2029	11	842
4	1.983	12	1264
5	6958	13	875
6	1536	14	1262
7	1053	15	916

Computer Assisted Interviewing

Computer-Assisted Interviewing	Data collection for the household component of the NLSCY relied heavily on CAI technology. The use of computer-assisted personal interviewing (CAPI) technology allows for high quality collection of complex population-specific content sections. For example, the system facilitates the collection of the relationships of all household members to each other (i.e., the relationship grid). This wealth of information will enable a detailed analysis of family structures, an important concept for analysis of the child information. This type of collection would be very difficult to implement in a paper and pencil environment..
The CAI System	The CAI system has two main parts 1. Case Management, and 2. the survey-specific components
Case Management	The Case Management system controls the case assignment and data transmission for the survey. For the NLSCY, a case refers to a household selected for the NLSCY sample. The Case Management system also automatically records management information for each contact (or attempted contact) with respondents and provides reports for the management of the collection process.
Transmission of Cases	The Case Management system routes the questionnaire applications and sample file from headquarters to the regional offices, and from the regional offices to the interviewer laptops. The returning data take the reverse route. To assure confidentiality, all data is encrypted for transmission. The data are unencrypted only once they are on a separate secure computer with no external access.

Survey Specific Components	The survey-specific component of CAPI includes an introductory component with procedures for contact and selection of households. Once contact has been made and household composition has been established, the CAPI system generates applicable questionnaire components dependent on the household composition and the outcome of the selection procedures. Some of the specific components generated included a Parent and General Questionnaire for the Person Most Knowledgeable (PMK) and spouse/partner and Child's Questionnaire for selected children in each household.
Household Roster	The household roster becomes more difficult when a longitudinal survey interviews more than one longitudinal respondent per household. Eligibility rules need to be defined to know when to trace and when to interview. An added complexity was due to the fact that households of the Cycle 3 sample were divided into two groups: 1. longitudinal households, that is, those that had already participated in Cycle 1 and/or 2 of the survey; 2. new households with children aged 0 to 23 months, 1 years of age or 5 years of age.

Longitudinal Households 1st Contact	About 50% of all households contacted had already participated in either the first and/or second cycle of the survey. Of the selected children in these Cycle 2 households, a maximum of two were chosen for whom data was to be collected. The first contact was established with these households using the address and telephone number provided during Cycle 2. Next, the interviewer confirmed that at least one member of the household list provided in 1996-97 still lives at the address. If none of the individuals on the list were in the household contacted, the file for the household was transferred to the trace folder and the interview with the household was ended. If one of the individuals on the list was a member of the household contacted, the interview continued beginning with the confirmation or updating of the contact information (mailing address and residence, telephone number), and the updating of the list of household members.
The Final Phase of 1st Contact	During this final phase, if one of the children selected was no longer part of the household, information as to why (parents' separation, departure for a foster home, etc.), the date of the child's departure and the child's new address or other relevant information for tracing them was obtained. Then, the new members of the household were added to the list. If at least one of the selected children was no longer a member of the household, a new household file was created and transferred to tracing.
The Tracing File	The Tracing file includes all household members from the first cycle who were no longer part of the contacted household. The interview with the contacted household was discontinued if all the selected children had left, but was continued if at least one of the selected children was still a member of the household.

Contacting Non-responding Households	In order to achieve the desired response rate, an effort was made to recontact non-responding households to the first collection in the second collection period and to recontact non-responding households to the second collection period in the third collection period. For example, if in the first collection period, a household could not be reached because no one was at home, then this case was sent out again with the February sample and further attempts were made at that time to contact the household.
Demographic Information Collected	For households with eligible children, basic demographic information was then gathered (age, date of birth, sex, marital status) and relationships between the members of the household were completed.
Person Most Knowledgeable (PMK)	Some questions about dwelling conditions were asked and this questionnaire ended with a question designed to select from among those individuals aged 15 or older the Person Most Knowledgeable (PMK) about the selected child(ren). This person became the primary respondent and was labeled as the PMK for this household. In most cases, the PMK was the mother of the child.
New Cross-sectional Households	The second group of households included 2,087 new households with children aged 0-11 months, 7,932 new households with children 1 year of age and 6,952 new households with children aged 5 years. For these households, the initial contact procedures were the same, except for the fact that no tracing was done for people who had moved. Households were updated and the interviewer gathered the demographic data and relationships. After this stage, if there were no eligible children in the household, the interview ended; otherwise, it continued in the same way as for the households in the first group with questions asked about dwelling conditions and the selection of the PMK.

Household Collection

Household Collection Period	There were three collection periods for the household collection, 1. November and December 1998 2. February and March 1999 3. April-May 1999. The overall sample was split evenly among the three collection periods and each period lasted approximately six weeks.
The Household Collection -	For the household collection, data were collected from a variety of respondents using different data collection instruments. Except for the questionnaires asked of 10 to 15 year olds all of the information for the household collection was collected in a face-to-face or telephone interview using computer-assisted interviewing (CAI).
Instruments Completed by the PMK	After completing the contact and demographic data questionnaire, the PMK was asked to complete a series of questionnaires. The Parent Questionnaire for this person and their spouse, if applicable; a Child's Questionnaire for each child selected in the survey; and a computerized consent form about contacting the schools attended by the children.
The Parent Questionnaire	The first part of this questionnaire was completed by both the PMK and his/her spouse/partner and was designed to gather socio-economic and health data about these two individuals. Topic areas included education, labour force and income. The second part of the Parent Questionnaire was completed by and for one of the parents only, usually the PMK. The purpose was to gather information about the child's family environment, notably the mental health of the PMK and family functioning.

Child's Questionnaire	The Child's Questionnaire was completed for selected children in the household aged newborn to15 years. Topic areas included health, birth information, temperament, behaviour, education, activities, literacy, social relationships, parenting, and legal custody of the children.
The Informed Consent Questionnaire	For each child who attended school in 1997-98, the PMK also answered a computerized questionnaire in which his/her consent was requested to: (a) contact the child's teacher and the school principal, and (b) administer a test of about 45 minutes measuring the child's mathematics computation and reading comprehension skills. In this questionnaire, school contact information was also gathered (principal's name, school address, telephone number).
Cognitive Measure	Two tests were administered to respondents in order to assess cognitive measures. They are: < Math and Reading Skills Indicator, and < The Peabody Picture Vocabulary Test Revised (PPVT-R).
Math and Reading Skills Indicator	School children in grade 2 or higher were given a brief mathematics and vocabulary/reading test of about 12 questions. This placement test was designed to make it possible to determine the level of the math computation and reading comprehension tests that would subsequently be administered in the schools. For grade 2 children, the interviewer read the questions and recorded the answers on an answer sheet. For children in grade 3 or above, the child read the questions and gave the interviewer the answer.

The Peabody Picture Vocabulary Test - Revised (PPVT-R)	The Peabody Picture Vocabulary Test - Revised (PPVT-R) was administered by the interviewer to each selected child between 4 and 5 years old, as well as to children aged 6 years and older who were not yet in grade 2. The oral consent of the PMK was obtained before the test was administered. The purpose of the test was to assess the child's level of receptive vocabulary. After having completed the full NLSCY interview and leaving the household, the interviewer completed an administrative questionnaire describing the conditions in which the test was administered. This is done in order to identify any factors that might have influenced the child's answers and overall reaction to the test.
Self Completed Questionnaire - 10-15 yrs	The objective of the Self-completed Questionnaire is to collect information directly from the child on a variety of aspects of his/her life. These self-completed questionnaires are used to supplement, and in subsequent analyses, compare with information obtained from the parent and teacher. Starting at age 10, with the PMK's permission, the interviewer provides a questionnaire to the child and encourages him/her to complete it in a private setting. Upon completion, the questionnaire is sealed in an envelope to ensure confidentiality. The PMK was informed of the confidentiality of the questionnaire before giving permission for the child to complete it. The PMK is not allowed to see the completed questionnaire. It was hoped that this procedure would increase the likelihood that the child would provide accurate and honest information.

The following table contains the content of the questionnaires completed by those 10-15 years of age:

Table 4

The Self-completed Questionnaire for those aged:	**Contains questions on the topics of:**

10 -11 years	< friends and family, school, feelings and behaviours, smoking and drinking and activities.
12-13 years	< friends and family, school, feelings and behaviours, < delinquent behaviour, smoking, drinking, drug use, health (general, depression and puberty) and about work and sources of money.
14-15 years	< friends and family, school, feelings and behaviours, < delinquent behaviour, smoking, drinking, drug use, health (general, depression and puberty) and about work and sources of money. < work during the school year, summer work, sources of money and how they spent their money.

Interview Length for Household Collection	For the household collection, the interview length for responding NLSCY households was approximately two hours. The total amount of time that it took to complete the major questionnaires that were part of the NLSCY household collection are presented in the table below. The table gives median interview times (i.e., the time at which 50% of the cases took more time and 50% took less). It should be noted that all extreme times (high and low) were removed before these times were derived, since they often represent a problem with the time clock/procedure rather than a real interview time.

Table 5 outlines the length of time required to complete the various questionnaires:

Table 5

Type of Questionnaire	Time in Minutes
All questionnaires in the household interview	98
All Child Questionnaires for the household	31
All Parent Questionnaires for the household (for the PMK and spouse/partner)	21
Total for major components (Child, Parent, General & PPVT & Informed Consent)	75

Remaining Components[1]	34

Tables 6 gives the median interview times for a family with PMK a spouse and 1-3 children. The number of selected children (0 to 13) in the household was the factor that had the strongest impact on interview length.

Table 6:

PMK, spouse and :	Time in Minutes
1 child	81
2 children	134
3 children	162

Table 7 gives the median interview times for a family with a PMK (no spouse) and 1-3 children. For households in which the PMK had a spouse/partner and more than two selected children, the interview length was over two hours.

Table 7 :

PMK, spouse and :	Time in Minutes
1 child	84
2 children	139
3 children	171

School Collection

[1]This is the difference between the total time and the time required for the major components. This would include time for the interviewer to introduce the survey, complete the household roster, the relationships, set-up time for the 10 to 11 Questionnaire, the 12-13 Questionnaire and the math and reading skills test, time for the computer to generate the various questionnaires, etc.

The School Collection	The school collection took place from April to June 1998. For all children in the Cycle 3 sample who were attending school, the PMK was asked to give written permission to allow the collection of information from the child's teacher and principal. In cases where the child was in grade 2 or higher the PMK was asked to give permission to allow the teacher to administer a skills test in math computation and reading comprehension to the child. The school collection involved three questionnaires. These questionnaires were mailed out to teachers and principals, who were asked to complete the questionnaires and mail them back to Statistics Canada in the envelopes provided.
Collection Strategy for the School Collection	Questionnaire packages were mailed to principals with instructions on how the various instruments should be completed. The principals were then asked to distribute the questionnaires and tests to the teachers. Approximately one week after the initial mailing a postcard was sent out to thank all respondents and to remind those who had not yet responded to do so. Roughly two weeks later, a second questionnaire package was sent out to teachers and principals who still had not responded. Finally three weeks later non-responding teachers and principals were contacted by telephone and encouraged to participate.
Teacher's Questionnaire	The goal of the teacher's questionnaire was to collect information about the child's academic achievement and behaviour at school, as well as information on characteristics of the class and the teacher's instructional practices. There were three teacher questionnaires which were completed depending on the circumstances of the child: • a kindergarten questionnaire, • a teacher questionnaire, for students who had one teacher for the basic academic subjects; • a different teacher questionnaire for students who had different teachers for the basic academic subjects.

The Principal's Questionnaire	The goal of the Principal's Questionnaire was to gather information on the school environment in order to assess how this may impact child development. Consequently, the Principal's Questionnaire collected information on school policies, resources and educational climate, rather than data about a specific child.
The Math Computation and Reading Comprehension Test	The math portion of the skills test to be administered to the child was a shortened version of the Mathematics Computation Test of the standardized Canadian Achievement Tests, Second Edition (CAT/2). The CAT/2 is a series of tests designed to measure achievement in basic academic skills. Some of the test's questions on reading comprehension are taken from the CAT/2 test, and some are new questions developed for the NLSCY.

Interview Training, Supervision and Control

Interviewers	The NLSCY was conducted by Labour Force Survey interviewers. All LFS interviewers are under the supervision of a staff of senior interviewers who are responsible for ensuring that interviewers are familiar with the concepts and procedures involved in the survey, and also for periodically monitoring their interviewers and reviewing their completed documents. Senior interviewers ensure that prompt follow-up action is taken for refusal and other non-response cases. If necessary, non-response cases were transferred to the senior and reassigned. The senior interviewers are, in turn, under the supervision of the LFS program managers, located in Statistics Canada regional offices.
Training	For the NLSCY a combination of classroom training and self-study materials were prepared to ensure that interviewers had a proper understanding of survey concepts. <u>Self-study</u> • involved the interviewers reading the Interviewer's Manual prepared for the survey and completing home study exercises. <u>Classroom</u> • a program manager or a senior interviewer presented an overview of the survey, went through a mock interview with the participants, gave more specific training on administering the PPVT-R and presented exercises to help interviewers minimize non-responses. In total, 14 hours were devoted to these training activities for each interviewer.

Editing

Introduction	The main output of the NLSCY is a "clean" master data file. This section presents a brief summary of some of the processing steps involved in producing this file.
Computer Generated Edits	As discussed earlier, all of the information for the household collection (except for the 10-11 year old and 12-13 year old self-completed questionnaires) was collected in a face-to-face or telephone interview using computer-assisted interviewing (CAI). As such, it was possible to build various edits and checks into the questionnaire for the various household CAI components, in order to ensure high quality of the information collected.
Types of Computer Edits	Various types of computer generated edits were used to check data while the interviewer was completing the interview. The NLSCY computer generated survey used the following: < Review Screens, < Range Edits, < Flow Patterns Edits, < Consistency Edits.
Review Screens	Review screens were created for important and complex information. Example: The selection procedures for the PMK, a critical element of the survey, were based on the household roster. The household roster screen showed the demographic information for each household member and his/her relationship to every other household member. The collected information was displayed on the screen for the interviewer to confirm with the respondent before continuing the interview.

Range Edits	Range edits were used for continuous variables, to confirm or correct unusual answers during collection. Example: For the question regarding the weight of a child at birth, if a weight entered into the computer was either significantly high or low, a pop-up message would appear asking the interviewer to confirm the answer with the respondent.
Flow Pattern Edits	All flow patterns were automatically built into the CAI system. Example: In the Child Care Section, the PMK is asked he/she used daycare or babysitting in order that he/she (or a partner/spouse) could work or study. Based on the response given the flow of the questions could be different. If Child Care was used, the CAI system continued with a series of questions about the specific care method(s) used for the child. If not, the CAI system automatically skipped this series of questions.
General Consistency Edits	Some consistency edits were included as part of the CAI system, and interviewers were able to "slide back" to previous questions to correct for inconsistencies. Instructions were displayed to interviewers for handling or correcting problems such as incomplete or incorrect data. Example: In the collection of the Labour Force Section, the number of weeks working, not working, and looking for work should not total more than 52 weeks. If this was the case, the system generated a pop-up window which stated the error and instructed the interviewer to slide back to the appropriate question to confirm the data and make corrections as required.

Consistency Edits Between Cycles	For this second cycle of the NLSCY edits were also performed to ensure consistency between cycles for data that was not expected to change. Data from the previous cycle (feedback variables) were included in the CAI system for the current cycle. When inconsistencies were identified, the interviewer was asked by the system to confirm the Cycle 2 data with the respondent through a series of questions. Example: For the Chronic Conditions questions, if a chronic condition such as asthma was reported in the previous cycle but not indicated as being present in the current cycle, the system prompted the interviewer to ask questions to determine if the current data was in fact correct, or if the condition had changed since the previous cycle.

Data Capture

Paper and Pencil Questionnaires	Some questionnaires for the NLSCY were completed on paper and pencil questionnaires (PAPI). The 10-11, 12-13 and 14-15 year old Self-Completed Questionnaires, the Teachers' Questionnaires and the Principals' Questionnaire were all completed by PAPI. All of these documents were completed directly by a survey respondent.
Data Capture for PAPI Questionnaires	Data capture for these questionnaires were accomplished through scanning at a centralized area at Statistics Canada's Head Office.
Questionnaire Grooming	Prior to scanning, the documents were groomed and verified for completeness. During this process, any document containing at least one respondent-completed item was scanned and a file containing each record was provided to Head Office processing staff for further processing. As part of the scanning system, some quality checks were built in to flag unusual entries to warn the operators of potentially incorrect entries. The operator visually reviewed the questionnaire responses and manually entered the correct values. In cases where more than one response was checked off by the respondent, the operators were instructed to accept the first response. Errors remaining within the questionnaires were then edited at a later stage.

Minimum Completion Requirements

Defining Requirements	One of the first steps in the NLSCY processing was to define the requirements for a responding household. .
No Information Collected	In some cases, no NLSCY information was collected for a sampled household. This happened, for example, when an interviewer was unable to make contact with a selected household for the entire collection period, in other cases the household refused to participate in the survey, special circumstances such as an illness or death in a family or extreme weather conditions sometimes prevented an interview from taking place. For cases where no information was collected for a household, the household was dropped from the NLSCY file and the sampling weights for responding households were inflated to account for these "dropped" households
Partial Information	In other cases, it was possible to carry out some of the interview, but a complete interview was not obtained for a variety of reasons. Some respondents were willing to give only a certain amount of time to the completion of the survey. In some cases an interviewer completed a portion of the survey with the respondent and made an appointment to continue at another time but was unable to re-contact the respondent.
Criteria for Partial Response	It was necessary to come up with a criteria for deciding what to do with these "partial" interviews. If the majority of the survey had been completed, obviously the preference was to keep this case and label it as a responding household. However, if only very minimal information was collected the decision was made to drop the household and treat it as a non-responding household. In order to make this assessment, the data collected for each selected child in the household were examined. This was done by looking at certain key questions across the Child Questionnaire. An assessment was made as to whether or not there was an adequate amount of information collected for at least one child in each household. If there was, the household was maintained in the responding sample.

Missing Variables	All missing variables for households were set to not-stated or imputed. If there was not adequate information for at least one child then the household was dropped from the responding sample and treated as a non-response.

Longitudinal Child Records	In total, 17,618 longitudinal child records were determined to be complete enough to be kept (codes 000 and 001). These children came from 12,100 longitudinal households, which is the number of households maintained in the Cycle 3 NLSCY files. There were 18,612 child records for the responding longitudinal households. Out of these, there were 994 longitudinal child records that were "not acceptable" but were kept because there was at least one "acceptable" child record for the household.
Missing Components	Variables on missing components for the household were imputed or set to not-stated. The longitudinal file also contains 194 records that were created for some longitudinal children for whom no data was collected in this cycle. These are children who are now deceased or who have moved out of the country, but who will be kept on the longitudinal file for weighting purposes. For these records, all variables except for the longitudinal weight (CWTCW01L) have been set to 'not stated'.

Head Office Editing

Stages of Editing	For CAI questionnaires for the NLSCY, two stages of editing were conducted. < Pre-edit < Consistency Editing

The purpose of the Pre-edit was to carry out some basic formatting and preliminary editing. Table 9 outlines some of the procedures used.

Table 9

Step	Action	Done to the:
1	< Non-response values from the CAI system were recoded to standard non-response codes for refusals, don't know and not-stated. < Mark All That Apply' questions were destrung and values converted to Yes (1) or No (2) responses. < Databases files were created for each section of the Adult and Child questionnaires	complete Adult and Child file
2	< Small data base files were created for each section of each questionnaire. A record was kept for the section only if the section was applicable. For example, the section on temperament was only applicable for children 3 months to 3 years old. Therefore a temperament record was only created for children in this age group. < Within several sections, different wording was used for different age groups. For example, in the Activities section, Question 3 asks "In the past 12 months, outside of school hours, how often has (the child) taken part in any clubs, groups or community programs with leadership....". The wording for 4 to 5 year-olds (CAACQ3D1) was "such as Beavers, Sparks or church groups?". The wording for 6 to 9 year olds (CAACQ3D2) was "such as Brownies, Clubs or church groups?" Initially these questions were stored as separate variables. As part of the pre-edit the two variables were collapsed into one output variable CAACQ3D. The various wordings are given for these types of questions in the data dictionary in Appendix 4. < The flow patterns for each section were processed and valid skips were assigned 'not applicable' codes (6, 96, 996..).	Separate DBF files from Step 1

Consistency Editing

The Goal of Consistency Editing	After the pre-edit, consistency editing was carried out to verify the relationship between two or more variables. Example: In the Socio-Demographic Section, for children who were not born in Canada, Question CSDCQ2B asks on what year they first immigrated to Canada. There was a consistency edit which compared this question to the year of birth of the child. If the year of immigration was before year of birth then year of immigration was set to not-stated in the edit.
Consistency Between Cycles	Editing was also performed to ensure consistency between cycles. Example: The responding child's height in Cycle 3 should not be less than the height reported in Cycle 2. Flags were set for inconsistencies between cycles. These variables appear on the Secondary data file (Appendix 5) and contain 'Z' in the variable name. For PMK and Spouse variables, the data was linked using a unique person identifier, allowing the comparison to be made if the PMK was the same in both cycles or if the PMK was the spouse in the previous cycle and vice versa.
Consistency Edits for PAPI	For the questionnaires that were collected using a paper version, essentially the same steps of editing were carried out. In the pre-edit, however, there was an additional requirement. In some cases a value was captured that was not allowable for a particular item. This was possible due to the fact that the scanning operator was given the ability to overwrite the edits. These invalid entries were set to "not stated" values in the pre-edit. Editing for flow patterns was carried out at the consistency editing stage for the paper questionnaires.
Data File for 10 to 15 year olds	One data file was produced for the 10-11,12-13 and 14-15 questionnaires. For questions that did not apply to an age group, the variables were set to 'not applicable' codes (6,96,996..).
Data File for Teacher's File	In this cycle there were 3 Teachers' questionnaires with many of the same questions. These are to be released in July 2001. Questions that were not asked from a teacher were set to 'not applicable' codes (6,96,996..).

Naming Convention and Coding Structure for NLSCY Variables

Introduction	The NLSCY microdata file documentation system has employed certain standards to label variable names and values. The intent is to make data interpretation more straight-forward for the user.
Naming Convention for Variables	A naming convention has been used for each variable on the NLSCY data file in order to give users specific information about the variable. All variable names are at most eight characters long so that these names can easily be used with analytical software packages such as SAS or SPSS.
Format for Variable Names	**C SE C Q nnx** or **B SE C b Q nnx** **C** refers to the NLSCY Cycle "A" indicates the first cycle, "B" the second cycle, "C" the third etc... **SE** - refers to the section of the questionnaire where the question was asked or the section from which the variable was derived. **C** - refers to the collection unit or the unit to which the variable refers. There are four possibilities [2]: "C" is the variable refers to the child, "P" the PMK. "S" the spouse/partner "H" the household **b** - the lower case letter refers to the NLSCY Cycle in which the variable first appeared on the file.

[2] It should be noted that while variables do exist for various units of analyses (i.e., the PMK, the spouse/partner and the household), it will only be possible to produce "child estimates" from the NLSCY file. The characteristics of the PMK, spouse/partner and household can be used to describe attributes of the child. For example it will be possible to estimate the number of children living in a household with low income, or the number of children for whom the PMK has scored high on the depression scale etc. However it will **not** be possible to produce estimates of the number of low income households or depressed PMKs.

Example: "b" indicates the variable was new in Cycle 2. In subsequent cycles, new variables will also be identified using the lowercase letter representing the cycle. New variables in Cycle 3 will contain a "c", in Cycle 4 a "d" , etc. Some revisions were made to the content of the questionnaire between cycles. If the revision resulted in a change to the meaning or the values of a question, the variable was treated as new and contains a "c".

Format for Variable Names Cont'

Q refers to the variable type. There are six possibilities:
refers to the variable for a question that was asked directly on one of the NLSCY questionnaires

"S" refers to a score calculated for one of the scales used on the questionnaire

"D" means the variable was derived from other questions that were asked on the questionnaire

"I" means the variable is a flag created to indicate that an item has been imputed

"X" means the variable is a flag created to indicate an inconsistency in reported data between the current and previous cycles

"nnx" refers to the question or variable identification. Generally nn is a sequential number assigned to the variable; and x is a sequential alphabetic indicator for a series of variables of a similar type

Acronym Names for Questionnaire Sections

The following table gives the acronym names that were used for each section of the various NLSCY questionnaires. This acronym is embedded in the variable name for all variables on the NLSCY data file. The acronym is the second and third characters of the variable name.

Table 10

	Variable	Collected or Derived from the:
GE	Geographic	sample information
HH	Household	dwelling characteristics
MM	Variables collected as part of the household roster. .	Basic demographic variables for each household member. These variables are included on the NLSCY data file for the child, the PMK and the spouse/partner
DM	Demographic- derived to explain the living arrangements of the child:	information of the household roster and relationship grid
SD	Socio-demographic	child on the Child's Questionnaire and for the PMK and spouse/partner on the Adult Questionnaire.
HL	Health	PMK and Spouse on the Adult questionnaire, and for the Child on the Child questionnaire
CH	Adult Chronic Conditions	PMK and Spouse in the Health section of the Adult questionnaire
RS	Restriction of Activities :	PMK and Spouse in the Health section of the Adult questionnaire
DP	Depression scale	Parent Questionnaire (this scale was administered to the PMK)
ED	Education	children 4 to 13 years old on the Child's Questionnaire and about the PMK and spouse/partner on the Adult Questionnaire
LF	Labour force	PMK and spouse/partner on the Adult Questionnaire.
IN	Income	household income and personal income of the PMK, collected on the Adult Questionnaire.
FN	Family functioning scale	Adult Questionnaire (this scale was administered to the PMK or spouse/partner to measure how family members relate to each other.)
MD	Medical/biological .	Child's Questionnaire (0 to 3 years of age)

TM	Temperament	Child's Questionnaire (3 months to 3 years old)
LT	Literacy	Child's Questionnaire (0 to 6 years)
AA	Activities	Child's Questionnaire (0 to 13 years)
BE	Behaviour	Child's Questionnaire (0 to 13 years)
MS	Motor and social development	Child's Questionnaire (0 to 3 years)
RL	Social relationship	Child's Questionnaire (4 to 9 years)
PR	Parenting style	Child's Questionnaire (0 to 13 years)
CR	Child care	Child's Questionnaire (0 to 13 years)
PP	PPVT test:	4 to 6 years old (if child in grade 1 or less included those over 6 years of age)
PA	PPVT assessment:	interviewer to describe the conditions under which the PPVT was administered to the child.
FF	Friends and Family	10 to 13 Self-complete Questionnaires: Section A
SC	School	10 to 13 Self-complete Questionnaires: Section B
AM	About Me	10 to 13 Self-complete Questionnaires: Section C
FB	Feelings and Behaviour	10 to 13 Self-complete Questionnaires: Section D
PM	My Parents and Me	10-11 questionnaire Section E, 12-13 questionnaire, Section G
PU	Puberty	10 to 13 Self-complete Questionnaires: Section F, 12-13 year Health questions in Section H
DR	Smoking, drinking and drugs	10-11 questionnaire, Section G; 12-13 questionnaire Section F
AT	Activities	10-11 questionnaire, Section H, 12-13 questionnaire, Section E
HT	Health	12-13 Self-complete Questionnaire: Section H
WK	Work and Sources of Money	12-13 Self-complete Questionnaire: Section I
DA	Dating	12-13 Self-complete Questionnaire: Taken from questions in the Family and Friends and the Health Sections
EP	Principal's Education	Child's Principal about the school and the resources available to the staff
ET	Teacher's Education	Child's Teacher about the child and the classroom environment
RE	Reading test	children in grade 2 and over
MA	Math computation test	children in grade 2 and over.

Examples of Variables Names

In order to illustrate the naming convention used for variables included on the NLSCY data file the following examples are given.

Table 11

Variable Name	Refers to:
CLFSQ2	Q2 in the Labour Force Section for the spouse/partner
C	a Cycle 3 variable
LF	the Labour Force Section
S	the spouse/partner
Q	an item asked directly on the questionnaire
2	the ID of the item.[1]

Variable Name	Refers to:
CPRCS03	a positive interaction score on the parenting scale for a 2 to 15 year-old child
C	a Cycle 2 variable
PR	the Parenting Section
C	the child.
S	a score
3	ID of the variable

[1] There is a possibility that this name will not correspond to the questionnaire in the present cycle, given that we keep the same names of variables in the data dictionary. This usually happens when a number or section changes from one cycle to another. For example, cmdcbq31 corresponds to question 3 in the section on Working After Birth, whereas in Cycle 2 it corresponded to question 31 in the Medical and Biological Information section.

Variable Name:	Refers to:
CHLCbZ3	a flag that indicates an inconsistency in the child's height between the current and previous cycles.
C	a Cycle 2 variable
HL	the Health Section
C	to the child.
b	a new variable in Cycle 2.
Z	a longitudinal flag
3	ID of the variable

Coding Structure for NLSCY Variables

Introduction	Some standards have been developed for the coding structure of NLSCY variables in order to explain certain situations in a consistent fashion across all variables. The following describes these various situations and the code used to describe the situation.
Refusal	During a CAI interview, the respondent may choose to refuse to provide an answer for a particular item. The CAI system has a specific function key that the interviewer presses to indicate a refusal. This information is recorded for the specific item refused and transmitted back to Head Office. On the NLSCY data file an item which was refused is indicated by a code "8". For a variable that is one digit long the code will be "8", for a 2 digit variable "98" for a three digit variable "998" etc.

Don’t Know	The respondent may not know the answer to a particular item. Again the CAI system has a specific function key to describe this situation. On the NLSCY data file, the code used to indicate that the respondent did not know the answer to an item is "7". For a variable that is one digit long the code will be "7", for a two-digit variable "97" for a three-digit variable "997" etc.
Not Applicable	In some cases a question was not applicable to the survey respondent. A code "6", "96" "996" ... has been used on the data file to indicate that a question or derived variable is not applicable. < In some cases a single question or series of questions was not applicable. For example, the question on number of hours per week the child is cared for in a daycare centre (CCRCQ1G1) is only applicable for children for whom this type of care is used (CCRCQ1G=1). Otherwise there will be a code 996 for this question < In other cases an entire section of the questionnaire was not applicable or even an entire questionnaire. For example, the Motor and Social Development Section was applicable only to children 0 to 3 years old. For all children outside of this age group (i.e., 4 years and older) the motor and social development variables have been set to not-applicable ("6", "96", "996" etc.). For cases where the PMK did not have a spouse or common-law partner residing in the household, all "spouse" variables (e.g., the Labour Force Section and the Education Section for the spouse) have been set to not applicable.

Not-Stated

In some cases, as part of Head Office processing the answer to an item has been set to not-stated. The not-stated code indicates that the answer to the question is unknown. Not-stated codes were assigned for three main reasons.

1. As part of the CAI interview, the interviewer was permitted to enter a refusal or don't know code, as described above. When this happened the CAI system was often programmed to skip out of this particular section of the questionnaire. In the case of refusal, it was assumed that the line of questioning was sensitive and it was likely that the respondent would not answer any more questions on this particular topic area. In the case of a don't know it was assumed that the respondent was not well enough informed to answer further questions. As part of the NLSCY processing system, it was decided that all of these subsequent questions should be assigned a not-stated code. A not-stated code means that the question was not asked to the respondent. In some cases it is not even known if the question was applicable to the respondent.

2. In some cases a specific questionnaire was not started or it was started but ended prematurely. For example, there may have been some kind of an interruption, or the respondent decided that she/he wished to terminate the interview. If there was enough information collected to establish this household as a responding household, then all remaining items on the questionnaire (and on questionnaires that had not yet been started) were set to not-stated. The one exception was that if it was known that a certain section or a certain questionnaire was not applicable, then these questions were set to not applicable.

3. The third situation in which not-stated codes were used was as a result of consistency edits. When the relationship between groups of variables was checked for consistency, if there was an error, often one or more of the variables was set to not-stated.

For derived variables if one or more of the input variables to the derived variable had a refusal, don't know or not-stated code, then the derived variable was set to not-stated.

Coding of Open-ended Questions

Open-ended Format	A few data items on the NLSCY questionnaire were recorded by interviewers in an open-ended format. For example, in the Labour Force Section, a PMK who had worked in the previous 12 months was asked a series of open-ended questions about the current or most recent job: < What kind of business, service or industry is/was this? < What kind of work are/were you doing? < At this work, what are/were your most important duties or activities?
How they are recorded	The interviewer recorded in words the answer provided by the PMK. At Head Office, these written descriptions were coded into industry and occupation codes to describe the nature of the work of the PMK. Similar information was collected for the spouse/partner and codes assigned to describe the nature of the work.
How they are coded	The coding systems used were the 1980 Standard Occupational Classification codes (SOC) and the 1980 Standard Industrial Classification codes (SIC). Grouped versions of these codes are available on the data file (CLFPD07 and CLFPD08 for the PMK, and CLFSD07 and CLFSD08 for the spouse/partner).

Naming Imputation

Missing Variables	For various reasons there are certain variables that may be missing for responding households on the NLSCY file. This is usually referred to as item non-response. Earlier in the chapter the various codes that have been used to describe the reason for the item non-response ("refusal", "don't know", "not stated") are described.
Imputation	For some variables on the NLSCY file, however, rather than using a special non-response code, imputation has been carried out. Imputation is the process whereby missing or inconsistent items are "filled in" with plausible values. For the NLSCY, imputation was carried out for household income and PMK income. Imputation flags have been included on the NLSCY file so that users will have information on the extent of imputation and what specific items have been imputed on what records. All imputation flags on the NLSCY data file have an "I" as the fifth character of the variable name. For example, the name of the imputation flag for household income (CINHQ03) is CINHI03.

Derived Variables

Combining Items	A number of data items on the data file have been derived by combining items on the questionnaire in order to facilitate data analysis. For example, in the Labour Force section, one of the question is on the Number of Weeks Worked but in the Adult Education section, the question is Whether They Are Presently Going To School. The combination of these two questions forms a variable that is based on the Actual Situation Of Work And Study.
Longitudinal derived variables	Longitudinal derived variables were created to indicate changes between data reported in the current and previous cycles for family structure and PMK and Spouse changes.

Derived Variable Name	All derived variables on the NLSCY data file have a "D" as the fifth character of the variable name. The name of the variable for the primary care arrangement is CLFPD51.

Estimation

Estimation	The principle behind estimation in a probability sample, such as the NLSCY is that each respondent in the sample "represents," several other persons in the general population. For example, generally speaking, each child in the NLSCY sample represents about 300 children in the population.
The "Weighting Phase"	The weighting phase is a step which calculates how many people each respondent represents. As the target population is not the same for the cross-sectional sample and the longitudinal sample, the number of persons each child represents is not the same. Consequently, two series of weights must be calculated: < one for the cross-sectional sample, < one for the longitudinal sample. These weights appear on the NLSCY data files (CWTCW01C) for cross sectional weight, CWTCW01L for longitudinal weight), and must be used to derive meaningful estimates of the characteristics measured by the survey. For example, to estimate the number of children living in single-parent families in 1996 we would select the records in the cross-sectional sample of Cycle 2 with that characteristic and sum the weights found on those records.

The Longitudinal Sample or Cross-sectional?

Choice of Sample Dependant on Analysis	The choice of which sample to use depends on the type of analysis to be done. The longitudinal sample pertains to the child population at the time this sample was selected (i.e., 1994-95). The sum of the longitudinal weights is equal to the available demographic estimates for January 1995.
Longitudinal Weight	Only the longitudinal children, i.e., those selected in 1994, are given a longitudinal weight other than 0. For each cycle, the longitudinal weight of the panel is recalculated to take into account the further erosion (non-response) that occurs between the two cycles of the survey, i.e., about two years. It is this one that is usually better suited to longitudinal analysis based on a comparison of the data for more than one year, as it allows for the life courses of the children to be quantified over time.
Cross-sectional Weight	The cross-sectional sample makes it possible to do estimates based on data from a single cycle. A separate cross-sectional weight is calculated for each cycle. For Cycle 1, the longitudinal sample and the cross-sectional sample have the same target population. As the target populations are identical, only one series of weights was needed for this cycle.
Flows	Flows may be calculated using cross-sectional estimates produced for two cycles. However, the flows thus measured are net flows. They are calculated based on a snapshot taken for each reference period. As a result, they mask all transitions that cancel each other out. Here is an example to illustrate this phenomenon: A researcher wishes to know whether the number of young people who smoke increased between 1994 and 1996. He can therefore calculate the number of smokers in 1994 using the Cycle 1 sample, and a second estimate for 1996 using the cross-sectional sample for Cycle 2. By comparing these two estimates, he can determine whether the number of smokers increased or decreased. However, this comparison conceals the fact that a number of young people quit smoking in the interim. From this analysis, it would therefore not be possible to verify whether a program designed to reduce the number of young people who smoke is effective. Again using our example, the cross-sectional sample would make it possible to quantify each transition, and therefore to calculate the gross flows.

Weighting Procedures for the Cross-sectional and Longitudinal Samples

NLSCY Weighting Strategy	The NLSCY weighting strategy is based on a series of cascaded adjustments applied to a basic (or initial) weight. Conceptually, the basic weight of each child is approximately equal to the inverse of the child's probability of selection. In the case of the selected households of the LFS in 1996, the basic weight was the sub-weight calculated by this survey. For the longitudinal children, that is, those sampled in 1994, the basic weight was determined using the weight calculated for Cycle 1. The final weight, cross-sectional or longitudinal, was obtained by multiplying the basic weight by many adjustments. This section explains the various corrections made to the basic weight and the procedures used to weight the cross-sectional and longitudinal samples
Weighting of Longitudinal Sample	We will discuss the longitudinal weighting process first, as it is the simpler of the two. Furthermore, this weight is used later to determine cross-sectional weight. Two steps are involved in obtaining the longitudinal weight for children selected in Cycles 1 and 2. These adjustment factors are applied to the basic weight in order to obtain the final longitudinal weight. As concerns the sample of children selected in Cycle 1, the basic weight is the final weight, before post-stratification, obtained in Cycle 1. With respect to the sample of children selected in Cycle 2, the basic weight is the final weight, before post-stratification, obtained in Cycle 2. For further information on these weights, please consult the documentation from previous cycles.
Step One - Adjustment Factor	In step one, an adjustment factor is calculated that accounts for the erosion (non-response) observed since the sample was selected. As regards the sample of children selected in Cycle 1, this factor corrects the erosion that affected this cohort in Cycles 2 and 3. With respect to the cohort selected in Cycle 2, the factor inflates the basic weight in order to mitigate the non-response for this cohort observed in Cycle 3. These factors are determined by means of models.

Homogeneous Response Group - HRG	Regardless of whether they responded in Cycle 3, a considerable amount of information on these children was gathered during previous cycles. The non-response correction strategy makes use of this information. It is based on the homogeneous response group (HRG) method, which involves an attempt to consolidate those individuals with the same propensity to respond. These groups are formed using the characteristics for each child reported in Cycle 1. A correction factor is then derived for each HRG, as follows: $\frac{\textit{Sum of adjusted weights in the HRG}}{\textit{Sum of adjusted weights of respondents in the HRG}}$
Two HRG Sets	Two distinct HRG sets were constructed: one for the sample of children selected in Cycle 1, and another for the sample of children selected in Cycle 2. Both sets are required, as these samples do not necessarily react to the same non-response mechanism. As there is every reason to believe that this mechanism changes in accordance with the number of times an individual is surveyed, the non-response adjustment model must take this fact into account. Lastly, the constraints represented by adjustment-factor range and minimum HRG size are imposed during HRG formation in order to obtain reasonable, reliable correction factors.
Post-stratification	The purpose of the second adjustment factor is to ensure consistency between survey estimates and demographic estimates produced by Statistics Canada. This method is known as post-stratification. For the sample of children selected in Cycle 1, the target population is the set of children aged 0 to 11 in early 1995. As a result, the post-stratification adjustment for this sample ensures consistency between the sum of the weights and demographic estimates from January 1995 for each combination of province, age and sex. As regards the sample of children selected in Cycle 2, the adjustment is made using demographic estimates from January 1997.

Weighting of the Cross-sectional Sample	As explained earlier, the cross-sectional sample is comprised of children selected in 1994 and children selected in 1996. In the following paragraphs, we present the correction factors which, when applied to the basic weights, make it possible to calculate the weights of the cross-sectional sample. These correction factors differ according to whether the child was selected in 1994 or in 1996. First of all, cross-sectional weights were calculated separately for the children selected in 1994 and those selected in 1996. Thereafter, each of these two components represents its respective target population. However, these target populations are not entirely separate. It is therefore necessary to apply other correction factors to take this overlap into account. The purpose of the last step (post-stratification) is to ensure consistency between survey estimates and demographic estimates produced by Statistics Canada.

Cross-Sectional Weights for Children Surveyed for the First Time in Cycle 3

Children Selected from the Labour Force Survey (LFS) Sample	The weighting strategy applied to these children is similar to that used in Cycles 1 and 2.
1st Correction For Number of Rotation Groups	The LFS sample is made up of six "rotation groups", each of which is a representative sub-sample of the LFS target population. In the NLSCY, we used 13 rotation groups. Consequently, the first adjustment is 6/13. Further to this adjustment, the adjusted weight is obtained by multiplying the LFS weight by 6/13.
2nd Correction For Household Non-Response	In surveys such as the NLSCY, some households do not provide responses[1] for a variety of reasons: refusal, special circumstances, language problems, temporary absence. This non-response is usually compensated for by proportionally correcting the sub-weights of the responding households. The correction is made by multiplying the sub-weight of the responding households by the following factor: *Sum of adjusted weights of households sampled within a stratum of the NLSCY* *Sum of adjusted weights of responding households within a stratum of the NLSCY* In this equation, the adjusted weight is the weight obtained after Correction 1. A different correction was made in each of the strata specially defined for non-response by the LSF. The strata are defined using the following information: province, economic region, census metropolitan area, type of sector (urban, rural), apartment frame, whether special region or not. Each of the strata has at least 30 children and a response rate of at least 70%. [2] Strata that are too small or have a response rate of less than 30% are grouped together until these restrictions are met.

[1] Following the survey, it is possible that information is gathered only for one child in a household, although two children are in the sample. According to the NLSCY release strategy, both these children are considered respondents, as we have considerable information about their parent(s). For this reason, it is not necessary to apply a correction factor for the non-response of the children.

[2] These restrictions are designed to ensure that the adjustment factor is relatively stable and not too large.

3rd Correction For Households With More Than One Economic Family	Sometimes a household includes more than one economic family. When this occurs, the child selection procedure requires the selection of one of these families at random. This correction is the inverse of the selection probability of the family in the household in question. This correction affected only two households.
4th Correction For Households With More Than Two Eligible Children	For Cycle 3, a maximum of 2 children were to be interviewed in the new households. If the economic family has more than 2 eligible children, 2 children are chosen at random. This correction takes this selection process into account in economic families, and affects only 5 households, as very few households have more than two children under 1 year of age. This is the last correction to be calculated for these children before weight integration.

Weighting of Children Sampled in 1994 and 1996

Weighting of Children Selected from the Birth Register in 1998	Two correction factors are required for these children. The first inflates the survey weight in order to account for the non-response observed during data collection in Cycle 3. For this adjustment, the homogeneous response group method is used once more. However, as there is little information on non-responding households from this sample, HRGs in this particular case correspond to the strata used to select the birth-register sample. The second adjustment calculated for these children accounts for the fact that we interviewed twins. The basic weight was modified for couples of twins, as households with twins have a higher probability of selection than those with just one eligible child.
Weighting of Children Sampled in 1994 and 1996	It is not necessary to apply all the corrections described in the previous section to these children, as this was done in Cycles 1 and 2. The basic weight we use is therefore the weight obtained in previous cycles after the adjustment for non-response and before post-stratification. Only two corrections were necessary for these children.
1st Correction	The first correction inflates the basic weight in order to account for non-response. The adjustment used in this step is identical to that calculated in determining longitudinal weight.

2nd Correction	The second adjustment attempts to minimize the impact of rare interprovincial migrations. Some children selected in 1994 or 1996 had moved or changed province since the first interview. This can sometimes distort weights for the new province of residence. For example, the weight of a child selected in Ontario is far greater than that for a child selected in Prince Edward Island. When a child selected in Ontario moves to Prince Edward Island, this will have an enormous impact on the estimates for Prince Edward Island if he/she retains his/her original weight. This type of migration is very rare among the target population. In this context, it is not reasonable to assume that the sampled child who has moved from Ontario to Prince Edward Island represents a large number of children in the target population who have followed the same life course. Rather, such a case should be considered uncharacteristic. The weight of these children has therefore been corrected downward
Weight Integration	Using the three weight calculation methods presented in the previous sections, it is possible to produce estimates for their respective target population. In some cases, however, these target populations are not mutually exclusive. It is therefore necessary to derive a correction factor that takes this overlap into account. In addition, one final factor is needed to ensure that these weights produce estimates consistent with the demographic estimates produced from other sources.
Correction For Overlap Of Target Populations	We are dealing with three types of households: those selected in Cycle 1, those selected in Cycle 2, and those selected in Cycle 3. However, the target populations for these three samples overlap in the cases of children selected in 1994, who are now 5 years of age, and children aged 5 selected from the birth register in 1998. This overlap must be taken into account in order to ensure that our sample does not systematically overestimate the characteristics of the population.

Multiplier Factor	To take the relative contribution of each sample into account, we calculated a multiplier factor for each province. If an optimal combination of these samples is to be obtained, this factor must take into account the accuracy of each sample's estimates. For example, an estimate from a highly accurate sample is considered more important than that from a sample of low accuracy. Accordingly, the former would have a high adjustment factor, and the latter, a low adjustment factor. An example will illustrate this approach. Let us suppose that 30 longitudinal children aged 5 years were sampled in New Brunswick in 1994 and 10 children from the same age group were selected from the birth register in 1998. Moreover, suppose the design for the birth register sample is twice as effective[1] as that for the 1994 sample. In this case, the correction factor for the longitudinal children would be: $\frac{30/2}{(30/2+10)}$ = 0.6, while the correction factor for the birth register sample would be 0.4. Note that the sum of the two adjustment factors is 1.
Correction For Post-Stratification	Post-stratification was carried out on the weights thus far to ensure that the national and provincial estimates agreed with the January 1997 demographic estimates of the population of children aged 0 to 13. For Cycle 3, post-stratification was done by province, age group and sex. This correction factor was derived for each post- stratification, as follows. *Demographic estimate* *Sum of weights in the post-strata* This correction ends the weighting process of the cross-sectional sample for the second cycle of the NLSCY.

[1] In this context, a sample is more effective if its sampling variance is smaller than that of another sample of equal size selected using a different sampling design.

Introduction	There are many variables and concepts which are critical to the analysis of the NLSCY data. In this section there is a brief discussion regarding the types of possible analyses with the NLSCY data. This is followed by a description of key variables which have been derived to explain the living arrangements of the child and the socio-economic conditions under which the child lives. The content areas for each section of the various questionnaires used for the first cycle of the NLSCY are presented in the next section.

Cross-sectional and Longitudinal Estimates

NLSCY Design	The NLSCY design and sample has been constructed so that it will be possible to produce both cross-sectional and longitudinal estimates. At present, it is possible to obtain cross-sectional estimates with Cycle 1, Cycle 2 and more recently with Cycle 3 data. It is also possible to obtain longitudinal information from the longitudinal file. The allocation of the Cycle 1, 2 and 3 sample was such that it is possible to produce estimates at the national level for the specific age cohorts and at the provincial level for aggregated age groups. This is true for cross-sectional data as well as longitudinal data.

Longitudinal Cohorts	There are two longitudinal cohorts, those who were in the sample beginning with Cycle 1 (aged 0-11 years at cycle 1) and those who were in the sample beginning in Cycle 2 (0-1 year olds). The Cycle 1 longitudinal sample is comprised of all children sampled for Cycle 1 of the survey in responding households (excluding those from the integrated sample (NPHS) and the 3rd and 4th child of each family). The plan is to follow these children over time, and revisit them every two years. Analyses of these children will permit researchers the opportunity to perform in-depth studies of the long-term impact of risk factors (such as divorce or the onset of a health condition) and protective factors (such as positive interactions with parents or academic success at school) on these children as they move into adulthood. If a child moves out of the household where he or she was sampled at Cycle 1, that child will be traced to wherever he or she resides during future cycles of the survey. From a longitudinal perspective, the child, not the household, is the statistical unit of analysis.
Attrition	It should be noted that some children who were participants in Cycle 1 of the NLSCY did not participate in the second cycle or may not participate in subsequent cycles due to a variety of reasons. This is usually referred to as attrition. The number of these children is being carefully monitored and we are making every effort to keep these numbers at a minimum. The Cycle 1 sample and its allocation were designed with this in mind and as long as future response rates are not lower than expected the sample will still permit longitudinal research by age cohort at the national level.
Augmenting the Sample	In the second and subsequent cycles, it is intended that the NLSCY will add children belonging to age groups no longer covered in the longitudinal sample. For example, for Cycle 3 a panel of children 0 and 1 year of age was added to the Cycle 3 sample. This augmented sample will allow for ongoing cross-sectional analyses to supplement the primary longitudinal research. As such, at each cycle it will be possible to get a snapshot of Canadian children of all ages. At the present time, it is not planned to follow this augmented component of the sample longitudinally, or if so it will be done on a limited scope.

Children Who Immigrate to Canada	It should be noted that the children who immigrate to Canada at any point in time after the Cycle 1 sample was selected and who are in the age cohorts covered in the Cycle 1 sample, will not be included in either cross-sectional or longitudinal estimates at this time. The number of children excluded by this criterion is small. Estimates of the number of children immigrating to Canada will be monitored and a decision may be made in the future to introduce a new sample into the NLSCY to cover these children.

NLSCY Units of Analyses

Unit of Analysis - Child	The unit of analysis for the NLSCY is intended to be the child and eventually the young adult. For each cycle of the NLSCY, extensive information will be gathered on the child's family, parent(s), and neighborhood.
Defining Longitudinal Households	It is true that families or households are relatively straightforward units of analysis with cross-sectional data but the situation becomes problematic with longitudinal data. Households change composition frequently, due to divorce of parents or children leaving the parental nest. Attempts have been made in other studies to define "longitudinal households", but the implementation of this concept has never been straightforward. No single definition has been found to be appropriate for most analytic tasks, and many definitions exclude the portion of the population that has undergone the change. Unfortunately, this is often a significant as well as interesting population to study. It has been suggested that a superior alternative is to use the individual as the unit of analysis and present family and household variables as a characteristic of the individual.[1] Thus the files which have been constructed for all NLSCY data consist of child records. In order to understand the family situation, estimates such as of the number of children in single parent families, or the number of children living in low-income households, can be produced.

[1] For a more detailed examination of units of analysis in longitudinal studies, see G.D. Duncan and M.S. Hill, "Conceptions of Longitudinal Households: Fertile or Futile?" *Journal of Economic and Social Measurement* (1985) 13: 361-375.

PMK and Spouse

Person Most Knowledgeable	In each NLSCY household for Cycle 3, for each selected child, a question was asked about who in the household was the person most knowledgeable about this child. This person was labeled as the PMK. The intention was that the PMK would provide the information for all selected children in the household and then give socio-demographic information about himself/herself and him/her spouse/partner. In some rare cases it might have been appropriate to label two different people in a household as PMKs. For example, in the case of a step family, it may have been appropriate to label the mother as the PMK for one child and the father for another. However, in order to simplify the interview procedures, only one PMK was selected per household.
Relationship of PMK to NLSCY Children	The following is the breakdown of the relationship of the PMK to the NLSCY children for Cycle 3. For 93.0 % of responding children, the PMK was the mother (92.1 % the biological mother and 0.9 % the step, adoptive or foster mother) For 6.4 % of the children the PMK was the father for 0.6 % of children the PMK was not a parent.[1]
Cases Where the PMK was not the Parent	For the majority of cases of the PMK not being a parent, the child had a parent living in the household, but the parent was not selected as the PMK. For the most part this situation occurred when a child had a very young mother living with her own parents, i.e., the child's grandparents, and the grandmother was selected as the PMK
Spouse/Partner as PMK	If the PMK had a partner residing in the household at the time of the interview, then this person was labeled as the spouse. Spouses included both married and common-law partners. Detailed socio-economic information was collected about the spouse/partner in order to describe the family situation of the child See the table below.

[1] *These numbers for the PMK and spouse/partner are based on unweighted data.*

The following is the breakdown of the relationship of the spouse/partner to the children.

For families where the PMK ('s)...	The % was...
did not have a spouse/partner residing in the household	14.8
Spouse/partner was the father	78.9
was the biological father	74.8
was the step, adoptive or foster father)	4.1
spouse/partner was the mother (biological, step, adoptive or foster	5.4
spouse/partner was not a parent	0.9

Change in PMK Between Cycles	For several reasons, the PMK and his/her spouse could be different people than those designated in the first and second cycles. For this reason, a variable flagging the change in individual on the longitudinal file was created (see CDMPcD27 for the PMK change and CDMScD28 for the change in spouse). This new variable indicates whether there was any change in the PMK from one cycle to the other. It is highly recommended that this variable be used when doing longitudinal analyses involving the characteristics of the parents.

Here is a breakdown of the consistency of the relationship between the NLSCY children and the PMK and his/her spouse:

For families where the PMK was ...	The % was
the same person in both cycles	91.6
the spouse of the PMK in Cycle 2	7.1
a new individual	1.2

For families where the PMK ('s)...	The % was
had no spouse living in the household for either of the two survey cycles	10.7
spouse was the same person for both cycles of the survey	74.4
spouse of the PMK for Cycle 3 had been the PMK for Cycle 2	6.4
had no spouse for Cycle 2, but did have a spouse for Cycle 3	4.6
had no spouse for Cycle 2, but did have a spouse for Cycle 3	3.2
was the same person for both survey cycles, but had a different spouse	0.7

Relationship Grid	Using NLSCY data, a child's family may be described in several different ways. Many of the family variables used to describe the NLSCY children were derived from what is known as the relationship grid. As part of the household roster some basic demographic information was collected for all members of the child's household. As part of this questionnaire, the relationship of everyone in the household to everyone else was asked. Using this information it was possible to create an extensive set of variables to describe the child's family situation. The following are some of the family derived variables for the children that exist on this second micro data file for the NLSCY. The names of the derived variable are given in brackets.
Single Parent Families	There are two ways to describe the parental situation of children using NLSCY data. Using the relationship grid, a child's single-parent status was derived. There were 84.4% of children living with two parents, 15.4% with one parent and 0.2% without a parent[1] (CDMCD04). A child's parental status can also be defined in terms of the PMK. There were 85.2% of the NLSCY children living in a household where the PMK had a spouse/partner; and for 14.8% of children the PMK did not have a spouse/partner (CDMPD06A). The two ways of describing the child's family are very similar. The only reason for the small differences is a result of the few cases where the child lived with a parent, but the parent was not selected to be the PMK.

[1] *These estimates for family derived variables are based on unweighted data.*

Step, Blended and Intact Families	Children living with two parents are classified as being members of intact, step and/or blended families based on the relationship of these children to the parents.[1]
Intact Family	An intact family consists of a married or common-law couple in which all children are the natural and/or adopted offspring of both members of the couple. For the NLSCY children, 75.9% were a member of an intact family (CDMCD16). For the NLSCY children, 4.3% were step children themselves (CDMCD03) and 8.5% lived in a step family (CDMCD15).
Step Family	A step family consists of a married or common-law couple residing in the same household, with at least one step child living with them who is the biological or adopted child of one parent but not the other. It should be noted that a child who is the biological child of both parents is said to belong to a step family if at least one of these parents has a step child residing in the household. For the NLSCY children, 4.3% were step children themselves (CDMCD03) and 8.5% lived in a step family (CDMCD15).

[1] *Foster children and children living with only one parent are not included in step, blended or intact families. In the derivation of blended, intact and step families, if a child was the adoptive child of one parent and the biological child of the other parent, then this child was treated like a step child, and thus the family labelled as a step family. In other Statistics Canada publications children of this type are treated as if they were biological children of both parents.*

Blended Families	Blended families combine children who have different relationships with their parents. A blended family consists of a married or common-law couple living with at least two children, one of whom does not share the same natural and/or adoptive parents as the other child(ren). The following are examples of blended families: < a couple with biological children of the female partner as well as biological children of the male partner (i.e., hers and his) < a couple with biological children of the female partner as well as children out of the new union (i.e., hers and theirs). The blended family is a sub-set of the step family. For the NLSCY children, 6.2% were members of a blended family (CDMCD14).
Economic Family	For the NLSCY, an economic family is defined as all family members related by blood, marriage, common-law relationship or adoption. Foster children are considered to be part of the economic family. For example, if a woman lives in a household with her spouse and two children as well as her sister and her sister's child then all of these individuals would be part of one economic family. If a boarder also resided in the household with her child then this would constitute a second economic family.
Siblings	For the NLSCY data, siblings include full, half, step, adopted and foster siblings. Only siblings residing in the household have been included in the calculation of the sibling derived variables included on the micro data file. In the case of common-law relationships, if both members have brought their own children into the relationship then these children are considered siblings. It should be noted that the classification of siblings was age independent. If an NLSCY child had an adult sibling (for example, 21 years of age) living in the household then this sibling was included in the calculation of the sibling derived variables. The sibling derived variables include total siblings, as well as number of older siblings, younger siblings and siblings of exactly the same date of birth (i.e., twins) (CDMCD08, 09, 10 and 11).

Socio-Economic Derived Variables

Derived Variables	There were two derived variables produced from Cycle 1 data to assist analysts in understanding and explaining the socio-economic situation of the child's family: socio-economic status, and income ratio. In the second and third cycle of the survey, two distinct measures of socio-economic status were calculated: one longitudinal, and one cross-sectional. The derivations of cross-sectional SES and of longitudinal SES differ only with respect to the standardization of the components. The derivation of the non-standardized components of SES (i.e., parents' education level, parents' occupational prestige and household income) was the same for both SES measures.
Socio-Economic Status	Sociologists often use the term "socio-economic status" (SES) to refer to the relative position of a family or individual in an hierarchical social structure, based on their access to, or control over, wealth, prestige and power. In studies of children's academic and social-emotional development, SES is often operationally defined through measures describing the occupational prestige, educational levels, and economic positions of children's parents. The measure of SES is calculated for each household assigned to each selected child in that household.[1] It was derived from five sources: the level of education of the PMK, the level of education of the spouse/partner, the prestige of the PMK's occupation, the prestige of the occupation of the spouse/partner, and household income. The method of constructing each component of SES, and the construction of the overall cross-sectional and longitudinal SES measure are described below.

[1] *This particular definition of SES was proposed by Dr. Douglas Willms, Atlantic Centre for Policy Research in Education. University of New Brunswick.*

Education - Years of School

The education variable used in the construction of SES was years of schooling. Two such variables were derived independently; one for the PMK and one for the spouse/partner (CEDPD04 for the PMK and CEDSD04 for the Spouse/partner). For the PMK the years of schooling variable was derived based on items CEDPQ01 (years of elementary and high school) and CEDPQ04 (highest level of education attained beyond high school). To create a somewhat continuous interval-level education variable, these two items were recoded to form years of schooling in the following manner:[1]

CEDPD04	Condition
00	CEDPQ01=1 (no schooling)
03	CEDPQ01=2 (1 to 5 years)
06	CEDPQ01=3 (6 years)
07	CEDPQ01=4 (7 years)
08	CEDPQ01=5 (8 years)
09	CEDPQ01=6 (9 years)
10	CEDPQ01=7 (10 years)
11	CEDPQ01=8 (11 years)
12	CEDPQ01=9 (12 years)
13	CEDPQ01=10(13 years)
16	CEDPQ04=6 (BA/BSC)
18	CEDPQ04=7 (Masters)
20	CEDPQ04=8 or 9 (MD/PHD)

An extra year was then added to CEDPD04 if the PMK had a diploma from a trade school or community college (i.e., if CESPDQ04= 4 or 5 then CEDPD04 = CEDPQ04+1).

The same procedure was used to set up a years of schooling variable for the spouse/partner (CEDSD04).[2]

[1] In cases where the PMK had not graduated from high school but had completed a post-secondary degree or certificate, then the post-secondary degree or certificate took precedence. For example, if the PMK had completed only grade 10, but had masters, then AEDPD04 was set to 18.

[2] It was decided that years of schooling was an interesting derived variable itself and therefore this variable has been included on the NLSCY master file for the PMK and spouse/partner (CEDPD04 and CEDSD04).

Occupational Prestige

Occupational status is an important indicator of SES. The occupation variable used in the derivation of SES was a modified version of a scale developed by Pineo, Porter and McRoberts (1977). The classification system groups occupations described in Statistics Canada's 1980 Standard Occupational Classification into 16 somewhat homogeneous categories, ordered from 1 to 16, where code 1 represents the highest level of occupation and code 16 the lowest. The 16-category scale provides a ranking of occupations according to their social standing or prestige. For the NLSCY, for both the PMK and the spouse/partner, a detailed description was taken of the job considered to be his or her main job during the previous 12 months. The information was used to code occupations into the 1980 classification, and in turn into the 16 prestige categories. For the purposes of deriving both SES, the order of the Pineo-Porter-McRoberts scale was reversed. The final scale used in the derivation of both SES had the following values:

01	Farm labourer
02	Unskilled manual
03	Unskilled Clerical/sales/service
04	Semi-skilled manual
05	Semi-skilled clerical/sales
06	Farmer
07	Skilled crafts and trade
08	Skilled clerical/sales/service
09	Foreman/forewoman
10	Supervisor
11	Middle manager
12	Technician
13	Semi-professional
14	High-level management
15	Employed professional
16	Self-employed professional
96	Not-applicable - this was assigned for the Spouse/partner for cases where the PMK did not have a spouse/partner
99	Not stated

This ordinal scale can be used to rank individuals into the various occupation groups but one cannot assume that the intervals between ranks are equal. For example, in this scale a middle manager (code 11) is ranked higher than a supervisor (code 10), which in turn ranked higher than a foreman (code 09). However, this does not imply that the difference in occupation between the middle manager and a supervisor is equivalent to the difference between a supervisor and a foreman. By assuming that the underlying latent construct has a particular distribution, one can assign intervals to the various categories. Mosteller and Tukey (1977) propose a logit transformation to re-express ordinal data on an interval scale. To do this, the percentage of individuals in each occupation group is considered a piece of the logistic distribution. The code assigned to each occupation is the centre of its piece in the logistic distribution. This transformation was employed to scale the 16 occupations.

For each occupation group x, the following values were computed:

p = the percentage of individuals with an occupation less than occupation x (based on the Pineo-Porter-McRoberts category)

pp = the percentage of individuals with an occupation less than or equal to occupation x (based on the Pineo-Porter-McRoberts category)

phi(p) = p*ln(p) + (1-p)*ln (1-p)

phi(pp) = pp*ln(pp) + (1-pp)*ln(1-pp)

The recoded (logit) value for occupation x was assigned to be:

$$\text{PINEOLOG} = \frac{\text{phi(pp)} - \text{phi(p)}}{\text{pp-p}}$$

PINEOLOG (for both the PMK and spouse/partner) was then used in the derivation of both SES.

Household Income	The last variable used in the derivation of SES was household income. More detail regarding the collection of household income and data quality issues can be found in Section 9.17. To derive SES, income was coded in $1,000s of dollars, and a few outliers with incomes greater than $150,000 were recoded to $150,000.
Final Derivation of Cross-sectional and Longitudinal SES	Thus the five variables that were used to derive both SES were: - CEDPD04 (years of schooling for the PMK), - CEDSD04 (years of schooling for the spouse/partner), - PINEOLOG-PMK (the pineo occupation code for the PMK transformed to the logit distribution), - PINEOLOG-SP (the pineo occupation code for the spouse/partner transformed to the logit distribution) and - HHINC (household income in thousands of dollars)
Final Derivation of Cross-sectional SES	Each of the five variables was standardized to have a mean of zero and a standard deviation of one.

Consideration of Missing Data for the Derivation of Cross-Sectional SES	In the case of cross-sectional SES, the components were standardized using the means and standard deviations of the variables for all households as observed in Cycle 3. Thus, new standards were established based on the data for Cycle 3 families with selected children aged 0 to 15. Given the change in age of the selected children between Cycle 3 and Cycle 2 (0-13 years) it is expected that our sample allowing for the production of Cycle 3 standards consists of slightly older families. This characteristic difference is of some importance, as older families are generally expected to present more favourable socio-economic characteristics than younger families. From one cycle to the next, this difference might not be felt, but over the long term (or over several cycles), differences will likely be noticeable. The income variable which is utilized to derive SES is expressed in current dollars. Thus, the cost-of-living increase and the subsequent adjustment of salary and income level will also, over the long term, have a significant impact on the value of the means and standard deviations used to standardize the components of cross-sectional SES. The variable for cross-sectional SES is labeled CINHD08.
Final Derivation of Longitudinal SES	The final derivation of longitudinal SES is based on the standards calculated for the first cycle of the survey. The same raw values of the components helpful in deriving cross-sectional SES are used, but the standardization differs in this way. Thus, unlike cross-sectional SES, the standardization is not expected to produce a mean of zero and a standard deviation of one for each of the variables. By definition, the use of longitudinal SES is relevant only for analyses based on longitudinal children.
Initial Standards of the First Cycle	The initial standards of the first cycle which were used to derive longitudinal SES were created based on the characteristics specific to households having children aged 0 to 11. These same families, in the third cycle of the survey, have children aged 4 to 15. The value of longitudinal SES therefore allows us to calculate the net progression of each child in relation to the initial characteristics of his/her household.

Values of SES	A child living in a household where the income has improved appreciably (all things being equal), will see the value of his/her longitudinal SES improve as well. However, in the same circumstances, the value of cross-sectional SES may decline. This would be the case, notably, if all children were living in households that experienced on average an improvement in socio-economic status.
Two SES Values	It is therefore essential to be familiar with the rules used to derive the two SES values in order to use the variables properly in the analyses. The differences observed from one cycle to the other for the standards of both SES are not yet very pronounced. Therefore, the use of one measure rather than another, in the short term, should not produce significant differences in research results. But over the long term, the proper use of both measures should become more important. Normally, it is recommended that cross-sectional SES be used to accurately measure the relative position of a child in relation to other children in a given cycle, whereas the use of longitudinal SES provides a better indication of the progression of an individual's situation from one cycle to the other.

Consideration of Missing Data	Missing values (i.e., not-stated values) were ignored in the standardization. In the standardization of the spouse/partner variables (CEDSD04 and PINEOLOG-SP), if the PMK did not have a spouse/partner these records were ignored. The SES composite was then calculated by taking the (unweighted) average of the five standardized variables. If one of the five variables had missing data due to non-responses (refusal, don't know, etc.) then the average was taken over the remaining non-missing items. If there was no spouse/partner in the household (i.e., the PMK had no spouse/partner) then the average was taken over the three applicable variables (CEDPD04, PINEOLOG-PMK, and HHINC).[1] For two-parent families (i.e., for cases where there was a PMK and a spouse/partner), if two or more out of the five input variables were missing, then SES was set to "not-stated." For single-parent families (i.e., there was no spouse/partner), if one or more out of the three input variables were missing, then SES was set to "not-stated."
Examples of SES	The values for SES range from -2.000 to +1.750. The distribution of SES scores is as follows for children on the file.

SES SCORE RANGE % CHILDREN WITH SCORE IN RANGE

	Cross-Sectional	Longitudinal
1.5 or over	1.92	2.17
1.0 to less than 1.5	5.44	5.13
0.5 to less than 1	10.53	11.03
0 to less than 0.5	21.28	24.77
-0.5 to less than 0	30.06	30.11
-1.0 to less than -0.5	17.74	15.2
-1.5 to less than -1.0	7.68	4.4
Less than -1.5	3.35	1.11
Not-stated	2	6.08

Note: These numbers are based on unweighted data.

[1] *With this procedure, the SES score for single-parent families will tend to be lower because household income, on average, will be lower. However, the SES score will properly reflect the level of education and the occupational prestige of the single parent. Nevertheless, for most regression analyses where SES is used as a control variable, it would be useful to include a dummy variable denoting whether the family was a single- or two-parent family.*

Types of Families	In order to give a flavour for the types of families associated with various SES scores the following examples are given for illustration purposes. It should be noted that the SES scores given in these examples are approximate and do not correspond to actual records on the NLSCY file. Many more examples are possible for each score involving both one and two parent families.

SES SCORE Cross-sectional	EXAMPLE A Family in Which...
1.5	**!** both the PMK and spouse have a university degree (BA/BSC) **!** they are both employed professionals **!** the household income is $80,000
0.5	**!** the PMK has a university degree (BA/BSC) and the spouse has grade 13 **!** the PMK is employed as a semi-professional and the spouse is employed in a semi-skilled clerical position **!** household income is approximately $65,000
0.0	**!** the PMK has grade 13 and the spouse grade 12 **!** the spouse is employed in a semi-skilled manual position and the PMK has a semi-skilled clerical position, is not in the labour force **!** household income is approximately $55,000
-0.5	**!** the PMK and spouse have both completed grade 12 **!** the PMK is employed in a semi-skilled manual position and the spouse in an unskilled manual position **!** household income is approximately $30,000
-1.0	**!** neither the PMK nor the spouse have completed high school **!** the PMK is employed in an unskilled manual position and the spouse is employed in an unskilled manual position **!** household income is approximately $25,000
-1.5	**!** neither the PMK nor the spouse have completed high school **!** neither the PMK nor the spouse are in the labour force **!** household income is approximately $15,000
-2.0	**!** there is no spouse **!** the PMK has not completed high school **!** the PMK is not in the labour force **!** the household income is less than $10,000

Chapter 8 - Content and Validation of NLSCY

Introduction	The NLSCY was designed to follow an ecological or holistic approach to measuring child development. The survey captures the diversity and dynamics of the factors affecting children. To ensure that all relevant topic areas affecting child development were adequately addressed by the survey, a multidisciplinary consultation was carried out at the inception of the survey. The selection of specific subject areas, priorities and survey questions was very much a group effort with input and advice from: - the NLSCY expert advisory group which consists of researchers in the area of child development and the social sciences; - federal departments; - representatives from the provinces and territories responsible for child development programs.
Factors Affecting Child Growth	It was recommended that the NLSCY cover a broad range of characteristics and factors affecting child growth and development. Extensive information was gathered about the child, as well as the child's parent(s), characteristics of the family and the neighbourhood. This section provides an outline of the content for each section of the questionnaire included in the NLSCY data.
NLSCY Processing System	As part of the NLSCY processing system, there were some basic quality checks performed for each section of the questionnaire. Any items for which there was a high level of non-response or which were frequently involved in edit failures were looked at in detail. Where appropriate, comparisons were made to external data sources and analyses were carried out to investigate possible reasons for differences from these other sources. Any concerns about potential data quality problems for any items in a particular section of the questionnaire are discussed in this section of the documentation.

General Validation Procedures	Before the section-by-section discussion of content and validation results, the general validation procedures used for the "scale" data are presented. PLEASE NOTE THAT MOST SCALES WERE DEVELOPED AND VALIDATED IN CYCLE 1. IN SUBSEQUENT CYCLES, THE SAME FACTOR STRUCTURE WHICH EMERGED FROM THE CYCLE 1 ANALYSIS WAS IMPOSED. THIS ENSURES THAT THE SCALES ARE CONSISTENT ACROSS TIME TO ALLOW FOR LONGITUDINAL ANALYSIS AND CROSS SECTIONAL COMPARISONS. IN THE SECTIONS, DESCRIBING THE VALIDATION OF THE SCALES, WHERE THE ANALYSIS WAS DONE USING CYCLE 1 DATA, THE VARIABLES CITES WILL BEGIN WITH AN “A” (I.E. ABECB10). LIKEWISE WHEN THE SCALE IS NEW IN CYCLE 3, THE SCALE ANALYSIS WILL CITE CYCLE 3 VARIABLES

Validation of Scale Data

Scale Definition	For some of the concepts deemed important to measure in the NLSCY it was decided that the concept would most appropriately be measured through the use of a scale. A scale is simply a group of questions or items that measure a certain concept when the answers to the items are put together. For example, on the child’s questionnaire it was determined that it was important to have an assessment of certain parenting behaviours. The Parenting Scale that was employed was one that was proposed by Dr. M. Boyle at Chedoke-McMaster Hospital, based on work by Dr. Ken Dodge (Vanderbilt University) which was an adaptation of Strayhorn and Weidman’s Parent Practices Scale. The scale is intended to measure three different constructs or factors related to parenting; positive interaction, hostile/ineffective parenting and consistent parenting.

Scales and Calculations	For each factor measured by a scale, a score is calculated. The score for a particular factor can be used to give an ordering of individuals. For example, for the Parenting Scale, for children with higher scores for the "positive interaction" factor, the PMK reported having more positive encounters with the child (e.g., laughed with them more, praised them more etc.). The score for a particular factor is usually based on a series of items, since one single item usually cannot measure the factor or construct with adequate precision. During the development of the NLSCY, when consideration was being made of what specific scales should be used to measure a particular concept, scales were as much as possible selected that had been used in other studies where the psychometric properties of the measures produced by the scale were available with complete references.
Evaluation of Scale Data	In many instances, the wording of certain questions was modified and in some cases new questions were added. Sometimes the scale that was used had not previously been used for children in Canada, or had only been used for very small samples. Given these concerns and further concerns regarding interviewing conditions, it was felt that the factor structures of the scales used in the NLSCY could be different from the ones given in the literature. Therefore the project team felt the need to carry out an extensive evaluation of the scale data to ensure that the psychometric properties found in other studies also held true for the NLSCY experience. There were three major steps in the analyses of the scale data. First a new factor analysis was performed on all scales to determine the constructs or factors inherent in each scale. Then scale scores were calculated based on this factor structure. Finally reliability measures were produced. The general procedures followed for each of these steps are described in detail in the following pages.

Factor Analysis for Scales	The factor structure of each scale was determined based on data from the first cycle. The factor structure imposed on the scales already used in the first cycle and repeatedly utilized in the second cycle of the survey was the result of analyses of data from the first cycle. The following is a summary of the procedures used in the factor analysis for each scale.
	1/ The sample of respondents for each scale (and age group, if the scale used different questions for different groups), was randomly divided into two half-samples. This was done to find out whether different samples would yield the same results. 2/ Principal component analysis was carried out separately on each half-sample to find out how many factors should be extracted in the factor analysis performed subsequently. In principle, the same number of factors as was found in the literature was expected. In practice, however, some scales showed a different number of factors because in some cases factors combined while in others new factors emerged. 3/ Factor analysis was done on each half-sample and the factor structure and loading of each factor were compared across the half-samples. 4/ In the factor analysis, the items for each child in the appropriate age group were used, multiplied by the child's normalized weight. An individual's statistical weight is normalized by dividing his/her weight (AWTCW01) by the average weight for all individuals. Thus, the sum of the normalized weights is equal to the sample size.

	5/ Once the factor structures were analysed and the items included in each factor were determined, scores were calculated. To produce the scores, 1 was subtracted from each item so that the lowest possible score would be 0. A score of 0 indicates that the child has no problems for all factors in the behaviour scale except for the Prosocial factor, where a score of 0 indicates the absence of prosocial behaviour. Some items were imputed. The imputed values were computed by a procedure (the SAS PRINQUAL procedure) that determines which of the possible values for an item is the most plausible for an individual in view of his/her response profile, the response profiles of others in the sample, and the number of factors included in the analysis. 6/ The score for each factor on the scale was derived by totaling the values of the items that made up that factor (including imputed values). The score was set to "missing" if too many of the values of an items included in the factor were unreported. A value may be missing if the parent refused to answer or did not know the answer to the item.
Distance Between Answer Categories	Factor analysis requires that the data have the property of interval or ratio data, that is the distance between each answer category of the question should be the same. For example, in scales where the answer choices are: Never, Sometimes, Often, and Always, one must assume that the distance between Never and Sometimes is the same as that between Sometimes and Often in the respondent's perception. It was felt that this was not necessarily true in the case for the scales used in the NLSCY.
Data Transformation Using Optimal Scaling	Therefore before performing the factor analysis for each of the NLSCY scales, the data were transformed using optimal scaling. The method used was one proposed by Young and several associates (Young, 1981) which is a variant of Fisher's optimal scaling technique. The method is presented as a means of transforming data which are fundamentally nominal or ordinal in nature to interval or ratio level data so that statistical techniques which are appropriately applied only to interval and ratio data may be utilized.

Factor Analysis Using Weighted Data	Initially the factor analysis for each scale to be included in the NLSCY data was carried out using unweighted data. At that point in time the final weights had not yet been calculated. Once the weights were available, work started on repeating the factor analyses using the weighted data. (See Section 7 for a description of the weighting procedures.) With the weights, the same factor structure was not always observed. When there was a discrepancy, results emerging from the weighted analysis were used.

Calculation of Scores and Item Imputation

Calculation of Scores for Each Factor	The results of the factor analyses were used to determine what items "loaded" into each factor (i.e., were a part of each factor). The next step was to calculate a score for each factor. This was done by summing the values for each individual item that made up the factor. In some cases some rescaling of values was done before the final score was calculated. The following example illustrates how factor scores were computed.

Example of Factor Score Computation

One of the constructs that emerged in the factor analysis for the Parenting Scale on the Child's Questionnaire was the ineffective parenting factor. In the factor analysis on cycle 1 data seven items were found to load into this factor.

APRCQ04 How often do you get annoyed with your child for saying or doing something he/she is not supposed to?
APRCQ08 Of all the times you talk to your child about his/her behaviour, what proportion is praise?
APRCQ09 Of all the times you talk to your child about his/her behaviour, what proportion is disapproval?
APRCQ13 How often do you get angry when you punish your child?
APRCQ14 How often do you think the kind of punishment you give your child depends on your mood?
APRCQ15 How often do you feel you have problems managing your child in general?
APRCQ18 How often do you have to discipline your child repeatedly for the same thing?

The answer categories for these items were of two types:

1 - never
2 - about once a week or less
3 - a few times a week
4 - one or two times a day
5 - many times each day

1 – never
2 - less than half the time
3 - about half the time
4 - more than half the time
5 - all the time

Example of Factor Score Computation: Continued	In the calculation of the score for this hostile/ineffective parenting factor, the categories were rescaled to 0 to 4 (i.e., the category "never" was scored as 0, the category "about once a week or less/less than half the time" was scored as 1, ... and the category "many times each day/all the time" was scored as 4). In order to compute the score these values were summed across the seven items involved in the factor resulting in a hostile/ ineffective parenting score in the range 0 to 28. A score of 0 represents the absence of a problem and a score of 28 is the highest possible score with respect to problems. For most of the scores calculated for the NLSCY, a score of 0 represents the absence of a problem. However there are exceptions to this which are noted in the documentation for each particular scale.
Negative Loading	Note that the second item that loaded into the hostile/ineffective parenting factor, APRCQ08 (Of all the times you talk to your child about his/her behaviour, what proportion is praise?) is in the opposite direction compared to the other items. In fact the item loaded "negatively" into the factor. Therefore when computing the score the values for this item were reversed - all the time was scored as 0, more than half the time as 1, ... and never as 4. In the documentation for each scale any item that was reversed for the scoring algorithm due to a negative loading is indicated.

Non-Response Code	The score for the hostile/ineffective parenting factor is labeled as APRCS04 on the record layout for the micro data file. An "S" in the 5th position of the variable name indicates a score. When the score was being calculated for each factor there was a possibility that one or more of the items making up the score had a non-response code (don't know, refusal or not-stated). If the number of items with a non-response code was above a certain threshold, the factor score was set to not-stated. Generally this threshold value was set at 10% of the items. If less than 10% of the items had a missing value then the items with non-response codes were imputed before the score was computed. The procedure used to impute these missing items is a routine available in SAS in the procedure called PRINQUAL. This procedure indicates, among valid item values, the one that seems the most plausible for a given record. It considers the response profile of the record with the missing item, the response profile of other responding records in the sample as well as the number of factors considered in the analyses.
Imputation Flags	A flag was created for many of the items for which values have been imputed to indicate the records for which imputation has taken place. Where these exist, the flags have been included on the micro data file. The flag on the file which corresponds to an item has the same name as the item itself except that the Q (question indicator) in the variable name is replaced by I. For example some imputation was carried out for APRCQ04 (How often do you get annoyed with your child for saying or doing something he/she is not supposed to?). The imputation flag for this item is labeled APRCI04.
Raw Items	It should be noted that in addition to the scores, the raw items for each scale are included on the micro data file. This will allow researchers to consider alternate factor structures if desired. For the raw items the original values (in the 1 to 5 range for the parenting scale) have been retained before any rescaling or reversal of values took place.

Reliability Measures for Scales

Introduction	Reliability refers to the accuracy, dependability, consistency or repeatability of score results. In more technical terms, reliability refers to the degree to which the scores are free of measurement errors. There are many ways to measure reliability.
Cronbach's Alpha	One of the most commonly used reliability coefficients is Cronbach's alpha (Cronbach, 1951). Alpha is a measure of the internal consistency of the items within the factor. It is based on the average covariance of items within the factor. It is assumed that items within a factor are positively correlated with each other because they are attempting to measure, to a certain extent, a common entity or construct.
Interpretations of Cronbach's Alpha	Cronbach's a has several interpretations. It can be viewed as the correlation between this scale or factor and all other possible scales containing the same number of items, which could be constructed from a hypothetical universe of items that measure the characteristic of interest. In the hostile/ineffective parenting factor, for example, the seven questions actually used for inclusion on the scale can be viewed as a sample from the universe of many possible items. Parents could also have been asked: "How often do you raise your voice when you discipline your child?" or "How often do you threaten punishment more often than you use it?" Cronbach's a tells how much correlation can be expected between the scale which was used and all other possible seven-item scales measuring the same thing.

Another Interpretation of Cronbach's Alpha	Another interpretation of Cronbach's a is the squared correlation between the score an individual obtains on a particular factor (the observed score) and the score he/she would have obtained if questioned on all possible items in the universe (the true score). Since a can be interpreted as a correlation coefficient, it ranges from 0 to 1. It has been shown that in general, a is a lower bound to the reliability of a scale of n items (Novick and Lewis, 1967). In other words in most situations, a provides a conservative estimate of a score's reliability.
Satisfactory Level of Reliability	What is a satisfactory level of reliability? It is difficult to specify a single level that should apply in all situations. Some researchers believe that reliabilities should not be below 0.8 for widely used scales. At that level, correlations are affected very little by random measurement error. At the same time, it is often very costly in terms of time and money to obtain a higher reliability coefficient. It should be noted that for some of the factors for which scores were computed for the NLSCY, the reliabilities are below this level. The Cronbach a is given in the documentation for each score that has been calculated. Researchers can determine for themselves whether or not the score has adequate reliability for their specific purposes. Finally, it should be mentioned that for the NLSCY the Cronbach a for each factor score was computed using SAS. Typically, the a coefficients calculated using SAS are lower than those calculated using SPSS.

Parent-Reported Scales

Temperament Scale

Introduction	Temperament scales are used to measure the temperament of young children (up to and including the age of three) based on the parents' answers to questions about the degree of difficulty their child presents for them. This measure is founded on the assumption that a child's temperament is not solely dependent on biological factors, but is also influenced by the parents' perception of the difficulty of the child.
The Infant Characteristics Questionnaire	The temperament scale used in the NLSCY for children 3 to 5 months old was developed by Dr. John Bates of the University of Indiana. This well-established scale, originally known as the Infant Characteristics Questionnaire (ICQ), has been used in large-scale studies and is considered by specialists to be the best available measure for use in household surveys. The ICQ has been adapted for use in other surveys covering different age groups: 6 to 11 months, 12 to 23 months and two-year-olds. A revised version of the scale, devised by Dr. Jo-Anne Finegan at Toronto's Hospital for Sick Children, is used for three-year-olds.
Questions Measuring Aspects of Temperament : Children 3 to 5 Months	For children aged 3 to 5 months, the scale is made up of questions ATMCQ01 to ATMCQ12, ATMCQ14 to ATMCQ20, ATMCQ23 and ATMCQ33 is intended to measure the extent to which the child is fussy, unadaptable, unpredictable and dull. For children 6 to 11 months old, the foregoing list was expanded to include ATMCQ13 and ATMCQ24 to ATMCQ27. The expanded list of questions measures the same four aspects of temperament as for children 3 to 5 months old.
Aspects of Temperament Children 1 to 3 Years	For children between 1 and 3 years-old, questions ATMCQ1 to ATMCQ15 and ATMCQ17 to ATMCQ33 should theoretically measure the degree to which the child is difficult, irregular, unadaptable, affectively negative and persistent/unstoppable.

Meanings of Ratings for Specified Behaviours	The respondent, in most cases a parent, is required to answer each question in the scale by assigning a rating between 1 and 7. For all questions except ATMCQ14, a 1 means that the child has a favourable response or usually exhibits the specified behaviour, while a 7 indicates that the child reacts negatively or seldom displays the behaviour in question. If the child is in the middle, a 4 is assigned. In question ATMCQ14, the meanings of the ratings are reversed.

Education (Child)

Introduction	The objective of this section was to obtain some basic information about the child's educational experiences. The amount and type of information collected varied depending upon the age of the child, with more information being collected for the older children who have had greater school experience. Basic information was collected for all age groups, such as: the child's grade level, type of school and language of instruction, whether the child looks forward to school, behaviour problems at school, absenteeism, parental hopes for the child's educational outcomes, number of school changes and residential moves. For children in grade 1 or higher, additional questions were asked concerning other aspects such as skipping and repeating grades, achievement, special education, parents' perception of school climate and importance of good grades to parents.

The Teacher's and Principal's Questionnaires	The Teacher's and Principal's Questionnaires provide additional information about the child and his/her school achievement and behaviour. At the data collection stage, six different questions were asked to determine the child's grade. This was done due to differences in grade classification among provinces. At the processing stage, these six questions were collapsed into one variable. On the record layout, an indication is given as to what the code means for each province. For example, if the grade code (CEDCD01) is 10, this refers to secondary 1 for Québec and grade 7 for all other provinces. A similar procedure was carried out for grade skipped (CEDCD02) and grade repeated (CEDCD03).
Child's Grade	The child's grade was also collected on the Teacher's Questionnaire. There was not always consistency across the data collection units on what the correct grade was. In the edit, priority was placed on what the teacher said in the case of discrepancies. On the micro data file the variables on language of instruction (BEDCQ12A) and type of school (BEDCQ08) were set to not-stated because of confidentiality concerns.
Education Section	In the Education Section, there was one question (BEDCQ13) which asked the number of days the child had missed since the beginning of the school year. The answer to this question obviously depends on the collection date which has not been included on the micro data file because of confidentiality concerns. Therefore this variable has been suppressed and a derived variable was created (BEDCD04) to indicate the percent of days missed since the beginning of the school year.

Behaviour Scale

Objective of the Behaviour Scale	The objective of the behaviour scale is to assess aspects of the behaviour of children two years of age and older. Initially, an attempt was made to measure the following behaviours for children aged 2 and 3: ! hyperactivity, ! emotional disorder, ! anxiety, ! physical aggression, ! inattention, ! prosocial behaviour, ! separation anxiety and ! opposition.
Similar Behaviours	For children between 4 and 11 years of age, an attempt was made to measure similar behaviours; separation anxiety and opposition were omitted, and indirect aggression and some aspects of conduct disorder were added.
Factor Analysis for the Behaviour Scale	The following indicates the items that were included on the questionnaire to measure these various constructs of behaviour. As discussed in Section 9.1, a complete factor analysis was carried out for the behaviour scale to assess the psychometric properties of this scale for the NLSCY population. As part of this analysis, the items that loaded into each construct or factor were compared to the expected result described below. The results of this analysis are presented later on in this section.
Theoretical Constructs	Below are the theoretical constructs used for the factor analysis. The actual scales that emerged from the analysis vary from these constructs.

Two- and three-year-olds:

- **Conduct disorder**
  Items include BBECQ6G from the Ontario Child Health Study (OCHS).

- **Hyperactivity**
  Items include BBECQ6B, Q6I, Q6N, Q6P, Q6S and Q6W from the OCHS and ABECQ6HH from the Montreal Longitudinal Survey.

- **Emotional disorder**
  Items include BBECQ6F, Q6K, Q6Q, Q6V, Q6CC, Q6MM and Q6RR from the OCHS.

- **Anxiety**
  Items include several of the OCHS emotional disorder questions (BBECQ6F, Q6Q, Q6V and Q6CC).

- **Physical aggression**
  Items include BBECQ6X from the Montreal Longitudinal Survey and BBECQ6G from the OCHS.

- **Inattention**
  Items include BBECQ6P from the OCHS and ABECQ6EE, Q6KK and Q6QQ from the Montreal Longitudinal Survey.

- **Prosocial behavior**
  Items include BBECQ6D, Q6U, Q6BB, Q6SS and Q6UU from the Montreal Longitudinal Survey; the last four items are from a scale developed by K. Weir and G. Duveen.

- **Separation anxiety**
  Items include BBEC6DD1, 6LL1, 6PP1 and Q6TT1 from Achenbach's Child Behavior Checklist (CBCL).

- **Opposition**
  Items include BBECQ6E1, Q6J1, Q6R1 and Q6T1 also drawn from Achenbach's CBCL.

Children aged 4 to 11:

! Conduct disorder
Items include BBECQ6C, Q6E, Q6G, Q6L, Q6O (this item is coded "not applicable" for children not in school), Q6T, Q6AA, Q6DD, Q6FF, Q6JJ and Q6PP from the Ontario Child Health Study (OCHS).

! Hyperactivity
Items include BBECQ6B, Q6I, Q6N, Q6P, Q6S and Q6W from the OCHS and Q6HH from the Montreal Longitudinal Survey.

! Emotional disorder
Items include BBECQ6F, Q6K, Q6Q, Q6V, Q6CC, Q6MM and Q6RR from the OCHS.

! Anxiety
Items include BBECQ6Y and Q6II from the Montreal Longitudinal Survey along with several of the OCHS emotional disorder items (BBECQ6F, Q6Q, Q6V and Q6CC).

! Indirect aggression
Items include BBECQ6J, Q6R, Q6Z, Q6LL and Q6TT from Lagerspetz, Bjorngvist and Peltonen of Finland.

! Physical aggression
Items include BBECQ6X from the Montreal Longitudinal Survey and BBECQ6G, Q6AA and Q6NN from the OCHS.

! Inattention
Items include BBECQ6P from the OCHS and BBECQ6EE, Q6KK and Q6QQ from the Montreal Longitudinal Survey.

! Prosocial behaviour
Items include BBECQ6A, Q6H, Q6M, Q6GG and Q6OO from the OCHS and ABECQ6D, Q6U, Q6BB, Q6SS and Q6UU from the Montreal Longitudinal Survey; the last four items are from a scale devised by K. Weir and G. Duveen.

Results: Two- and three-year-olds	There were 3,909 two- and three-year-olds in the sample. The group was split into two sub-samples of 1,932 and 1,977 individuals, and the analysis for this age group was performed separately for each sub-sample. The non-response rate for most items was about 2.2%. Some individuals were excluded from the analysis that produced the factors. The exclusion criteria were as follows: individuals with eight or more items coded "missing," individuals with one or more refusals, individuals with two or more missing items under hyperactivity and emotional disorder, and individuals with one or more missing items for the other theoretical factors. After the criteria were applied, there were 1,742 and 1,773 individuals left in the sub-samples to be analysed. Data were imputed for only 12 items. The number of imputations ranged between 1 and 8 for those 12 items. A total of 34 values were imputed.
Factor Analysis	The factor analysis derived five factors for this age group: hyperactivity-inattention (ABECS01), prosocial behaviour (ABECS02), emotional disorder-anxiety (ABECS03), physical aggression-opposition (ABECS04) and separation anxiety (ABECS05). The items making up each factor are listed in the table below.

BEHAVIOUR SCALE FOR 2- AND 3-YEAR-OLDS

FACTOR	SCORE	ITEMS
Hyperactivity – inattention	ABECS01	ABECQ6B, 6I, 6N, 6P, 6S, 6HH, 6QQ
Prosocial behaviour	ABECS02	ABECQ6D, 6U, 6BB, 6SS, 6UU
Emotional disorder – anxiety	ABECS03	ABEQC6F, 6K, 6Q, 6V, 6MM, 6RR
Physical aggression – opposition	ABECS04	ABECQ6G, 6W, 6X, 6E1, 6R1, 6T1, 6Z1, 6NN
Separation anxiety	ABECS05	ABECQ6CC, 6DD1, 6PP1, 6LL1, 6TT1

Cronbach's Alpha for 2- and 3- Year Olds

Cronbach's alpha (raw value) was computed with SAS using normalized weighted data (in general, Cronbach's alphas computed by SAS are lower than those produced by SPSS). For hyperactivity-inattention (ABECS01), Cronbach's alpha was 0.798. The item that had the greatest effect on this factor was ABECQ6P, as removing it lowers Cronbach's alpha to 0.762. The table below shows the Cronbach's alpha for each factor, first including all items, then excluding the item having the greatest effect.

CRONBACH'S ALPHA FOR THE BEHAVIOUR SCALE FOR 2- AND 3-YEAR-OLDS

FACTOR	CRONBACH'S ALPHA (RAW)	ITEM THAT LOWERS CRONBACH'S ALPHA THE MOST IF IT IS EXCLUDED	CRONBACH'S ALPHA IF THE ITEM IS EXCLUDED
Hyperactivity-inattention (ABECS01)	0.798	ABECQ6P	0.761
Prosocial behaviour (ABECS02)	0.847	ABECQ6SS	0.795
Emotional disorder-anxiety (ABECS03)	0.593	ABECQ6MM	0.539
Physical aggression-opposition (ABECS04)	0.754	ABECQ6Z1	0.717
Separation anxiety (ABECS05)	0.561	ABECQ6DD1	0.431

Children aged 4 to 11:

There were 14,226 children in the 4 to 11 age group. Two sub-samples of 7,073 and 7,153 were created for analysis. The item non-response rate was approximately 2.1% for most of the 47 items involved in the analysis. Individuals were excluded from the analysis on the basis of the following criteria: individuals with eight or more items coded "missing," individuals with one or more refusals; individuals with two or more missing items under prosocial behaviour, conduct disorder, hyperactivity, anxiety and emotional disorder; and individuals with one or more missing items for the other factors. After the criteria were applied, 6,620 and 6,683 individuals remained in the sub-samples to be analysed. Data were imputed for 26 items. The number of imputations ranged between 1 and 159 for those 26 items. A total of 363 values were imputed.

Six Factors for 4- to 11-Year Olds	Six factors were identified for this age group: hyperactivity-inattention (ABECS06), prosocial behaviour (ABECS07), emotional disorder-anxiety (ABECS08), physical aggression-conduct disorder (ABECS09), indirect aggression (ABECS10) and a new factor, property offence (ABECS11). The items making up each factor are listed in the table below.

BEHAVIOUR SCALE FOR 4- TO 11-YEAR-OLDS

FACTOR	SCORE	ITEMS
Hyperactivity – inattention	ABECS06	ABECQ6B, 6I, 6N, 6P, 6S, 6W, 6HH, 6QQ
Prosocial behaviour	ABECS07	ABECQ6A, 6D, 6H, 6M, 6U, 6BB, 6GG, 6OO, 6SS, 6UU
Emotional disorder – anxiety	ABECS08	ABECQ6F, 6K, 6Q, 6V, 6CC, 6II, 6MM, 6RR
Physical aggression – conduct disorder	ABECS09	ABECQ6G, 6X, 6AA, 6FF, 6JJ, 6NN
Indirect aggression	ABECS10	ABECQ6J, 6R, 6Z, 6LL, 6TT
Property offence	ABECS11	ABECQ6C, 6E, 6L, 6T, 6DD, 6PP

Cronbach's Alpha for 4- to 11- Year Olds	Cronbach's alphas for these factors are given in the table below. Normalized weighted data were used in the computations.

CRONBACH'S ALPHA FOR THE BEHAVIOUR SCALE
FOR 4-TO 11-YEAR-OLDS

FACTOR	CRONBACH'S ALPHA (RAW)	ITEM THAT LOWERS CRONBACH'S ALPHA THE MOST IF IT IS EXCLUDED	CRONBACH'S ALPHA IF THE ITEM IS EXCLUDED
Hyperactivity-inattention (ABECS06)	0.838	ABECQ6I	0.810
Prosocial behaviour (ABECS07)	0.816	ABECQ6BB	0.789
Emotional disorder – anxiety (ABECS08)	0.794	ABECQ6II	0.756
Physical aggression – conduct disorder (ABECS09)	0.770	ABECQ6AA	0.716
Indirect aggression (ABECS10)	0.781	ABECQ6LL	0.733
Property offence (ABECS11)	0.637	ABECQ6C	0.553

The scores for these factors could not be computed in 338, 647, 324, 358, 814 and 310 cases respectively because of unreported values.

Motor and Social Development

Objective for Motor and Social Development Section	The Motor and Social Development Section of the Child's Questionnaire was completed for children in the 0 to 3 age group. The objective was to measure motor, social and cognitive development of young children. A scale was used to assess these concepts (BMSCQ01 to BMSCQ48).

Overview of the Motor and Social Development (MSD) Scale	The Motor and Social Development (MSD) Scale was developed by Dr. Gail Poe of the U.S. National Center for Health Statistics. The MSD scale consists of a set of 15 questions that measure dimensions of the motor, social and cognitive development of young children from birth through 3 years; the questions vary by age of the child. Each item asks whether or not a child is able to perform a specific task. The scale has been used in collections of the National Longitudinal Survey of Youth in the United States and in recent versions of the National Child Development Survey in England.
Standardized Scores	A score was calculated for each child by summing the number of "yes" answers to each item in the scale (BMSCS01). Although there were different sets of questions depending on the age in months of the child, differences were observed when comparing score within these age bands. For example, there was a specific set of questions for children 4 to 6 months old. It was found that children who were 6 months old had scores that were on average higher than those 4 months olds. Therefore a decision was made to produce standardized scores. Each child was assigned a standard score, such that the mean MSD score was 100 and the standard deviation was 15 for all age groupings of Cycle 2 and Cycle 3. This standardization had been done by 1 month age groups. Therefore children who are 0 months old had in Cycle 1 an average MSD score of 100, children who are 1 month old had an average MSD score of 100, ..., and children 47 months old had an average MSD score of 100. Using a standardized score (BMSCS02) makes it possible to compare scores of children across the 0 to 3 age group, not controlling for age.
Standardized Scores from Previous Cycles	In the previous cycle the name was based on the cycle 1 child. However, since the number of children is not very big we decided to create new names in cycle 3 based on the combination of the scores from cycle 1, 2 and 3. The standardized scores from cycle 1 and 2 will be recalculated based on these names.

Relationships

Objective	The Relationships Section of the Child's Questionnaire was completed for all children 4 years of age and older. The objective was to provide information about the child's relationships with others. Positive relationships with other children and adults may help to counteract other factors which place a child at risk. The section collects information about how the child gets along with parents, brothers and/or sisters, teachers, friends, and classmates, with some variation by age of the child. Parents' knowledge of the names of the friends of 8- to 13-year-olds is also investigated, along with their perception of these other children's behaviours, and whether their own child is shy or outgoing.
Questions from the Ontario Child Health Study	The questions on number of days spent doing things with friends, number of friends, and getting along with friends, parents, teachers and siblings (BRLCQ01, Q02, Q06-Q09) are based on those in the Ontario Child Health Study.

Parenting Scale

Objective	The objective of this scale is to measure certain parenting practices. Specifically, two scales were used. The first was designed to measure the positive interaction, hostility/ ineffectiveness and consistency of the parenting of the child. The second scale was designed to measure parental practices that may or may not provoke aversion. The questions from the Child's Questionnaire used to measure these aspects of parenting are identified in the following paragraphs. As mentioned in Section 9.1, complete factor analyses were done on the parenting scales to evaluate the psychometric properties of these scales for the NLSCY population. The make-up of each factor obtained during these analyses was compared to that which had been indicated in the literature. The results of these analyses are presented later in this section.

Questions

Questions for the 0-11 Age Groups	Questions BPRC-Q1 to BPRC-Q18 on positive interaction, hostility or ineffectiveness and on coherence were provided by Dr. M. Boyle of the Chedoke-McMaster Hospital, based on the work of Dr. Ken Dodge (Venderbilt University) and an adaptation of the Parent Practices Scale of Strayhorn and Weidman. (For children ages 0 to 23 months, only questions APRCQ1 to APRCQ7 were asked.)
Questions for the 2-11 Years Age Groups	Questions BPRC-Q19 to BPRC-Q25 which measure parental practices which may or may not cause aversion were provided by Dr. M. Boyle.

Analysis of NLSCY Data

Factor Structure	The factor structure of each scale was determined based on data from the first cycle. The factor structure imposed on the scales already used in the first cycle and repeatedly used in the second cycle of the survey was the result of analyses done based on data from the first cycle. To conduct the analysis on the parenting scales for the NLSCY data, a factor analysis was conducted on the scale for the 0 to 23 months age group and the two scales for the 2 to 11 age group separately. New factor structures emerged which are described in the Results Section below.

New Factor Structures	Once the factor structures were analysed and the items included in each factor were determined, scores were calculated. To produce the scores, 1 was subtracted from each item so that the lowest possible score value would be 0. For each of the four factors, a score of 0 indicates: - the absence of positive interaction for the positive interaction factor; - the absence of hostile/ineffective interaction for the hostile/ineffective factor; - the absence of consistent parenting for the consistency factor; - the absence of punitive interaction or aversion producing practices for the hostility/ineffective parenting factor.

Results (Cycle 1)

Children aged 0 to 23 months	There were 4,696 children in the sample for the age group 0 to 23 months. The group was split into two sub-samples of 2,311 and 2,385 individuals, and the analysis for this age group was performed separately for each sub-sample. The non-response rate for the seven items ranged from 1.9 to 2.5%. Some individuals were excluded from the analysis that produced the factors. The exclusion criterion was as follows: individuals with one or more missing items. After the criterion was applied, there were 2,245 and 2,307 individuals left in the sub-samples to be analysed. No imputation was done. The factor analysis derived two factors for this age group: positive interaction (APRCS01), and hostile/ineffective (APRCS02). The items making up each factor are listed in the table below.

PARENTING SCALE FOR CHILDREN AGED 0 TO 23 MONTHS

FACTOR	SCORE	ITEMS
Positive interaction	APRCS01	APRCQ1, 2, 3, 6, 7
Hostile/ineffective	APRCS02	APRC4, 5

Cronbach's Alpha for Children aged 0 to 23 Months	Cronbach's alpha (raw value) was computed with SAS using normalized weighted data. (In general, Cronbach's alphas computed by SAS are lower than those produced by SPSS.) For the positive interaction factor (APRCS01), Cronbach's alpha was 0.727. The item that had the greatest effect on this factor was APRCQ7. Removing it lowers Cronbach's alpha to 0.656. For the hostile/ineffective factor (APRCS02), Cronbach's alpha was 0.394. (It should be noted that there were only two items for this factor, and the alpha can only be derived if one of the 2 items is removed.) After identifying the two factors, the next step was to calculate scores for each.
Missing Values	Scores could be calculated for only 132 individuals for the positive interaction factor, and for only 124 individuals for the hostile/ineffective factor because of missing values for the items for these factors.
Children aged 2 to 11	There were 18,135 children in the sample for the age group 2 to 11. The group was split into two sub-samples of 9,090 and 9,045 individuals, and the analysis for this age group was performed separately for each sub-sample. The non-response rate for each of the eighteen items ranged from 2.1 to 2.7%. Some individuals were excluded from the analysis that produced the factors. The exclusion criteria were as follows: individuals with two or more items coded "missing" under positive interaction and hostility, and individuals with a single missing item under consistency. After the criteria were applied, there were 8,815 and 8,772 individuals left in the sub-samples to be analysed. Data were imputed for 12 items. The number of imputations ranged between 1 and 16. A total of 91 values were imputed. The factor analysis derived three factors for this age group: positive interaction (APRCS03), and hostility (APRCS04), and consistency (APRCS05). The items making up each factor are listed in the table below.

PARENTING SCALE FOR CHILDREN AGED 2 TO 11

FACTOR	SCORE	ITEMS
Positive interaction	APRCS03	APRC Q1, 2, 3, 6, 7
Ineffective	APRCS04	APRC Q4, 8*, 9, 13, 14, 15, 18

Consistency	APRCS05	APRC Q10, 11, 12*, 16*, 17*

* Item inverted when computing the score.

Cronbach's alphas for these factors are given in the table below. Normalized weighted data were used for the computations.

CRONBACH'S ALPHA FOR THE PARENTING SCALE FOR 2- AND 3-YEAR-OLDS

Factor	Cronbach's alpha (raw)	Item that lowers Cronbach's alpha the most if it is excluded	Cronbach's alpha if the item is excluded
Positive interaction (APRCS03)	0.808	APRCQ2	0.749
Ineffective (APRCS04)	0.706	APRCQ13	0.654
Consistency (APRCS07)	0.660	APRCQ12	0.569

The scores for these factors could not be computed in 408, 482 and 534 cases respectively because of unreported values.

Parenting scale for children aged 2 to 11	There were 18,135 children in the sample for the age group 2 to 11. The group was split into two sub-samples of 9,090 and 9,045 individuals, and the analysis for this age group was performed separately for each sub-sample. The non-response rate for the seven items analysed was about 2.5%. The exclusion criterion was as follows: individuals with one or more items coded "missing" were excluded. After this criterion was applied, there were 8,848 and 8,801 individuals left in the sub-samples to be analysed. No unreported values were imputed.

Aversion Factor Derived for Children aged 2 to 11	A factor was derived for this age group: aversion (APRCS06). The items making up this factor are APRCQ21, 22, 23 and 24. Items 21 and 23 were inverted when computing the scores. The factor weights of variables APRCQ19, 20 and 25 were insufficient to be included. Cronbach's alpha for this factor was 0.569. The item that had the greatest effect on this factor was APRCQ22. Removing it lowers Cronbach's alpha to 0.377. (Normalized weighted data were used in the computations.) The score for this factor could not be computed in 478 cases because of unreported values.

Parenting Scales: 12-15 Year Olds

Conflict Tactics Scale	The conflict tactics score was created for children aged 12-15. The following items were used in the factor analysis: CPRCBb30a, CPRCBb30b, CPRCBb30c, CPRCBb30d, CPRCBb30e, CPRCBb30f, CPRCBb30g, CPRCBb30h, CPRCBb30i, and CPRCBb30j.

Factor Structure	The factor structure of this scale was determined based on data from cycle3. To conduct the analysis on this scale for the NLSCY data, a factor analysis was conducted splitting the data into two separate files. Once the factor structure was analysed and the items included in the factor were determined, the final score were calculated. To produce the scores, 1 was subtracted from each item so that the lowest possible score value would be 0. For the factors, a high score indicates the presence
Results (Cycle 3)	There were 4,296 children in the sample for the age group 12 to 15 years. The group was split into two sub-samples of 2,140 and 2,156 individuals, and the analysis for this scale was performed separately for each sub-sample. The non-response rate for the ten items ranged from 1.9 to 2.5%. In total 310 cases who had one or more missing values and were excluded from the analysis. These cases were given a missing value for the overall score since no imputation was completed. The factor analysis revealed one strong factor -- conflict tactics--(CCRCS09). Items I and J were not included in the factor as they reduced the Alpha Cronbach score. The final score included items items A,B,C,D,E,F,G, and H . Items A and H were reversed in the calculation of the score. All values were recoded from 1-5 to 0-4. The final score ranges from 0-28 with a high score indicating a higher degree of parent-child disagreements. The Alpha Cronbach value for the score is 0.75.
Parent-Child Cohesion Scale	The parent child cohesion score was created for children aged 12-15. The following items were used in the factor analysis: CPRCBb31a, CPRCBb31b, CPRCBb31c, CPRCBb31d, CPRCBb31e, CPRCBb31f, CPRCBb31g, and CPRCBb31h.

Depression Scale (PMK)

Introduction	The depression scale was administered to the PMK as part of the Parent Questionnaire. Questions for this scale (BDPPQ12A to BDPPQ12L) are a shorter version of the depression rating scale (CES-D), comprising 20 questions, developed by L. S. Radloff of the Epidemiology Study Center of the National Institute of Mental Health in the United States. This rating scale is used to measure the frequency of symptoms in the public at large. The occurrence and severity of symptoms associated with depression during the previous week are measured. The rating scale was reduced to 12 questions by Dr. M. Boyle of the Chedoke-McMaster Hospital of McMaster University.
Symptoms of Depression	This rating scale is aimed at gathering information about the mental health of respondents, with particular emphasis on symptoms of depression. Several members of the NLSCY advisory group of experts pointed out that the best way of proceeding was to measure one particular aspect of the PMK's mental health instead of trying to measure overall mental health. It was proposed that this section focus on depression for the following reasons: depression is a prevalent condition; it has been demonstrated that depression in a parent affects the children; present research on this subject is generally based on demonstration groups and not on population samples; and it is felt that introducing policies in this area could make a difference.
Questions for the Depression Rating Scale	The depression rating scale includes twelve questions, each of which contains four response categories. In order for the lowest score value to be 0, the value for each question was reduced by 1 in calculating the score. As well, the answer categories were reversed for questions having a negative loading (BDPPQ12F, Q12H, and Q12J). The total score (BDPPS01) may therefore vary between 0 and 36, a high score indicating the presence of depression symptoms.

Unweighted Data	The factor structure of each scale was determined based on data from the first cycle. The factor structure imposed on the scales already used in the first cycle and repeatedly used in the second cycle of the survey was the result of analyses done based on data from the first cycle. In analysing this scale, unweighted data[1] were used. The sample size was 13,439 PMKs. However, once the observations containing mostly missing values were eliminated, the analysis dealt with only 13,140 PMKs. The non-response rate for the various questions in the rating scale was roughly 2.0%, whereas for the total score, a non-response rate of 2.2% was obtained. There was no imputation for the variables in this rating scale.
Single-Factor Analysis	In spite of the possibility of extracting more than one factor from the depression rating scale, a single-factor analysis was used since the interest was in developing a global depression index. Following the analysis, the 12 variables of the scale were all kept as components of this factor since all 12 loading values met the established threshold. The Cronbach alpha coefficient (calculated using SAS software) was 0.82. The variable ADPPQ12D showed the highest correlation (0.68) with the total score (once the variable was removed), whereas the variable showing the lowest correlation was ADPPQ12L with a correlation of 0.33. The Cronbach alpha coefficient calculated by omitting one variable was between 0.79 and 0.82 for the 12 variables.

[1] *Weighted data could not be used since the weights developed for the NLSCY are for children only, and not for parents.*

Family Functioning Scale (Parent)

Introduction	Questions related to family functioning, i.e., BFNHQ01A to BFNHQ01L, were developed by researchers at the Chedoke-McMaster Hospital of McMaster University and have been used widely both in Canada and abroad. This scale is used to measure various aspects of family functioning, (e.g. problem solving, communications, roles, affective involvement, affective responsiveness and behaviour control).
Global Assessment of Family Functioning	Question BFNHQ01M, drawn from the Follow-up to the Ontario Child Health Study, was added to the original scale to determine whether alcohol consumption had an effect on global family dynamics. However, it was not used in the analysis of the scale. This scale is aimed at providing a global assessment of family functioning and an indication of the quality of the relationships between parents or partners. For this reason and because of the small number of questions, no attempt was made to measure the various aspects of family functioning.
Effect of Family Relations on Children	Other surveys have shown that the relationship between family members has a considerable effect on children. The results of the Ontario Child Health Study have shown, for example, that there is an important link between family dysfunction and certain mental conditions in children.
Administering the Family Functioning Scale	The family functioning scale was administered to either the PMK or the spouse/partner as part of the Parent Questionnaire. The unit of analysis for the scale is the family. The scale includes twelve questions, each of which contains four response categories. In order for the lowest score value to be 0, the value of the categories was reduced by 1 in calculating the score. The order of the categories was reversed for questions having a negative loading (BFNHQ01A, Q01C, Q01E, Q01G, Q01I, and Q01K). The total score (BFNHS01) may therefore vary between 0 and 36, a high score indicating family dysfunction.

Results	The factor structure of each scale was determined based on data from the first cycle. The factor structure imposed on the scales already used in the first cycle and repeatedly used in the second cycle of the survey was the result of analyses done based on data from the first cycle.
Non-response Rate	In analysing this scale, unweighted data[1] were used. The sample size for the scale was 13,439 families. However, once the observations containing missing values were eliminated, the analysis dealt only with 13,190 families. The non-response rate for the different variables was between 1.3 and 1.4%, whereas for the total score, a non-response rate of 1.9% was obtained. There was no imputation for the variables in this scale.
Cronbach's Alpha for Family Functioning Scale	Following single-factor analysis, all 12 variables of the scale were kept since the loading values were well above the established threshold. The Cronbach alpha coefficient (calculated using SAS software) was 0.88. The variable AFNHQ01L showed the highest correlation (0.66) with the total score (once the variable was removed), whereas the variable showing the lowest correlation was AFNHQ01A with a correlation of 0.51. The Cronbach alpha coefficient calculated by omitting one variable was stable at about 0.87 for the 12 variables.
Distribution of Values for the Family Functioning Scale	When the values for the factor score for the family functioning scale are examined for the NLSCY children, the distribution that is observed is not a continuous one. In fact, the most common score is 12. This is a result of the fact that there are 12 items in the scale and four possible rescaled values (0 to 3). Many respondents had a rescaled score of 1 for every item in the scale and thus an overall score of 12. This means that the respondent answered "agree" to all of the items in the scale which were positive and "disagree" to all of the negative items, as opposed to the more extreme answers of "strongly agree" or "strongly disagree." Basically this artifact in the scale score is due to the fact than many respondents were consistent in their answering pattern across items.

[1] *Weighted data could not be used since the weights developed for the NLSCY are for children only, and not for families.*

Activities Scale-10/13 Years (BACCS6)	The object of the activities scale is to measure the child's participation in home responsibilities. In Cycle 2, the factor scores were derived based on the factorial structure identified in Cycle 1. Below is a description of the items that were included on the questionnaire to measure activities, the analysis used to construct the scale and the results of these analyses, all from Cycle 1.
Questionnaire Items	In Cycle 1, questions ACCSQ6A- ACCSQ6F were tested and questions ACCSQ6A- ACCSQ6E were used to construct the scale. Only Children aged 10 and 11 years answered these questions. This set of questions about responsibilities is from the Home Observation for Measurement of the Environment-Short Form questionnaire in the National Longitudinal Survey of Youth, Ohio State University.
Analysis of the NLSCY Data	To construct the Activities Scale for the NLSCY, a factor analysis was conducted to test the theoretical construct. In the factor analysis the items were multiplied by the child's normalized weight. An individual's statistical weight is normalized by dividing his/her weight (AWTCW01) by the average weight of all individuals. Consequently, the sum of the normalized weights is equal to the sample size. Once the factor structures were analysed and the items included in the factor was determined, the score was calculated. No imputation was done on the values. If any values were missing the final score was set to missing. A value may be missing if the child refused to answer or did not know the answer to the question. To produce the score, 1 was subtracted from each item so that the lowest score would be 0. The final score was derived by totaling the values of all items with non-missing values. The score ranges from 0 to 15. A score of 0 indicates the respondent does not participate in home responsibilities.

Results	In the sample there were 3,434 children aged 10 or 11 years. They were divided into two sub samples of size 1,705 and 1,729 and an analysis was done on each sample. The non-response rates for the 5 items was 1.3%. Individuals with missing values were excluded from the analysis conducted for the purpose of constructing the factor. After these exclusions. The sub-samples contained 1,680 and 1,709 individuals respectively, for analysis purposes. No imputation took place. As a result of factor analysis, one factor was identified: the activities factor (AACCS6). Items AACCQ6A-AACCQ6E loaded into the factor.
Cronbach's Alpha for Activities	Cronbach's alpha coefficients (raw values) were calculated with SAS, using the normalized weighted data. Please note that, in general, Cronbach's alphas calculated with SAS are lower than those produced by the SPSS software package. The Cronbach alpha for the activities score was 0.778. The item that affects the factor the most is AACCQ6B. If it were removed from the analysis, the Cronbach's alpha would drop to 0.705. The final activities score could not be calculated for 45 (1.3%) individuals, due to missing values for the items comprising this factor.

My Parents and Me Scale (BPRCbS07 and BPRCbS08) - Parent

Objective	The objective of the My Parents and Me scale is to measure the parent's perception of his/her relationship with his/her child. This was asked only for children 12 or 13 years of age. Below is a description of the items that were included in the My Parents and Me section of the parent report questionnaire to measure family relations, the analysis used to construct the scale and the results of these analyses.
Questionnaire Items	Questions BPRCQ29A to BPRCQ29R were taken from the Western Australia Child Health Survey. The scale was developed by Lempers et al. (1989) based on work of Schaefer (1965) and Roberts et al. (1984) and measures parental nurturance, rejection and monitoring.

Analysis of the NLSCY Data	To construct the My Parents and Me Scale for the NLSCY, a factor analysis was conducted to test the theoretical construct. In the factor analysis the items were multiplied by the child's normalized weight. An individual's statistical weight is normalized by dividing his/her weight (BWTCW01C) by the average weight of all individuals. Consequently, the sum of the normalized weights is equal to the sample size.
Imputation for Missing Values	Once the factor structures were analysed and the items included in each the factor were determined, the scores was calculated. Imputation was done for missing values. The imputed values were imputed using the SAS PRINQUAL procedure that determines which of the possible values for an item is the most plausible for an individual in view of his/her response profile, the response profiles of others in the sample, and the number of factors included in the analysis.
Missing Values	If too many values were missing the final score was set to missing. To produce the final scores, 1 was subtracted from each item so that the lowest score would be 0. The final score was derived by totaling the values of all items with non-missing values. A score of 0 indicates the following for the two factors that were found to exist in the My Parents and Me scale: -a low degree of parental nurturance for the parental nurturance score;. -a low degree of parental rejection for the parental rejection score; and
Results	In the sample there were 2,258 children aged 12 or 13 years. They were divided into two sub samples and analysis was done on each sub-sample. Individuals with missing values were excluded from the analysis conducted for the purpose of constructing the factor. After these exclusions the sub-samples contained 1,076 and 1.146 individuals respectively. As a result of the factor analyses, two factors were identified: the parental nurturance factor and the parental rejection factor. The items that comprised each factor are described in the following table.

MY PARENTS AND ME SCALE FOR CHILDREN AGED 12 AND 13 YEARS OLD (PARENT REPORT).

FACTOR	SCORE	ITEMS
Parental Nurturance	BPRCbS07	BPRCQ29A, BPRCQ29H, BPRCQ29I, BPRCQ29L, BPRCQ29N, BPRCQ29R
Parental Rejection	BPRCbS08	BPRCQ29C, BPRCQ29G, BPRCQ29J, BPRCQ29K, BPRCQ29M, BPRCQ29P, BPRCQ29Q

Cronbach's Alpha For 12 / 13 Year Olds	Cronbach's alpha coefficients (raw values) were calculated with SAS, using the normalized weighted data. Please note that, in general, Cronbach's alphas calculated with SAS are lower than those produced by the SPSS software package. Cronbach's alphas for these factors are given in the table below.

CRONBACH'S ALPHA VALUES FOR MY PARENTS AND ME SCALE: 12/13 YEAR OLDS (PARENT REPORT)

Factor	Cronbach's alpha	Items that lowered cronbach's alpha the most if excluded	Cronbach's alpha if the item is excluded
Parental Nurturance (BPRCbS07)	0.780	BPRCQ29N	0.729
Parental Rejection (BPRCbS08)	0.747	BPRCQ29M	0.710

Child Scales from Self-completed Questionnaire

Friends and Family (self-complete, 10-13)	Friends and Family was one of the sections on the questionnaire completed by children in the 10 to 13 age group. The objective was to determine how well the child felt he/she was getting along with others.
Information Collection	The section collected information on numbers of close friends, time spent with friends, presence of someone the child can confide in, and the quality of relationships with others, such as parents, peers and teachers. This information is important in identifying the extent and quality of the child's social support network. To allow for comparison, the section includes questions which are also included on the Child's Questionnaire completed by the PMK.
Peer Relations Sub-scale	There was one group of questions in this section which were part of a scale. Items BFFCQ01, BFFCQ02, BFFCQ03 and BFFCQ04 are intended to measure how well the child gets along with peers. It is part of the Peer Relations Sub-scale from the Marsh Self-Description Questionnaire, developed by H.W. Marsh.
Friends Scale (BFFCS01)	The object of the friends scale is to measure how well the child feels he/she gets along with his/her peers. In order to understand how the factorial structure was determined in Cycle 1, below is a description of the items that were included on the questionnaire in Cycle 1 to measure peer relations, the analysis used to construct the scale and the results of these analyses.
Questionnaire Items	In Cycle 1, questions AA1CQ01 to AA1CQ04 were used to construct the scale. This set of questions on getting along with peers is the Peer relations Subcale from the Marsh Self-Description Questionnaire.
Analysis of the NLSCY Data	To construct the Friends Scale for the NLSCY, a factor analysis was conducted to test the theoretical construct. In the factor analysis the items were multiplied by the child's normalized weight.

Score Calculation	Once the factor structures were analysed and the items included in the factor was determined, the score was calculated. No imputation was done on the values. If any values were missing the final score was set to missing. A value may be missing if the child refused to answer or did not know the answer to the question. To produce the score, 1 was subtracted from each item so that the lowest score would be 0. The final score was derived by totaling the values of all items with non-missing values. The score ranges from 0 to 16. A score of 0 indicates the respondent does not have a lot of friends and does not have positive relations with other children.
Results	In the sample in Cycle 1, there were 3,434 children aged 10 or 11 years. They were divided into two sub samples of size 1,705 and 1,729 and analysis was done on each sample. The non-response rates for the 4 items ranged from 10.9% to 11.5%. Individuals with missing values were excluded from the analysis conducted for the purpose of constructing the factor. After these exclusions, the sub-samples contained 1,508 and 1,529 individuals respectively, for analysis purposes. No imputation took place. As a result of factor analysis, one factor was identified: the friends factor (AA1CS01). All items - AA1CQ01 to AA1CQ04 - loaded into the factor. Cronbach's alpha coefficients (raw values) were calculated with SAS, using the normalized weighted data. Please note that, in general, Cronbach's alphas calculated with SAS are lower than those produced by the SPSS software package. The Cronbach alpha for the friends score was 0.779. The item that affects the factor the most is AA1CQ04. If it were removed from the analysis, the Cronbach's alpha would drop to 0.689. The final friends score could not be calculated for 397 (11.6%) individuals, due to missing values for the items comprising this factor.

Feelings and Behaviour (self-complete, 10-15)

Feelings and Behaviour	This section was part of the self-complete questionnaire given to children in the 10 to 15 age group. The objective of this section was to determine the child's perception of his/her general behaviour and the child's engagement in risk-taking behaviours.
Behaviour Checklist	This section replicates the behaviour checklist included on the Child's Questionnaire completed by the PMK for those aged 10-11 and the one on the Teacher's Questionnaire. It is intended to provide indicators of the following behaviours: conduct disorder, hyperactivity, inattention, physical aggression, indirect aggression, emotional disorder, anxiety and prosocial behaviours. In Cycle 2, the factor scores were derived based on the factorial structure identified in Cycle 1.
Analysis of the NLSCY Data	The following indicates the constructs or factors that the behaviour scale was intending to measure, the items that were included in the factor and the sources for the items.

	! Conduct disorder: Items include AD1CQ01C, E, G, L, O, T, AA, DD, FF, JJ, and PP from the Ontario Child Health Study (OCHS). ! Hyperactivity Items include AD1CQ01B, I, N, P, S and W from the Ontario Child Health Study and AD1CQ1HH from the Montreal Longitudinal Survey. ! Emotional disorder Items include AD1CQ01F, K, Q, V, CC, MM, and RR from the Ontario Child Health Study. ! Anxiety Items include AD1CQ01Y and AD1CQ1II from the Montreal Longitudinal Survey and several of the OCHS emotional disorder items - AD1CQ01F, Q, V and CC. ! Indirect aggression Items include AD1CQ01J, R, Z, LL and TT from Lagerspetz, Bjorngvist and Peltonen of Finland. ! Physical aggression Items include AD1CQ01X from the Montreal Longitudinal Survey and AD1CQ01G, AA and NN from the Ontario Child Health Study.
	! Inattention Items include AD1CQ01P from the Ontario Child Health Study and AD1CQ1EE, KK, QQ from the Montreal Longitudinal Survey. ! Prosocial behaviour Items include AD1CQ01A, H, M GG and OO from the Ontario Child Health Study and AD1CQ01D, U, BB, SS, and UU from the Montreal Longitudinal Survey.
Constructing the Behaviour Scale	In Cycle 1, to construct the Behaviour Scale for the NLSCY, a factor analysis was conducted to test the theoretical construct. In order to be consistent with the behaviour scale created from the parent questionnaire, the factor structure which emerged from the 4-11 behaviour scale was imposed on the 10/11 behaviour scale.

Normalized Weight	In the factor analysis the items were multiplied by the child's normalized weight. An individual's statistical weight is normalized by dividing his/her weight (AWTCW01) by the average weight of all individuals. Consequently, the sum of the normalized weights is equal to the sample size.
Score Calculation	Once the factor structures were analysed and the items included in each the factor were determined, the scores was calculated. Some items were imputed. The imputed values were imputed using the SAS PRINQUAL procedure that determines which of the possible values for an item is the most plausible for an individual in view of his/her response profile, the response profiles of others in the sample, and the number of factors included in the analysis.
Producing Final Scores	To produce the final scores, 1 was subtracted from each item so that the lowest score would be 0. The score for each factor on the scale was computed at by totaling the values of the items that made up the factor (including imputed values). The score was set to 'missing' if too many of the values of any items included in the factor were unreported. A value may be missing if the child refused to answer the item. A score of 0 indicates that the child has no problems for any of the factors in the behaviour scale with the exception of the prosocial factor, where a score of 0 indicates the absence of prosocial behaviour.
Results	In the sample there were 3,434 children aged 10 or 11 years. They were divided into two sub samples of size 1,705 and 1,729 and analysis was done on each sample. The non-response rates for the 8 items ranged from 13.6% to 16.7%. Individuals with missing values were excluded from the analysis conducted for the purpose of constructing the factor. After these exclusions, the sub-samples contained 1,352 and 1,398 individuals respectively, for analysis purposes. As a result of imposed factor analysis, five factors were identified: hyperactivity-inattention, prosocial behaviour, emotional-disorder-anxiety, physical aggression-conduct disorder, and indirect aggression. The items that comprised each factor are described in the following table.

BEHAVIOUR SCALE FOR 10 AND 11 YEARS OLD.

FACTOR	SCORE	ITEMS
Indirect aggression	AD1CS01	AD1CQ01J, AD1CQ01R, AD1CQ10Z, AD1CQ10LL, and AD1CQ01TT
Emotional disorder	AD1CS02	AD1CQ1F, AD1CQ1K, AD1CQ1Q, AD1CQ1V, AD1CQ1CC, AD1CQ1II, AD1CQ1MM, and AD1CQ1RR
Conduct disorder and physical aggression	AD1CS03	AD1CQ1G, AD1CQ1X ,AD1CQ1AA, AD1CQ1FF, AD1CQ1JJ, and AD1CQ1NN
Hyperactivity/inattention	AD1CS04	AD1CQ1B, AD1CQ1I, AD1CQ1N, AD1CQ1P, AD1CQ1S, AD1CQ1W, AD1CQ1HH and AD1CQ1QQ
Prosocial behaviour	AD1CS05	AD1CQ1A , AD1CQ1D, AD1CQ1H, AD1CQ1M, AD1CQ1U, AD1CQ1BB, AD1CQ1GG, AD1CQ1OO, AD1CQ1SS, and AD1CQ1UU

Cronbach's Alpha for Behaviour Scale	Cronbach's alpha coefficients (raw values) were calculated with SAS, using the normalized weighted data. Please note that, in general, Cronbach's alphas calculated with SAS are lower than those produced by the SPSS software package. Cronbach's alphas for these factors are given in the table below.

CRONBACH'S ALPHA VALUES FOR BEHAVIOUR SCALE: 10/11 YEAR OLDS

Factor	Cronbach's alpha	Items that lowered cronbach's alpha the most if excluded	Cronbach's alpha if the item is excluded
Indirect aggression (AD1CS01)	0.728	AD1CQ1LL	0.657
Emotional disorder (AD1CS02)	0.760	AD1CQ1II	0.717
Conduct disorder and physical aggression (AD1CS03)	0.738	AD1CQ1AA	0.678
Hyperactivity/inattention (AD1CS04)	0.751	AD1CQ1QQ	0.717
Prosocial behaviour (AD1CS05)	0.766	AD1CQ1SS	0.741

The scores for these factors could not be computed in, 566 (16.5%), 597 (17.4%), 585 (17%), 621 (18.1%) and 587 (17.1%) cases respectively because of unreported values.

My Parents and Me (self-complete 10-15)

Objective - My Parents and Me	This section was part of the self-complete questionnaire given to children in the 10 to 15 age group. The objective was to complement the Parenting Section on the Child's Questionnaire completed by the PMK by gathering information directly from the child regarding his/her perception of his/her relationship with parents. For the self-completed questionnaire, it was also considered important to obtain a measure of parental supervision (i.e., monitoring), as this has been shown to be linked to child outcomes - there is a correlation between a lack of supervision and negative outcomes, such as juvenile delinquency and other risk-taking behaviours.

Scale Used for My Parents and Me	The scale that was used was also used in the Western Australia Child Health Survey. It was developed by Lempers et al (1989) based on work of Schaefer (1965) and Roberts et al (1984) and measures parental nurturance, rejection and monitoring. This information will complement the constructs measured in the parent-completed Child's Questionnaire (positive child-parent interaction, hostile/ineffective child-parent interaction, and consistent child-parent interaction, aversive and non-aversive parent management techniques.)
My Parents and Me Scale (CPMCcS1, CPMCbS2B, CPMCcS3)	The objective of the My Parents and Me scale is to measure the child's perception of his/her relationship with his/her parents and parental supervision. Below is a description of the items that were included on the 10-15 year old questionnaires to measure family relations, the analysis used to construct the scale and the results of these analyses.
Questionnaire Items	Questions CPMCcQ1A to CPMCcQ1Q were taken from the Western Australia Child Health Survey. In addition to these questions, questions CPMCcQ1R to CPMCcQ1T were also used. The scale was developed by Lempers et al. (1989) based on work of Schaefer (1965) and Roberts et al. (1984) and measures parental nurturance, rejection and monitoring.
Analysis of the NLSCY Data	To construct the My Parents and Me Scale for the NLSCY, a factor analysis was conducted to test the theoretical construct. In the factor analysis the items were multiplied by the child's normalized weight. An individual's statistical weight is normalized by dividing his/her weight (CWTCW01C) by the average weight of all individuals. Consequently, the sum of the normalized weights is equal to the sample size.

Score Calculation	Once the factor structures were analysed and the items included in each factor were determined, the scores were calculated. Imputation was done for missing values. The imputed values were imputed using the SAS PRINQUAL procedure that determines which of the possible values for an item is the most plausible for an individual in view of his/her response profile, the response profiles of others in the sample, and the number of factors included in the analysis.
Missing Values	If too many values were missing the final score was set to missing. To produce the final scores, 1 was subtracted from each item so that the lowest score would be 0. The final score was derived by totaling the values of all items with non-missing values. A score of 0 indicates the following for the three factors that were found to exist in the My Parents and Me scale: -a low degree of parental nurturance for the parental nurturance score; -a low degree of parental rejection for the parental rejection score; -a low degree of parental monitoring for the parental monitoring score.
Results (Cycle 3)	In the sample of 10-15 year olds there were 5,539 children. The sample was divided into two sub-samples and an analysis was done on each sample. Individuals with missing values were excluded from the analysis conducted for the purpose of constructing the factor. After these exclusions, the two sub-samples contained 2509 and 2584 individuals respectively.
Three Factors Identified for 10-15 Year Olds	As a result of the factor analyses, three factors were identified for the 10-15 year olds: the parental nurturance factor, the parental rejection factor and the parental monitoring factor. The items that comprised each factor are described in the following table.

MY PARENTS AND ME SCALE FOR CHILDREN AGED 10 TO 15 YEARS OLD.

FACTOR	SCORE	ITEMS
Parental Nurturance	CPMCcS1	CPMCcQ1A, CPMCcQ1D, CPMCcQ1K, CPMCcQ1M, CPMCcQ1Q CPMCcQ1H CPMCcQ1I
Parental Rejection	CPMCbS2B	CPMCcQ1C, CPMCcQ1G, CPMCcQ1J, CPMCcQ1L, CPMCcQ1O, CPMCcQ1P, CPMCcQ1R
Parental Monitoring	CPMCcS3	CPMCcQ1B, CPMCcQ1F, CPMCcQ1N, CPMCcQ1E, CPMCcQ1T

Cronbach's Alpha for My Parents and Me	Cronbach's alpha coefficients (raw values) were calculated with SAS, using the normalized weighted data. Please note that, in general, Cronbach's alphas calculated with SAS are lower than those produced by the SPSS software package. Cronbach's alphas for these factors are given in the table below.

CRONBACH'S ALPHA VALUES FOR MY PARENTS AND ME SCALE: 10-15 YEAR OLDS

Factor	Cronbach's alpha	Items that lowered cronbach's alpha the most if excluded	Cronbach's alpha if the item is excluded
Parental Nurturance (CPMCcS1)	0.88	CPMCQ1M	0.855
Parental Rejection (CPMCbS2B)	0.73	CPMCQ1O CPMCcQ1R	0.504 0.680
Parental Monitoring (CPMCcS3)	0.57	CPMCcQ1T	0.459

About me (self-complete 10-15)

Objective - About Me Scales (BAMCS01, BAMCS02)	The objective of the About me scale is to measure the child's overall self-esteem and perception of physical appearance. Specifically, two scales were used: one was designed to measure overall self-esteem and the other was designed to measure perceptions of physical appearance.
Factor Scores	In Cycle 2, the factor scores were derived based on the factorial structure identified in Cycle 1. Below is a description of the items that were included on the questionnaire to measure these scales, the analysis used to construct the scale and the results of these analyses, all from Cycle 1.

Questionnaire Items	In Cycle 1, questions AA1CQ01A to AA1CQ01D on overall self esteem were taken from the General-Self Scale of the Marsh Self Description Questionnaire developed by H.W Marsh. Questions AA1CQ01E to AA1CQ01H on perceptions of physical appearance were taken from the Physical Appearance Scale of the Marsh Self Description Questionnaire developed by H.W Marsh
Analysis of the NLSCY Data	To construct the About me Scale for the NLSCY, a factor analysis was conducted to test the theoretical construct. In the factor analysis the items were multiplied by the child's normalized weight. An individual's statistical weight is normalized by dividing his/her weight (AWTCW01) by the average weight of all individuals. Consequently, the sum of the normalized weights is equal to the sample size.
Missing Values	Once the factor structures were analysed and the items included in each the factor were determined, the scores were calculated. No imputation was done for missing values. If any values were missing, the final score was set to missing. To produce the final scores, 1 was subtracted from each item so that the lowest score would be 0. The final score was derived by totaling the values of all items with non-missing values. A score of 0 indicates the following for the two factors that were found to exist for in the About me scales: -a lack of general self esteem for the general self scale; and -a negative perception of physical appearance for the physical appearance score.
Results	In the sample there were 3,434 children aged 10 or 11 years. They were divided into two sub-samples of sizes 1,705 and 1,729 and analysis was done on each sample. The non-response rates for the 8 items ranged from 14% to 15.8%. Individuals with missing values were excluded from the analysis conducted for the purpose of constructing the factor. After these exclusions, the sub-samples contained 1,371 and 1,413 individuals respectively, for analysis purposes. As a result of factor analysis, two factors were identified: the general self factor and the physical appearance factor. The items that comprised each factor are described in the following table.

GENERAL SELF SCALE FOR CHILDREN AGED 10 AND 11 YEARS OLD.

FACTOR	SCORE	ITEMS
General Self	AC1CS02	AC1CQ01A, AC1CQ01B AC1CQ01C AC1CQ01D
Physical Appearance	AC1CS01	AC1CQ01E, AC1CQ01F AC1CQ01G AC1CQ01H

Cronbach's Alpha for About Me Scales	Cronbach's alpha coefficients (raw values) were calculated with SAS, using the normalized weighted data. Please note that, in general, Cronbach's alphas calculated with SAS are lower than those produced by the SPSS software package. For the general self score the Cronbach alpha was 0.728. The item that affects the factor the most is AC1CQ01C. If it were removed from the analysis, the Cronbach's alpha would drop to 0.629. For the physical appearance score the Cronbach alpha was 0.874. The item that affects the factor the most is AC1CQ01E. If it were removed from the analysis, the Cronbach's alpha would drop to 0.811. Once the factors were determined, the next step was to calculate the scores for each of the two factors. For the general self factor, scores could not be calculated for 555 individuals (16.2%), due to missing values for the items comprising this factor. For the physical appearance factor, scores could not be calculated for 589 individuals (17.2%), due to missing values for the items comprising this factor.

Depression Scale (self-complete 12-15)

Depression Scale (BHTCbS1B)	In order to be consistent with the depression scale created from the parent questionnaire, the factor structure which emerged from the parental scale for PMK depression was imposed on the 12/13 depression scale.
Score Calculation	In order to produce the score, 1 was subtracted from each item so that the lowest score would be 0. The final score was derived by totaling the values of all items with non-missing values. As well, the answer categories were reversed for questions having a negative loading (BHTCb11F, 11H, and 11J). The total score (BHTCbS1B) may therefore vary between 0 and 36, a high score indicating the presence of depression symptoms.

Education (Parent)

Objective-Education (Parent)	The Education Section was completed for both the PMK and spouse/partner. The objective was to gather information on the years of school completed, educational attainment, and current attendance at an educational institution. Research (for example, the Ontario Child Health Study and the National Longitudinal Survey of Youth in the United States) has indicated a link between maternal educational attainment, the home environment and child development. The questions on full-time and part-time school attendance provide an indicator of the main activities of the PMK and the spouse/partner.
Values for CEDPD02 and CEDSD02	The variables (CEDPD02 for the PMK and CEDSD02 for the spouse/partner) have the following values. ! less than secondary ! secondary school graduation ! beyond high school ! college or university degree (including trade). The other education variable included is current school status and whether attendance is full-time or part-time.

Socio-demographic Characteristics

Objective - Socio-demographic Characteristics	The objective of the Socio-demographic Section was to gather information on immigration, ethnic background and the language profile of household members. This will allow analysis for various components of the Canadian population and will permit identification of visible minorities. As well, there were questions on religious affiliation and frequency of attendance at religious services. Religion, particularly frequency of attendance, is acknowledged as having a positive influence on a child's development.
Suppression of Variables	It was necessary to suppress many of the variables in this section on the micro data file due to confidentiality concerns. The questions on country of birth, ethnicity and religion have all been suppressed while frequency of attendance at religious services has been included.
Questions on Mother Tongue and Language of Conversation	The questions on mother tongue and language of conversation are included on the micro data file but only with aggregated answer categories: ! English only ! French only ! English and French only ! at least one "other" language indicated.
Aggregated Variables for Language	The aggregated variables for language of conversation are labeled CSDPD05B, CSDSD05B, and CSDCD05B, for the PMK, Spouse/partner and Child on the micro data file. The mother tongue variables are CSDPD06B, CSDSD06B and CSDCD06B. For the immigrant population, a derived variable was created to indicate the number of years since first immigrating to Canada. It was possible to put a grouped version of this derived variable on the micro data file (CSDPD02B, CSDSD02B, CSDCD02B).

Remote Access	Since there are many variables in this section which have been suppressed for the micro data file, researchers who are particularly interested in conducting analyses on socio-demographic variables are encouraged to consider making use of the remote access service described in Section 13.3.

Labour Force (Parent)

Employment Stability	Employment stability impacts the home environment, both in terms of income and stress levels. Research, conducted for the Ontario Child Health Study, indicates that parental unemployment can adversely impact child mental health.
Objective - Labour Force	The Labour Force Section was completed for both the PMK and the spouse/partner. The main objective of the section was to determine employment stability as an indicator of the continuity of employment income. Questions included, periods of absence from work, reason for the most recent absence, hours worked, and work arrangements (e.g. shifts) during the previous year. Information was collected on the main job and on all jobs for a one-year period.
Respondents and Employment	Respondents were asked to identify what they considered to be their main job over the previous year (if they had more than one job). A complete description was recorded for this main job and industry and occupation coding was carried out (using 1980 Standard Industrial Classification codes and 1980 Standard Occupational Classification codes).
Wages and Salaries	Data on wages and salaries for this main job were collected. Wage rate data provides an additional source of information on income. This data will be useful in analysing choices which parents, particularly mothers, face in deciding to stay at home or to return to the labour force.

Work Duration Derived Variables

Work Duration Derived Variables	With the data collected in the Labour Force Section it was possible to create a series of derived variables to describe the stability of work for the PMK and spouse/partner over the previous year.
Jobs Held During the Previous Year	As mentioned above, a series of questions were asked about all jobs the PMK and spouse/partner held during the previous year. As well, in order to address absences within a job the following question was asked as the initial lead-in question to a job: Did you have that job one year ago, without a break in employment since then? There is, moreover, a derived variable (CL FPD33) for indicating the number of weeks worked by the PMK in a job or company the previous year.
Response Burden	In the first cycle of the survey, an employment vector of 53 weeks was established based on information about each job held, to a maximum of six jobs. To reduce the respondent's response burden, this collection method was abandoned in favour of a more general section. A good many variables derived from Cycle 1 were reproduced, but it should be noted that while considerable effort was made to keep the same definitions, the collection tool was changed substantially.
Current Collection Tool	With the current collection tool, it is still possible to gather labour force data for the previous year, but in a more general way. A series of questions was used to determine the number of weeks worked in the 12 previous months, the number of weeks the individual was absent from work, the number of weeks the individual was without work but seeking employment, and so on. Moreover, the tool focuses on the current main job or, if applicable, the most recent job. A detailed description of this job was obtained (employer, type of company, nature of the work, main duties, status, hours worked, salary).

Other Derived Variables	This release includes other derived variables which describe the employment picture over the reference year, such as number of weeks worked part-time, number of weeks worked full time, etc.

Demographic Variables

Demographic Variables	The demographic variables discussed in this section refer to variables collected on the household roster. As part of the household roster, some basic demographic information (e.g., age, gender, marital status) was collected for all members of the child's household. The relationship grid was also completed as part of this questionnaire i.e., the relationship of everyone in the household to everyone else. Using this information it was possible to create an extensive set of variables to describe the child's family situation. Most of these derived variables are critical to the analyses of NLSCY data and are described in Section 8 (NLSCY Concepts and Definitions).
Edits on the Relationship Grid Data	If was necessary to perform an extensive series of edits on the data that were collected as part of the relationship grid. There were some edits that were carried out as part of the CAI system during collection. However in the data that were received at Head Office there were still inconsistencies.
Examples of Editing	The following are some examples of the types of editing that was carried out: **!** in all relationships reported, a person could not have more than two parents; and **!** the difference in age between a husband and wife had to be less than 29 years. In total there were over 30 relationship edits performed. Some of the edits were what is known as "soft" edits and some were "hard." The first example was a hard edit and the second a soft edit. For all edit failures, the records for the entire household were reviewed manually for obvious mistakes. A correction had to be made for the hard edit failures. For the soft edit failures a correction was made if it was deemed appropriate to do so.

Sources of Error	The major source of error for relationship data had to do with step children. There were several cases where a female parent was living with a biological child and a spouse or common-law partner. The relationship of the male partner to the child was coded as "unrelated." For questionnaires completed in French this relationship was often coded as "in-law." In the edit, the relationship code was changed to step child for these cases. As a result of the relationship edits the number of children in step families increased by close to 40%.

Medical/Biological

Medical / Biological	The Medical /Biological Section was completed for children in the 0 to 3 age group. The major objective was to collect information on factors such as gestational age and birth weight. These factors have been shown to have a direct impact on a child's growth and development. For example, in the long term, underweight babies face higher risks of poor health as well as longer-lasting developmental difficulties.
Children Under 2	For each child under two, the nature of the delivery, general health of the child at birth and the use of specialized services following the birth were collected in this section. The NLSCY also investigated the biological mother's pregnancy and delivery history, topics such as the mother's breast-feeding experiences and prenatal lifestyle.
Birth Weight	Since birth weight is such an important variable, caution was taken in editing this variable. The records for children with very low birth weights (< 1.5 kilograms) were examined to verify that the response was legitimate. Other variables considered in the edit were the length of the baby at birth, the number of days early of the delivery, the conditions of the delivery (e.g., multiple birth and special medical care) and the health of the child at birth. If there was nothing to corroborate the low birth weight it was set to "not-stated."

Gestational Age of the Child	There were a couple of derived variables created for this section that bear note. Two variables were derived to indicate the gestational age of the child. CMDCD06 gives the gestational age in days and CMDCD07 indicates if the child was born prematurely (gestational age 258 days or less), in the normal range (gestational age 259 to 293 days) or late (gestational age 294 days or later). A variable was derived (CMDCD08) to indicate if the child was of normal birth weight (2500 grams), moderately low birth weight (1500 to 2499 grams) or very low birth weight (< 1500 grams).

Types of Errors	The estimates derived from this survey are based on a sample of children. Somewhat different values might have been obtained if a complete census had been taken using the same questionnaires, 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 estimates.
Non-Sampling Errors	Interviewers might misunderstand the instructions, respondents might make errors while answering the questions, the answers might be incorrectly entered on the questionnaire, and errors might be introduced while processing and tabulating the data. These are all examples of non-sampling errors.
Defining the Term Respondent	In certain circumstances, it is not possible to gather all the data about a child. The definition of the term respondent used in Cycle 1 was again used for Cycle 2. According to this definition, a child is a respondent if there is enough information about at least one child in his household.

Cross-sectional and longitudinal response rates

Cross-Sectional Response Rate	The cross-sectional response rate (or collection rate), at the household level, is shown in the following table. This rate does not provide an indicator of the quality of cross-sectional estimates, as such an indicator would account for the non-response rate in previous cycles. Instead, the rates shown below reflect the efficiency of the data-collection process in Cycle 3.

NLSCY - Cross-Sectional Response Rate by Province

Province	Households Contacted	Respondent Households	Response Rate
Newfoundland	1,781	1,612	91%
Prince Edward Island	1,030	948	92%
Nova Scotia	2,235	2,018	90%
New Brunswick	2,181	1,954	90%
Quebec	6,963	6,294	90%
Ontario	10,501	8,651	82%
Manitoba	2,528	2,250	89%
Saskatchewan	2,619	2,306	88%
Alberta	3,583	3,117	87%
British Columbia	3,315	2,813	85%
TOTAL	36,736	31,963	87%

The cross-sectional sample included longitudinal households sampled in Cycles 1 and 2, as well as households contacted for the first time in Cycle 3 (newborn children selected from the LFS and the birth register). Since a good number of households were contacted for the first time in Cycle 3, the overall response rate for Cycle 3 is lower than that for Cycle 2.

Cross-Sectional Response Rate by Sample Source	The table below gives the response rate for households contacted for the first time in Cycle 3 as well as for respondent households contacted in at least one previous cycle.

NLSCY - Cross-Sectional Response Rate by Sample Source

	Households Contacted	Respondent Households	Response Rate
Longitudinal Households Selected in Cycle 1	16,563	14,777	90%
Longitudinal Households Selected in Cycle 2	3,947	3,640	92%
Newborn Children Selected from the LFS	1,999	1,736	86%
1-Year-Old Children Selected from Birth Register	7,542	6,390	85%
5-Year-Old Children Selected from Birth Register	6,685	5,420	81%
Total	36,736	31,963	87%

As well, the reason for household non-response will be different depending on whether the household is longitudinal. In fact, longitudinal households are usually more apt to take part in the survey (having already done so in the past). However, some households may have moved between the second and third collection cycles. As a result, it is sometimes necessary to track down the longitudinal children before proceeding with collection. This operation is not always successful. Longitudinal children who move may thus lead to some erosion of our longitudinal sample.

New Households Added to Cycle 2 Non-Respondents by Reason for Not Responding	The following tables show the distribution of non-responding, longitudinal and new households, by reason for not responding.

NLSCY – New Households Added to Cycle 2
Non-Respondents by Reason for Not Responding

	Non-Responding Households	%
Refusal	1,051	45%
No one at home	129	5%
Language barrier	34	1%
Special circumstances (sickness, weather conditions, etc.)	190	7%
Partial response (rejected for lack of information)	149	6%
Not tracked down	861	32%
Other/reason unknown	266	42%
Total	2,680	100%

NLSCY – Longitudinal Households Not Responding to Cycle 2, by Reason for Not Responding

	Non-Responding Households	%
Refusal	1,393	66%
Not tracked down	244	12%
No one at home	35	2%
Language barrier	3	0.1%
Special circumstances (sickness, weather conditions, etc.)	100	5%
Partial response (rejected for lack of information)	234	11%
Other or reason unknown	84	4%
Total	2,093	100%

Longitudinal Response Rate

Given the survey method applied to the first two collection cycles, it was unfortunately impossible to obtain an exact longitudinal response rate taking into consideration all the components of erosion. Ideally, this rate would be the simple ratio of the number of longitudinal children responding to the second cycle to the number of children contacted for the first cycle. However, the number of children present in non-responding households during the first cycle is unknown. The number of children present in households not responding to the LFS is also unknown. It is therefore impossible to compute an exact rate since the exact denominator of this rate is unknown.

In keeping with the custom for longitudinal surveys, we decided to publish the response rate among respondents for Cycle 1. In the table below, which gives these rates by province, the percentage reported is the ratio between the number of respondents for the cycle in question and the number of respondents in Cycle 1.

NLSCY - Longitudinal Response Rate by Province – Children Selected in Cycle 1

Province	No. of Respondents in Cycle 1	No. of Respondents in Cycle 2	No. of Respondents in Cycle 3
Newfoundland	950	892 (94%)	846 (90%)
Prince Edward Island	467	443 (95%)	434 (92%)
Nova Scotia	1,191	1,068 (90%)	1,085 (91%)
New Brunswick	1,070	958 (90%)	958 (90%)
Quebec	3,182	2,994 (93)%	2,845 (90%)
Ontario	4,342	3,899 (90%)	3,762 (87%)
Manitoba	1,232	1,162 (94%)	1,114 (90%)
Saskatchewan	1,413	1,305 (92%)	1,257 (89%)
Alberta	1,599	1,465 (92%)	1,420 (89%)
British Columbia	1,457	1,333 (92%)	1,284 (88%)
Canada	16,903	15,468 (92%)	15,005 (89%)

Non-Response Bias	Non-response is a type of error that can result in bias in survey estimates. Biased estimates can occur when the characteristics of non-respondents differ significantly from those of survey respondents. Bias resulting from non-response during the first contact was dealt with in the manual for the first cycle. As few households were added for the second cycle, and since similar results would be obtained, this study is not taken up for the second cycle. A considerable amount of information is available to evaluate this potential bias. As a result, we attempted to model the "non-response to Cycle 2" event using variables obtained during the first collection cycle. In this context, the non-response event may have two causes: (a) the decision made by the respondent not to cooperate; (b) our inability to contact the respondent. This second cause may be the result of a move or of a temporary absence when attempts at contact were made. The model must therefore include two distinct phenomena: mobility and cooperation.
Regional Models	Separate models have been developed for each region in the country in order to take into consideration the characteristics of each one. Note that the decision to cooperate or not in a survey is made by an adult. As a result, the explanatory variables for these models are in fact characteristics of adults. Without entering into the details of each regional model, here are some of the conclusions that were drawn: · - People with a lower income show lower response rates than people with a higher income. · - People with a lower level of education show lower response rates than people with a higher level of education. - People living in a large city show lower response rates than people living in smaller cities. - The presence of a spouse in the household is associated with better response rates.

Weighting Process	In order to minimize the risk associated with this potential bias, the models were used for the weighting process (see Section 7). This technique helps correct sampling weights in order to account for the potential bias resulting from non-response. However, it does not guarantee that there is no bias induced by non-response. There remains a latent risk, and we must remain watchful. That is why there is considerable effort to minimize and study non-response, during both collection and processing.
Other Sources of Bias	All children covered by the NLSCY have been selected among households having already taken part in the Labour Force Survey. This method of selection leads to three problems which might produce bias in our estimates.
First Problem	The first problem stems from the fact that only respondents to the LFS have been considered for the NLSCY sample. It could be that some of the LFS non-respondents had children in the appropriate age group. These households were not included in the NLSCY sample, which could be a source of bias.
Second Problem	The second problem is due to the fact that only households having children when the LFS was conducted were included in the NLSCY sample. It could be that some households were not included in the sample because the dwelling was vacant or their members were out-of-scope for the NLSCY at the time of the LFS. Some of these households may have had children (0 to 13) living in them a few months later when the NLSCY interview took place. Since these households were not eligible to be selected, some bias may have been introduced.

Third Problem	The third and last problem complements the second. In some cases, the sampled address, where a child was living at the time of selection, was no longer occupied by a family having in-scope children at the time of collection. In a way, this is a frame undercoverage issue linked to the time lag between the LFS interview and the NLSCY interview. This situation might occur when the selected occupants have moved before collection takes place. As a result, it is possible that the NLSCY sample undercovers the population of highly mobile children.

Component Non-Response

Component Non-Response	As discussed in Section 5, there were several respondents or components to the NLSCY interview. The PMK provided detailed information about each selected child. In the Parent Questionnaire and the general questionnaire, the PMK provided information about himself or herself and his or her spouse/partner. The PPVT-R test was administered to children in the 4 to 5 age group. Children in the 10 to 15 age group completed a questionnaire on their own. For school-aged children the teacher completed a questionnaire about the child, and if the child was in grade 2 or above, a Math Test was administered. There was a potential for non-response for each of these components.
Responding Household	It should be noted, however, that when a household was deemed to be a responding household, then all required components were created for that household, even if there were no data provided for a particular component. For example, if there was a 10 year-old in a responding household who did not complete the 10 to 11 Questionnaire, then this component still exists for the child, with all variables set to not-stated. Likewise if a parent completed a Child Questionnaire for one child in the household but refused to do so for a second child, then there is a record for this second child (with not-stated values for all variables).

Parent Questionnaire Response Rates

Response Rates	The PMK and his or her spouse/partner answered this questionnaire. Again, we determined the valid response rate obtained in order to assess the completeness of the data. Out of the 24,692 PMKs and their spouse/partners: ! there were answers to all relevant questions in 74% of the cases; ! a valid answer was obtained for more than 90% of questions submitted to 95% of the adults; ! less than 50% valid answers were gathered for 1.5% of the adults.

Child Questionnaire Response Rates

Response Rates	In order to assess completeness of the child data, we determined the rate of answered questions among those that were relevant to the child. In the sample of respondents consisting of 20,102 children: - there were answers to all relevant questions in 63% of the cases; - a valid answer was obtained for more than 90% of questions submitted to 98% of the children; - less than 50% valid answers were gathered for less than 1% of the children.

NLSCY School component

School component	The School component of the NLSCY collects information every two years on a nationally representative group of children, within their school environment. This information is used jointly with the information collected earlier about the same children in the Household component of the survey. By collecting both the child's household information and school performance, the NLSCY can obtain a more complete picture of the child's development. Every child surveyed in the NLSCY, from grades two to ten, are given mathematics and reading tests. In order for a test to be administered, the consent from parents and the school board are required. These tests were constructed by selecting a subset of questions from the Canadian Test Centre's Canadian Achievement Tests, second edition (CAT/2). The mathematics test is a shorten version of the CAT/2 mathematical operations test. This test measures the student's ability to do addition, subtraction, multiplication and division operations on whole numbers, decimals, fractions, negatives and exponents. Problem solving involving percentages and the order of operations are also measured.

School component	The reading comprehension test is developed in part from the CAT/2. Since the CAT/2 contains only English passages, French passages were developed in co-operation with educators at Université de Sherbrooke. The test is designed to measure basic reading skills. The test's objectives cover information recall, analysis of passages, identifying the main idea, interpretation of various types of writing and critical evaluation. Each test consists of two original English passages and two original French passages in order to make the test as linguistically equivalent as possible.

Response Rates for Math and Reading tests

Response Rates	Among the 9,542 children eligible for the math and reading tests for Cycle 3: < 86% of parents (representing 8,206 children) consented to having the school board contacted to administer the math and reading tests. < The school boards of 97% of the 8,206 children consented to administer the tests. That meant that from the total number of 9,542, consent was obtained for 7,920 or 83% of all eligible children. < 65% of the tests that were administered were returned. < Due to an operational error, approximately 2% of the tests were not sent to the schools. To summarize, out of the total of 9,542 eligible children we received 5,153 or 54% completed math and reading tests for Cycle 3. This rate is much lower than the 74% total that was obtained from Cycle 2.

Testing strategy	In cycle 3, the evolution of the NLSCY testing strategy continued: 2) The reading comprehension test introduced in Cycle 2 of the survey, has seen few modifications, while the mathematics test has evolved considerably from its inception in Cycle 1. These tests are administered in the school to children from grades 2 to 10. During the household interview, the parents' consent is requested before the tests can be administered to the child at school. 3) Since Cycle 2, a skills indicator of mathematics and reading abilities is administered at the home to pre-assess their abilities. The indicator consists of 10 to 13 questions with multiple choice answers: the questions were taken from the second edition of the Canadian Achievement tests (CAT/2). The CAT/2 is a series of tests to measure basic skills in a variety of subjects taught in schools. 4) In Cycle 3 of the NLSCY, a separate version of the mathematics and reading comprehension tests was administered for each academic grade level, except for grades 9 and 10 which got the same level tests, for a total of eight in all. Thus, students in Grade 2 completed the level 2 test, students in Grade 3, the level 3 test, and so on to level 9 for students in Grades 9 and 10. In some instances, students were given a higher level test. Fifty per cent of the children who scored a perfect score on the home administered skills indicator test were given a higher level school test than their actual level. This approach was used to offset the potentially serious problem of "ceiling effect" encountered during Cycle 1 with the mathematics test, especially in Grades 3 and 5. The mathematics and reading comprehension tests were administered from the same booklet by the child's teacher, in class, using a multiple-choice questionnaire.

Mathematics test	This test was a shortened version of the CAT/2 mathematical operations test. The CAT/2 mathematical operations test measures the student's ability to do addition, subtraction, multiplication and division operations on whole numbers, decimals, fractions, negatives and exponents. Problem solving involving percentages and the order of operations are also measured. The short version of the test developed for the purposes of the NLSCY now consists of 20 questions at each level, except for level 9-10, which consists of 15 questions. The tests were expanded in Cycle 3 to include overlapping items between each level. An extra five items were added to each level selected from the test of the next level. Each child who took the mathematics test was given a raw (gross) score, a scaled score referred to as the classical scaled score and an IRT scaled score. The raw (gross) score is obtained simply by adding the number of correct answers. The Classically derived scale score and the IRT scaled score are described as follows.

The IRT derived scaled score	The approach of the item response theory (IRT) was used successfully in Cycle 2 to derive scores for the reading comprehension tests. Unlike the approach of the classical theory, the IRT makes it possible to scale the scores without preset population standards. Using common test items linking grades, standards are estimated from the entire population of children taking the test for this cycle. Scores are derived ranking each child within a level then the scores are scaled to reflect the progression of scores throughout all the levels. In order to ensure comparability from year to year, each sample from each cycle must represent equivalent populations. Among the single dimension models, the two-parameter and the three-parameter logistical model were chosen for math and the reading tests respectively. The two-parameter model takes into consideration both the difficulty and the discrimination of the item while the three parameter model also considers the pseudo-guessing component. In this way, the IRT takes into consideration the pattern of responses. Two children with the same raw (gross) score will not have the same scaled score unless they answered exactly the same way. For example, a child who only answered the 5 easiest questions correctly would have a lower scaled score than the one who only answered the 5 hardest questions correctly. The scaled scores of the Cycle 3 mathematics test ranged from 100 to 600.

The classically derived scaled score	The scaled score is derived from standards (norms) established by the Canadian Test Centre (CTC). The CTC developed these standards from a sample of Canadian children from all 10 provinces (however, the test has been developed in English only and so in Quebec, the sample represents only the English schools), which is referred to as the normative sample. The children from the normative sample received the complete test. The scaled scores are units of a single scale with equidistant intervals that covers all of the grade levels. The scale was developed using a Thurstone procedure derived from the classical testing theory. The fact that a short test was used for children in the NLSCY sample meant that it was not possible to directly associate the CTC scaled scores with the gross scores obtained in the survey. For this reason, the CTC normative sample was used to calculate the percentile rank for each gross score but using only the 15 of the 20 questions of the short NLSCY test. Only 15 of the 20 items were normalized for the appropriate grade level while the remaining 5 items were taken from the test of the next grade level. The normative score was then interpolated by inserting the percentile rank obtained with the 15 questions of the short test between the percentiles of the complete test. For example, using level 6, we find in the short test a percentile rank of 2.2% for a raw (gross) score of 1. On the complete test, the percentile ranks of 2.0% and 3.7% correspond to raw (gross) scores of 5 and 6 and to scaled scores of 332 and 348 respectively. After linear interpolation, we obtain a scaled score of 334 for the gross score of 1 on the short version of the test. The table below shows the relation between the raw (gross) scores and the scaled scores by grade for the NLSC mathematics test. The scaled scores for this test range from 200 to 999 for Cycle 3

Relation between raw (gross) scores and scaled scores by grade for the Cycle 3 mathematics test

Gross scores	Scaled scores							
	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grades 9-10
0	204	238	264	293	314	330	362	406
1	215	264	281	321	334	349	384	427
2	232	281	312	349	364	389	417	464
3	249	300	336	372	388	427	448	504
4	259	315	357	390	408	457	477	533
5	268	326	376	407	428	484	499	558
6	277	338	392	421	446	506	519	582
7	286	348	405	434	460	526	537	603
8	294	358	417	445	476	546	561	627
9	302	368	428	458	490	563	583	652
10	310	379	439	471	505	580	603	677
11	320	391	451	484	520	602	625	701
12	331	405	466	498	537	620	649	727
13	345	420	487	516	562	644	673	754
14	368	442	515	539	585	665	712	789
15	402	479	550	569	624	701	794	871

	With the expansion of the tests in Cycles 2 and 3, the ceiling effect measured in Cycle 1 has been greatly reduced. Although the skill indicator was still used to elevate children to the next level test, the process is problematic and prone to human error. During the implementation of the tests in Cycle 3, children who received a perfect score on the skills indicator were divided into two equal size groups; one group to receive their regular level tests, the other to receive next level tests. Unfortunately, half of the children targeted through this process, namely those who were to receive their regular level tests, were not sent tests. Although these missing tests would not affect the classically derived scaled scores, they had to be adjusted for during the IRT calculation of scaled scores.

Reading comprehension test	The reading comprehension test, like the mathematics test, was also developed in part from the CAT/2. However, since the CAT/2 contain only English passages, French passages had to be chosen from another source by educators at Université de Sherbrooke. The test is designed to measure basic reading skills. The test's objectives cover information recall, analysis of passages, identification of the main idea, interpretation of various types of writing and critical evaluation. For each grade level, the test developed for the NLSCY consists of four reading passages totalling 20 questions. Each test consists of two original English passages and two original French passages in order to make the test as fair as possible. In addition, between two consecutive grades, there are always two common passages with more or less 10 questions. Similarly to the mathematics test, each child who took the reading test was also given a raw (gross) score and a scaled score. Since the CTC did not have standards for this test, the approach of the item response theory (IRT) described for the mathematics tests was the only option for this test. Unlike the approach of the mathematics test, the three-parameter logistical model was chosen for the reading test. This model takes into consideration the difficulty and the discrimination of the item and a pseudo-guessing parameter that seems more prevalent for this test. A number of corrections were made to the English and French passages in Cycle 3 in order to improve the translation. Other items which had a negative biserial correlation with the ability being measured were also changed to improve their fit into the logistic model. The Bilog-MG software was used to calculate the scaled scores for both the reading and mathematics test.

Response Rates for Teachers and principals questionnaire

Response Rates	The response rates for the Teacher's Questionnaire and the Principal's Questionnaire were computed by province, type of school and the child's age. In Cycle 3, the parents of 16,558 children reported that their children were attending school. The children ranged in age from 4 to 15 and in level from Kindergarten to Grade 10. The parents of 94% of the 16,558 children gave us written permission to collect data from their children's teacher and principal. The school boards of 97% of the children whose parents had given permission (that is, 91% of all children attending school) agreed to take part in the survey. After obtaining parental and school board consent, we sent a questionnaire to each child's teacher. The response rate for the latter questionnaire was 67%. Taking into account the questionnaires that were never mailed to teachers because we were unable to obtain parental or school board permission, we collected questionnaires from the teachers of 61% of all children attending school.

Response Rates by province (Teacher's Questionnaire)

Province	Children Going to School	Consent of Parent		Consent of School Board			Questionnaires Returned		
		Freq.	Cum %	Freq.	Cond %	Cum %	Freq.	Cond %	Cum %
Newfoundland	824	803	97.5	803	100.0	97.5	519	64.6	63.0
Prince Edward Island	335	315	94.0	314	99.7	93.7	226	72.0	67.5
Nova Scotia	992	965	97.3	962	99.7	97.0	726	75.5	73.2
New Brunswick	1001	953	95.2	951	99.8	95.0	708	74.4	70.7
Québec	3256	2978	91.5	2882	96.8	88.5	1700	59.0	52.2
Ontario	4778	4536	94.9	4494	99.1	94.1	2842	63.2	59.5
Manitoba	1066	994	93.2	930	93.6	87.2	684	73.5	64.2
Saskatchewan	1155	1070	92.6	1015	94.9	87.9	778	76.7	67.4
Alberta	1621	1546	95.4	1507	97.5	93.0	1049	69.6	64.7
British Columbia	1526	1417	92.9	1261	89.0	82.6	854	67.7	56.0
Total	16554*	15577	94.1	15119	97.1	91.3	10086	66.7	60.9

* The province of residence is missing for 4 children.

Response Rates by province	The response rate for the Teacher's Questionnaire appeared to be lower in Quebec, British Columbia and Ontario. For Quebec and Ontario, this may be due to a lower rate of return by teachers. In British Columbia's case, while the questionnaire return rate was average, the low response rate may have been caused by a lower school board consent rate.

Response Rates by school type (Teacher's Questionnaire)

Type of School	Children Going to School	Consent of Parent		Consent of School Board			Questionnaires Returned		
		Freq.	Cum %	Freq.	Cond %	Cum %	Freq.	Cond %	Cum %
Public	12825	12098	94.3	11774	97.3	91.8	7925	67.3	61.8
Catholic	2337	2226	95.3	2201	98.9	94.2	1401	63.7	59.9
Private	660	591	89.5	517	87.5	78.3	357	69.1	54.1
Other/Missing	736	666	90.5	630	94.6	85.6	406	64.4	55.2
Total	16558	15581	94.1	15122	97.1	91.3	10089	66.7	60.9

Response Rates by school type	The response rate for the Teacher's Questionnaire appeared to be nearly equal for public school students and Catholic school students, but it appeared to be lower for children attending private schools. This could be due to the lower percentage of consent given by private school boards.

Response Rates by age (Teacher's Questionnaire)

Age	Children Going to School	Consent of Parent		Consent of School Board			Questionnaires Returned		
		Freq.	Cum %	Freq.	Cond %	Cum %	Freq.	Cond %	Cum %
4	617*	576	93.4	515	89.4	83.5	314	61.0	50.9
5	5520	5244	95.0	5046	96.2	91.4	3235	64.1	58.6
6	1219	1175	96.4	1153	98.1	94.6	785	68.1	64.4
7	1161	1120	96.5	1090	97.3	93.9	726	66.6	62.5
8	1147	1094	95.4	1070	97.8	93.3	716	66.9	62.4
9	1063	1024	96.3	1005	98.1	94.5	671	66.8	63.1
10	981	911	92.9	893	98.0	91.0	606	67.9	61.8
11	965	898	93.1	880	98.0	91.2	607	69.0	62.9
12	1035	963	93.0	944	98.0	91.2	668	70.8	64.5
13	985	894	90.8	875	97.9	88.8	612	69.9	62.1
14	1017	923	90.8	905	98.0	89.0	635	70.2	62.4
15	848*	759	89.5	746	98.3	88.0	514	68.9	60.6
Total	16558	15581	94.1	15122	97.1	91.3	10089	66.7	60.9

* There were 21 children that are 3 years old and 4 children that are 16 years old. The 3 year olds were regrouped with the 4 year olds and the 16 year olds were regrouped with the 15 year olds.

Response Rates by age	The response rate for the Teacher's Questionnaire appeared to be lower for four-year-olds. The percentage of questionnaires returned and the school board consent rate were also lower for four-year-old students.

Principal's questionnaire

Principal's questionnaire	As in the case of the Teacher's Questionnaire, when we had the permission of the parents and the school boards, we mailed a questionnaire to the school principal. In cases where more than one child was attending the same school, the principal received only one questionnaire. The response rate for the Principal's Questionnaire was 68%. This means that we collected Principal's Questionnaires for 69% of the children whose parents and school boards gave permission (or 63% of all children attending school).

Response Rates by province (Principal's Questionnaire)

Province	Principal of the Schools That Have Received a Questionnaire	Questionnaires Returned	
		Frequency	%
Newfoundland	225	153	68.0
Prince Edward Island	63	52	82.5
Nova Scotia	332	250	75.3
New Brunswick	279	216	77.4
Québec	1355	782	57.7
Ontario	2245	1499	66.8
Manitoba	370	277	74.9
Saskatchewan	389	296	76.1
Alberta	727	515	70.8
British Columbia	659	455	69.0
Total	6644*	4495	67.7

* The province of the school is missing for 3 principals.

Province	Children Going to School	Consent of Parent		Consent of School Board			Children whose Principal have returned their questionnaire		
		Freq.	Cum %	Freq.	Cond %	Cum %	Freq.	Cond %	Cum %
Newfoundland	824	803	97.5	803	100.0	97.5	520	64.8	63.1
Prince Edward Island	335	315	94.0	314	99.7	93.7	253	80.6	75.5
Nova Scotia	992	965	97.3	962	99.7	97.0	749	77.9	75.5
New Brunswick	1001	953	95.2	951	99.8	95.0	745	78.3	74.4
Québec	3256	2978	91.5	2882	96.8	88.5	1698	58.9	52.1
Ontario	4778	4536	94.9	4494	99.1	94.1	2991	66.6	62.6
Manitoba	1066	994	93.2	930	93.6	87.2	720	77.4	67.5
Saskatchewan	1155	1070	92.6	1015	94.9	87.9	798	78.6	69.1
Alberta	1621	1546	95.4	1507	97.5	93.0	1070	71.0	66.0
British Columbia	1526	1417	92.9	1261	89.0	82.6	878	69.6	57.5
Total	16554*	15577	94.1	15119	97.1	91.3	10422	68.9	63.0

* The province of residence is missing for 4 children.

Response Rates by province

The response rate for the Principal's Questionnaire (and hence the percentage of children whose principals returned their questionnaire) varied widely from province to province and appeared to be lower in Quebec.

Response Rates by school type (Principal's Questionnaire)

Type of School	Principal of the Schools That Have Received a Questionnaire	Questionnaires Returned	
		Frequency	%
Public	4948	3376	68.2
Catholic	1069	735	68.8
Private	316	199	63.0
Other/Missing	314	188	60.0
Total	6647	4498	67.7

Type of School	Children Going to School	Consent of Parent		Consent of School Board			Children whose Principal have returned their questionnaire		
		Frequency	Cum %	Frequency	Cond %	Cum %	Frequency	Cond %	Cum %
Public	12825	12098	94.3	11774	97.3	91.8	8176	69.4	63.8
Catholic	2337	2226	95.3	2201	98.9	94.2	1510	68.6	64.6
Private	660	591	89.5	517	87.5	78.3	327	63.2	49.5
Other/Missing	736	666	90.5	630	94.6	85.6	412	65.4	56.0
Total	16558	15581	94.1	15122	97.1	91.3	10425	68.9	63.0

Response Rates by school type	As in the case of the Teacher's Questionnaire, the response rate for the Principal's Questionnaire appeared to be about equal for public school students and Catholic school students, but it appeared to be lower for children attending private schools.

Response Rates by age (Principal's Questionnaire)

Age	Children Going to School	Consent of Parent		Consent of School Board			Children whose Principal have returned their questionnaire		
		Freq.	Cum %	Freq.	Cond %	Cum %	Freq.	Cond %	Cum %
4	617*	576	93.4	515	89.4	83.5	354	68.7	57.4
5	5520	5244	95.0	5046	96.2	91.4	3316	65.7	60.1
6	1219	1175	96.4	1153	98.1	94.6	840	72.9	68.9
7	1161	1120	96.5	1090	97.3	93.9	765	70.2	65.9
8	1147	1094	95.4	1070	97.8	93.3	763	71.3	66.5
9	1063	1024	96.3	1005	98.1	94.5	733	72.9	69.0
10	981	911	92.9	893	98.0	91.0	629	70.4	64.1
11	965	898	93.1	880	98.0	91.2	646	73.4	66.9
12	1035	963	93.0	944	98.0	91.2	685	72.6	66.2
13	985	894	90.8	875	97.9	88.8	587	67.1	59.6
14	1017	923	90.8	905	98.0	89.0	605	66.9	59.5
15	848*	759	89.5	746	98.3	88.0	502	67.3	59.2
Total	16558	15581	94.1	15122	97.1	91.3	10425	68.9	63.0

* There were 21 children that are 3 years old and 4 children that are 16 years old. The 3 year olds were regrouped with the 4 year olds and the 16 year olds were regrouped with the 15 year olds.

Response Rates by age	As in the case of the Teacher's Questionnaire, the response rate for the Principal's Questionnaire appeared to be slightly lower for four-year-olds. The school board consent rate was also lower for four-year-old students.

Introduction	This section of the documentation outlines the guidelines to be adhered to by users tabulating, analyzing, publishing or otherwise releasing any data derived from the survey microdata file. With the aid of these guidelines, users of microdata should be able to produce the same figures as those produced by Statistics Canada and, at the same time, will be able to develop currently unpublished figures in a manner consistent with these established guidelines.

Rounding Guidelines

Statistics Canada Guidelines	In order that estimates for publication or other release derived from the NLSCY microdata file correspond to those produced by Statistics Canada, users are urged to adhere to the following guidelines regarding the rounding of such estimates: a) Estimates in the main body of a statistical table are to be rounded to the nearest hundred units using the normal rounding technique. In normal rounding, if the first or only digit to be dropped is 0 to 4, the last digit to be retained is not changed. If the first or only digit to be dropped is 5 to 9, the last digit to be retained is raised by one. For example, in normal rounding to the nearest 100, if the last two digits are between 00 and 49, they are changed to 00 and the preceding digit (the hundreds digit) is left unchanged. If the last digits are between 50 and 99 they are changed to 00 and the preceding digit is incremented by 1. b) Marginal sub-totals and totals in statistical tables are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 100 units using normal rounding. c) Averages, proportions, rates and percentages are to be computed from unrounded components (i.e., numerators and/or denominators) and then are to be rounded themselves to one decimal using normal rounding.

	d) Sums and differences of aggregates (or ratios) are to be derived from their corresponding unrounded components and then are to be rounded themselves to the nearest 100 units (or the nearest one decimal) using normal rounding. e) In instances where, due to technical or other limitations, a rounding technique other than normal rounding is used resulting in estimates to be published or otherwise released which differ from corresponding estimates published by Statistics Canada, users are urged to note the reason for such differences in the publication or release document(s). f) Under no circumstances are unrounded estimates to be published or otherwise released by users. Unrounded estimates imply greater precision than actually exists.

Sample Weighting Guidelines for Tabulation

Sample Design	The sample design used for the NLSCY was not self-weighting. When producing simple estimates, including the production of ordinary statistical tables, users must apply the proper demographic load. If proper weights are not used, the estimates derived from the microdata file cannot be considered to be representative of the survey population, and will not correspond to those produced by Statistics Canada. In effect, the weight assigned to each child reflects the number of children represented by a particular respondent. For any analysis dealing with correlation analysis or any other statistics where a significance measure is required, it is recommended that a “sample” weight be used. This weight is obtained by multiplying the demographic load by the sample size and dividing this total by the total estimated population. This produces a mean weight of 1 and a sum of weights equal to the sample size.

Benefit of Using an Adjusted Weight	The benefit of this adjusted weight is that an over estimation of the significance (which is very sensitive to sample size is avoided while maintaining the same distributions as those obtained when using the population weight. The disadvantage is that the numerator is not weighted up to the target population and the Coefficient of Variance Tables described in section 12 and presented in Appendix 3 are no longer useful as a measure of data quality.
Software Differences	Users should also note that some software packages may not allow the generation of estimates that exactly match those available from Statistics Canada, because of their treatment of the weight field.

Definitions of Types of Estimates: Categorical vs. Quantitative

Unit of Analysis	The NLSCY file has been set up so that the child is the unit of analysis. The weight that can be found on each record (CWTCW01C for the cross-sectional sample and CWTCW01L for the longitudinal sample) is a "child" weight. Estimates of parents or families cannot be made from the NLSCY microdata file.
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	Q: Was (the child) born before, after or on the due date? R: Before After On due date Q: Compared to other babies in general, would you say the (the child's) health at birth was: R: Excellent Very good Good Fair Poor
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 $\frac{\hat{X}}{\hat{Y}}$ where $\hat{X}$ is an estimate of the surveyed population total quantity and $\hat{Y}$ is an estimate of the number of people in the surveyed population contributing to that total quantity.
Example of a Quantitative Estimate	An example of a quantitative estimate is the average number of days of care received by babies who required special medical care following birth. The numerator is an estimate of the total number of days for which babies required special care. The denominator is the number of babies who required special care at birth.

Example of a Quantitative Question	Q: For how many days, in total, was this care received? R: Days Q: What was the child's weight at birth in pounds and ounces? R: Pounds Ounces

Tabulation of Categorical Estimates

Estimates of the Number of Children	Estimates of the number of children 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. These estimates may be cross-sectional or longitudinal.
Proportions and Ratios	Proportions and ratios of the form $\frac{\hat{X}}{\hat{Y}}$ are obtained by: (a) summing the final weights of records having the characteristic of interest for the numerator ($\hat{X}$); (b) summing the final weights of records having the characteristic of interest for the denominator ($\hat{Y}$), then; (c) dividing the numerator estimate by the denominator estimate.

Tabulation of Quantitative Estimates

Estimates of Quantities	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.
Example of a Quantitative Estimate	For example, to obtain an estimate of the total number of days of special care received by infants who were born prematurely: - multiply the number of days for which special care was received by the final weight; - then sum this value over all records for which the child was born prematurely. To obtain a weighted average of the form $\frac{\hat{X}}{\hat{Y}}$, the numerator ($\hat{X}$) 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 days spent in special care by premature babies: (a) estimate the total number of days as described above; (b) estimate the number of children in this category by summing the final weights of all records for babies which were premature; then (c) divide estimate (a) by estimate (b).

Guidelines for Statistical Analysis

Sample Design	The NLSCY is based upon a complex sample design, with stratification, multiple stages of selection, and unequal probabilities of selection of respondents. Using data from such complex surveys presents problems to analysts because the survey design and the selection probabilities affect the estimation and variance calculation procedures that should be used. In order for survey estimates and analyses to be free from bias, the survey weights must be used.

Variance Estimates	While many analysis procedures found in statistical packages allow weights to be used, the meaning or definition of the weight in these procedures differ from that which is appropriate in a sample survey framework, with the result that while in many cases the estimates produced by the packages are correct, the variance estimates that are calculated are not adequate. Variances for simple estimates such as totals, proportions and ratios (for qualitative variables) are provided in the accompanying Sampling Variability Tables.
Rescaling the Weights	For other analysis techniques (for example linear regression, logistic regression and analysis of variance), a method exists which can make the variances calculated by the standard packages more meaningful, by incorporating the unequal probabilities of selection. The method rescales the weights so that there is an average weight of 1.
Example of Rescaling the Weights	For example, suppose that analysis of all male children is required. The steps to rescale the weights are as follows: -Select all respondents from the file with SEX = male (variable CMMCQ02). -Calculate the AVERAGE weight for these records by summing the original person weights (BWTCW01C) from the microdata file for these records and then dividing by the number of records with SEX = male. -For each of these records, calculate a RESCALED weight equal to the original person weight divided by the AVERAGE weight. -Perform the analysis for these respondents using the RESCALED weight. However, because the stratification and clustering of the sample's design are still not taken into account, the variances calculated in this way are likely to be under-estimated.

Calculation of Variance Estimates	The calculation of truly meaningful variance estimates requires detailed knowledge of the design of the survey. Such detail cannot be given in this microdata file because of confidentiality. Variances that take the complete sample design into account can be calculated for many statistics by Statistics Canada on a cost-recovery basis.

C.V. Release Guidelines

Release Guidelines	Before releasing and/or publishing any estimate from the NLSCY, users should first determine the quality level of the estimate. The quality levels are acceptable, marginal and unacceptable. As discussed in Chapter 10, sampling and non-sampling errors both influence data quality. For the purposes of this document, however, estimate quality is based solely on the sampling error illustrated by the coefficient of variation, as shown in the table below. First, the number of children who contribute to the calculation of the estimate should be determined. If this number is less than 30, the weighted estimate should be considered to be of unacceptable quality. For weighted estimates based on sample sizes of 30 or more, users should determine the coefficient of variation of the estimate and follow the guidelines below. These quality level guidelines should be applied to weighted rounded estimates. All estimates can be considered releasable. However, those of marginal or unacceptable quality level must be accompanied by a warning to caution subsequent users.

QUALITY LEVEL GUIDELINES

Quality Level of Estimate	Guidelines
1. Acceptable	Estimates have: a sample size of 30 or more, and low coefficients of variation in the range 0.0% to 16.5%. No warning is required.
2. Marginal	Estimates have: a sample size of 30 or more, and high coefficients of variation in the range 16.6% to 33.3%. Estimates should be flagged with the letter M (or some similar identifier). They should be accompanied by a warning to caution subsequent users about the high levels of error, associated with the estimates.
3. Unacceptable	Estimates have: a sample size of less than 30, or very high coefficients of variation in excess of 33.3%. Statistics Canada recommends not to release estimates of unacceptable quality. However, if the user chooses to do so then estimates should be flagged with the letter U (or some similar identifier) and the following warning should accompany the estimates: "The user is advised that…(specify the data)…do not meet Statistics Canada's quality standards for this statistical program. Conclusions based on these data will be unreliable, and most likely invalid. These data and any consequent findings should not be published. If the user chooses to publish these data or findings, then this disclaimer must be published with the data."

Introduction	In order to supply coefficients of variation which would be applicable to a wide variety of categorical estimates produced from this microdata file and which could be readily accessed by the user, a set of Approximate Sampling Variability Tables has been produced. These "look-up" tables, which can be found in Appendix 3, allow the user to obtain an approximate coefficient of variation based on the size of the estimate calculated from the survey data.
Coefficients of Variation	The coefficients of variation (c.v.) are derived using the variance formula for simple random sampling and incorporate a factor which reflects the multi-stage, clustered nature of the sample design. This factor, known as the design effect, was determined by first calculating design effects for a wide range of characteristics and then choosing from among these a conservative value to be used in the look-up tables which would then apply to the entire set of characteristics.
Sample Requirements	For the NLSCY, the sample was constructed taking account the following requirements. **!** A sufficient sample was required in each of the 10 provinces to allow for the production of reliable estimates for all longitudinal children who were 0 to 11 years of age in Cycle 1. **!** It was also necessary to have a large enough sample to produce estimates for Cycle 1 at the Canada level by seven key age groupings or cohorts: 0 to 11 months, 1 year, 2 to 3 years, 4 to 5 years, 6 to 7 years, 8 to 9 years, and 10 to 11 years. **!** In each province, a sufficient sample size was required for Cycle 2 to produce reliable estimates for all children who were 0 to 11 years of age in Cycle 1.

Design Effect, Sample Size, Population

The tables that follow show the design effects, sample sizes and population counts by province and age groupings used to produce the Approximate Sampling Variability Tables. First, the tables for the cross-sectional samples:

CROSS-SECTIONAL SAMPLE

Province	Design Effect	Sample Size	Population
Newfoundland	2.1	1,001	100,089
Prince Edward Island	2.2	545	26,932
Nova Scotia	2.7	1,293	167,311
New Brunswick	2.5	1,664	133,481
Québec	4.4	3,757	1,275,660
Ontario	4.3	5,195	2,107,791
Manitoba	3.8	1,484	213,543
Saskatchewan	2.9	1,589	203,197
Alberta	3.1	1,827	568,358
British Columbia	3.7	1,670	686,174
Atlantic provinces	2.6	4,503	427,813
Prairies	3.7	4,900	985,098
Total	4.1	20,025	5,482,536

CROSS-SECTIONAL SAMPLE			
Age Group	**Design Effect**	**Sample Size**	**Population**
0 to 23 years	2.1	4,154	740,151
2 to 3 years	2.4	3,866	766,998
4 to 5 years	2.7	2,928	804,057
6 to 7 years	2.9	2,418	812,201
8 to 9 years	2.5	2,161	773,433
10 to 11 years	2.4	2,240	792,572
12 to 13 years	2.8	2,258	793,124
0 to 3 years	2.7	8,020	1,507,149
4 to 11 years	3.4	9,747	3,182,263
4 to 7 years	4.2	5,346	1,616,258
8 to 11 years	3.5	4,401	1,566,005
Total (0 to 13 years)	4.1	20,025	5,482,536

Design effects for the longitudinal sample are as follows:

CYCLE-1 LONGITUDINAL SAMPLE			
Province	**Design Effect**	**Sample Size**	**Population**
Newfoundland	2.0	892	89,533
Prince Edward Island	2.0	443	23,161
Nova Scotia	2.9	1,068	144,722
New Brunswick	2.3	958	115,913
Québec	4.9	2,944	1,099,033
Ontario	4.2	3,899	1,777,525
Manitoba	3.4	1,161	183,268
Saskatchewan	2.8	1,305	176,449
Alberta	3.2	1,465	489,604
British Columbia	3.6	1,333	574,160
Atlantic provinces	2.7	3,361	373,351
Prairies	3.6	3,931	849,321
Total	5.3	15,468	4,673,390

CYCLE-1 LONGITUDINAL SAMPLE			
Age Group	**Design Effect**	**Sample Size**	**Population**
2 to 3 years	2.7	3,654	752,598
4 to 5 years	3.2	2,697	791,754
6 to 7 years	3.3	2,429	800,064
8 to 9 years	3.0	2,169	763,632
10 to 11 years	3.1	2,249	783,049
12 to 13 years	3.2	2,270	782,293
2 to 5 years	3.3	6,351	1,544,352
6 to 13 years	3.8	9,117	3,129,038
6 to 9 years	3.9	4,598	1,563,696
10 to 13 years	4.1	4,519	1,565,342
Total (2 to 13 years)	5.3	15,468	4,673,390

Approximate Sampling Variability Tables

All coefficients of variation in the Approximate Sampling Variability Tables are approximate and, therefore, unofficial. The use of actual variance estimates would likely result in estimates with lower variances; for example, estimates listed as “unacceptable” in the Approximate Sampling Variability Tables could move up to the “marginal” category.

Remember: If the number of observations on which an estimate is based is less than 30, the weighted estimate should be classified as “unacceptable” regardless of the value of the coefficient of variation for this estimate. This is because the formulas used for estimating the variance do not hold true for small sample sizes.

How to Use the C.V. Tables For Categorical Estimates

Introduction	The following rules should enable the user to determine the approximate coefficients of variation from the Sampling Variability Tables for estimates of the number, proportion or percentage of the surveyed population possessing a certain characteristic and for ratios and differences between such estimates.
Rule 1: Estimates of Numbers Possessing a Characteristic (Aggregates)	The coefficient of variation depends only on the size of the estimate itself. On the Sampling Variability Table for the appropriate geographic area or age group, locate the estimated number in the left-most column of the table (headed "Numerator of Percentage") and follow the asterisks (if any) across to the first figure encountered. This figure is the approximate coefficient of variation.
Rule 2: Estimates of Proportions or Percentages Possessing a Characteristic	The coefficient of variation of an estimated proportion or percentage depends on both the size of the proportion or percentage and the size of the total upon which the proportion or percentage is based. Estimated proportions or percentages are relatively more reliable than the corresponding estimates of the numerator of the proportion or percentage, when the proportion or percentage is based upon a sub-group of the population. For example, the proportion of female babies who were of low birth weight is more reliable than the estimated number of "female babies who were of low birth weight". Note that in the tables the c.v.'s decline in value reading from left to right. When the proportion or percentage is based upon the total population of the geographic area or age group covered by the table, the c.v. of the proportion or percentage is the same as the c.v. of the numerator of the proportion or percentage. In this case, Rule 1 can be used. When the proportion or percentage is based upon a subset of the total population, reference should be made to the proportion or percentage (across the top of the table) and to the numerator of the proportion or percentage (down the left side of the table). The intersection of the appropriate row and column gives the coefficient of variation.

Rule 3: Estimates of Differences Between Aggregates or Percentages	The standard error of a difference between two estimates is approximately equal to the square root of the sum of squares of each standard error considered separately. That is, the standard error of a difference $(\hat{d} = \hat{X}_1 - \hat{X}_2)$ is: $$\sigma_{\hat{d}} = \sqrt{(\hat{X}_1 \alpha_1)^2 + (\hat{X}_2 \alpha_2)^2}$$ where $\hat{X}_1$ is estimate 1, $\hat{X}_2$ is estimate 2, and alpha 1 and alpha 2 are the coefficients of variation of $\hat{X}_1$ $\hat{X}_2$ respectively. The coefficient of variation of $\hat{d}$ is given by $\sigma_{\hat{d}}/\hat{d}$. This formula is accurate for the difference between separate and uncorrelated characteristics, but is only approximate otherwise.
Rule 4: Estimates of Ratios	Where the numerator is not a subset of the denominator (for example, the ratio of the number of low birth-weight female babies to that of low-birth weight male babies), the standard deviation of the ratio of the estimates is approximately equal to the square root of the sum of squares of each coefficient of variation considered separately multiplied by the ratio itself. The standard error of ratio $(\hat{R} = \hat{X}_1 / \hat{X}_2)$ is therefore: $$\sigma_{\hat{R}} = \hat{R}\sqrt{\alpha_1^2 + \alpha_2^2}$$ where α_1 and α_2 are the coefficients of variation of $\hat{X}_1$ (the number of low-birth weight female babies) and $\hat{X}_2$ (the number of low birth-weight male babies) respectively. The coefficient of variation of $\hat{R}$ is given by $\sigma_{\hat{R}}/\hat{R}$. The formula will tend to overstate the error, if $\hat{X}_1$ and $\hat{X}_2$ are positively correlated and understate the error if $\hat{X}_1$ and $\hat{X}_2$ are negatively correlated.

Rule 5: Estimates of Differences of Ratios	In this case, Rules 3 and 4 are combined. The c.v.'s for the two ratios are first determined using Rule 4, and then the c.v. of their difference is found using Rule 3.
Warning Note on Confidence Intervals	Release guidelines applying to estimates also apply to confidence intervals. For example, if the estimate is "marginal", then the confidence interval is marginal and should be accompanied by a warning note to caution subsequent users about high levels of error.

Examples of using C.V. Tables for Categorical Estimates

Introduction	The following are examples using actual NLSCY data to illustrate how to apply the foregoing rules.
Example 1: Estimates of Numbers Possessing a Characteristic (Aggregates)	Using NLSCY data, 84,085 babies were estimated to be of low birth weight (i.e., less than 2,500 grams). How does the user determine the coefficient of variation of this estimate? (1) Refer to the c.v. table for children in 0 to 3 age group. It should be noted that, because the question on birth weight applied only to children in this age group, this table should be used to determine the c.v. for this estimate. (2) The estimated aggregate (84,085) does not appear in the left-hand column (the "Numerator of Percentage" column), so it is necessary to use the figure closest to it, namely 85,000. (3) The coefficient of variation for an estimated aggregate is found by referring to the first non-asterisk entry on that row, namely, 7.3%. (4) The approximate coefficient of variation of the number of low birth-weight babies is estimated to be 7.3%. The finding that there were 84,085 babies that were of low birth weight is "acceptable" and no warning message is required to produce this estimate since the c.v. for the estimate is in the 0.0% to 16.5% range.

Example 2: Estimates of Proportions or Percentages Possessing a Characteristic	Using NLSCY data, it is estimated that 70. 8% (59,567/84,085) of low birth-weight babies were born prematurely (gestational age 258 days or less). How does the user determine the coefficient of variation of this estimate? (1) Refer to the c.v. table for children in 0 to 3 age group. It should be noted that, because the questions on birth weight and delivery time applied only to children in this age group, this table should be used to determine the c.v. for this estimate. (2) Because the estimate is a percentage which is based on a subset of the total population (i.e., low birth-weight babies who were born prematurely), it is necessary to use both the percentage (70.8%) and the numerator portion of the percentage (59,567) in determining the coefficient of variation. (3) The numerator, 59,567, does not appear in the left-hand column (the "Numerator of Percentage" column) so it is necessary to use the figure closest to it, namely 60,000. Similarly, the percentage estimate does not appear as any of the column headings, so it is necessary to use the figure closest to it, 70.0%. (4) The figure at the intersection of the row and column used, namely 5.0% is the coefficient of variation to be used. (5) The approximate coefficient of variation of the percentage of low birth-weight babies who were premature is estimated to be 5.0%. Since the c.v. for the estimate falls in the 0.0% to 16.5% range, this estimate is "acceptable", and the finding that 70.8% of low birth-weight babies were born prematurely requires no warning note.
Example 3: Estimates of Differences Between Aggregates or Percentages	Using NLSCY data, it is estimated that 6.1% (45,690/753,203) of female babies were born prematurely, while 4.9% (38,395/791,149) of male babies were born prematurely. How does the user determine the coefficient of variation of the difference between these two estimates? (1) Using the c.v. table for the 0 to 3 age group in the same manner as described in example 2 gives the c.v. of the estimate for female babies as 10.3%, and the c.v. of the estimate for male babies as 10.9%.

Example 4: Estimates of Ratios

Suppose now a user wants to compare the number of low birth-weight female babies to the number of low birth-weight male babies. The user is interested in comparing these estimates in the form of a ratio. How does the user determine the coefficient of variation of this estimate?

(1) First of all, this estimate is a ratio estimate, where the numerator of the estimate = (X_1) is the number of low birth-weight female babies and denominator = (X_2) of the estimate is the number of low birth-weight male babies.

(2) Refer to the table for the 0 to 3 age group. The questions on birth weight were applicable only to children in the 0 to 3 age group.

(3) The numerator of this ratio estimate is 45,690. The figure closest to it is 45,000. The coefficient of variation for this estimate is found by referring to the first non-asterisk entry on that row, namely, 10.3%.

(4) The denominator of this ratio estimate is 38,395. The figure closest to it is 40,000. The coefficient of variation for this estimate is found by referring to the first non-asterisk entry on that row, namely, 10.9%.

(5) The approximate coefficient of variation of the ratio estimate is therefore given by Rule 4, which is $\alpha_{\hat{R}} = \sqrt{\alpha_1^2 + \alpha_2^2}$, where α_1 and α_2 are the coefficients of variation of X_1 and X_2, respectively.

That is:

$$\alpha_{\hat{R}} = \sqrt{(0,103)^2 + (0,109)^2}$$
$$= 0,150$$

The ratio of low birth-weight female babies versus low birth-weight male babies is 45,690/38,395, or 1.19:1. Since the c.v. for the estimate falls in the 0.0% to 16.5% range (15.0%), this estimate is “acceptable”, and the finding that 70.8% of low birth-weight babies were born prematurely requires no warning note.

How to Use the C.V. Tables to Obtain Confidence Limits

Introduction

Although coefficients of variation are widely used, a more intuitively meaningful measure of sampling error is the confidence interval of an estimate. A confidence interval constitutes a statement on the level of confidence that the true value for the population lies within a specified range of values. For example a 95% confidence interval can be described as follows:

If sampling of the population is repeated indefinitely, each sample leading to a new confidence interval for an estimate, then in 95% of the samples the interval will cover the true population value.

Using the standard error of an estimate, confidence intervals for estimates may be obtained under the assumption that under repeated sampling of the population, the various estimates obtained for a population characteristic are normally distributed about the true population value. Under this assumption, the chances are about 68 out of 100 that the difference between a sample estimate and the true population value would be less than one standard error, about 95 out of 100 that the difference would be less than two standard errors, and about 99 out 100 that the differences would be less than three standard errors. These different degrees of confidence are referred to as the confidence levels.

Confidence intervals for an estimate are generally expressed as two numbers, one below the estimate and one above the estimate, as where k is determined depending upon the level of confidence desired and the sampling error of the estimate.

Confidence intervals for an estimate can be calculated directly from the Approximate Sampling Variability Tables by first determining from the appropriate table the coefficient of variation of the estimate and then using the following formula to convert to a confidence interval CI:

$$IC_x = [X - tX\alpha_X), X + tX\alpha_X]$$

where α_X is the determined coefficient of variation X and

	t = 1 if a 68% confidence interval is desired t = 1.6 if a 90% confidence interval is desired t = 2 if a 95% confidence interval is desired t = 3 if a 99% confidence interval is desired.
Note Regarding Release Guidelines	Release guidelines applying to estimates also apply to confidence intervals. For example, if the estimate is "marginal", then the confidence interval is marginal and should be accompanied by a warning note to caution subsequent users about high levels of error.

Example of Using the C.V. Tables to Obtain Confidence Limits

Example	A 95% confidence interval for the estimated proportion of babies who were of low birth weight would be calculated as follows. Estimate of X = 5.5% t = 2 alpha estimate of X = 7.3% (.073 expressed as a proportion) is the coefficient of variation of this estimate as determined by the tables *CIx* = {0,055 - (2)(0,055)(0,073), 0,055 + (2)(0,055)(0,073)} *CIx* = {0,055 - 0,008, 0,055 + 0,008} *CIx* = {0,047, 0,063} With 95% confidence it can be said that between 4.7% and 6.3% of babies who were 0 to 3 years old at the time of the survey were of low birth weight.

Hypothesis Testing	Standard errors may also be used to perform hypothesis testing, a procedure for distinguishing between population parameters using sample estimates. The sample estimates can be numbers, averages, percentages, ratios, etc. Tests may be performed at various levels of significance, where a level of significance is the probability of concluding that the characteristics are different when, in fact, they are identical. Let X_1 and X_2 be sample estimates for two characteristics of interest. Let the standard error on the difference $X_1 - X_2$ be σ_d. $t = \frac{X_1 - X_2}{\sigma_d}$ If is between -2 and 2, then no conclusion about the difference between the characteristics is justified at the 5% level of significance. If however, this ratio is smaller than -2 or larger than +2, the observed difference is significant at the 0.05 level. That is to say that the characteristics are significantly different.

Example of Using C.V. Tables to do a T-Test

Example	Let us suppose we wish to test, at 5% level of significance, the hypothesis that there is no difference between the proportion of low birth-weight female babies and that of low birth-weight male babies. From example 3 (Section 12.1.1), the standard error of the difference between these two estimates was found to be = .008. Hence, $t = \frac{\hat{X}_1 - \hat{X}_2}{\sigma_d} = \frac{0{,}061 - 0{,}049}{0{,}008} = \frac{0{,}012}{0{,}008} = 1{,}5.$ Since t = 1.5 is between -2 and 2, no conclusion at the 0.05 level of significance can be made regarding the difference in proportions of low birth-weight male or female babies.

Coefficients of Variations for Quantitative Estimates

Quantitative Estimates	For quantitative estimates, special tables would have to be produced to determine their sampling error. Since most of the variables for the NLSCY are categorical in nature, this has not been done. As a general rule, however, the coefficient of variation of a quantitative total will be larger than the coefficient of variation of the corresponding category estimate. If the corresponding category estimate is not releasable, the quantitative estimate will not be either. For example, the coefficient of variation of the total number of days of special medical care received for low birth-weight babies would be greater than the coefficient of variation of the corresponding proportion of babies who were of low birth weight. Hence if the coefficient of variation of the proportion is not releasable, then the coefficient of variation of the corresponding quantitative estimate will also not be releasable.

Pseudo Replication	Coefficients of variation of such estimates can be derived as required for a specific estimate using a technique known as pseudo replication. This involves dividing the records on the microdata files into subgroups (or replicates) and determining the variation in the estimate from replicate to replicate. Users wishing to derive coefficients of variation for quantitative estimates may contact Statistics Canada for advice on the allocation of records to appropriate replicates and the formulae to be used in these calculations.

Release Cut-offs for the NLSCY

Cut-off Numbers	In the tables that follow, cut-off numbers are given for NLSCY estimates in order for them to be of “acceptable”, “marginal” or “unacceptable” quality. Users are encouraged to use these cut-offs when publishing data from the NLSCY. First a table is given to show the cut-offs at the provincial, regional and Canada level. Then a table is given to show the cut-offs for the various age cohorts. An interpretation of what is meant by the various cut-off levels can be found in Section 11.4. For example, an estimate for Nova Scotia of 5,000 would fall into the “marginal” range. This would mean that the estimate should be flagged and a note of caution would be attached for subsequent users about the high level of error associated with the estimate.

GEOGRAPHICAL RELEASE CUT-OFFS
CROSS-SECTIONAL SAMPLE

Province	Acceptable - Estimates at or above	Marginal - Estimates between	Unacceptable Estimates at or below
Newfoundland	7,500	2,000 to 7,500	2,000
Prince Edward Island	3,500	1,000 to 3,500	1,000
Nova Scotia	12,000	3,000 to 12,000	3,000
New Brunswick	7,000	2,000 to 7,000	2,000
Québec	52,500	13,500 to 52,500	13,500
Ontario	62,000	15,500 to 62,000	15,500
Manitoba	18,500	5,000 to 18,500	5,000
Saskatchewan	13,000	3,500 to 13,000	3,500
Alberta	33,500	8,500 to 33,500	8,500
British Columbia	51,500	13,500 to 51,500	13,500
Atlantic provinces	9,000	2,500 to 9,000	2,500
Prairie provinces	26,000	6,500 to 26,000	6,500
Total	41,000	10,000 to 41,000	10,000

RELEASE CUT-OFFS BY AGE GROUP
CROSS-SECTIONAL SAMPLE

Age Group	Acceptable - Estimates at or above	Marginal - Estimates between	Unacceptable - Estimates at or below
0 - 23 months	15,500	4,000 to 15,500	4,000
2 - 3 years	20,000	5,000 to 20,000	5,000
4 - 5 years	35,500	9,000 to 35,500	9,000
6 - 7 years	42,000	11,000 to 42,000	11,000
8 - 9 years	37,500	9,500 to 37,500	9,500
10 - 11 years	37,000	9,500 to 37,000	9,500
12 - 13 years	40,500	10,500 to 0,500	10,500
0 - 3 years	18,500	4,500 to 18,500	4,500
4 - 11 years	41,000	10,000 to 41,000	10,000
4 - 7 years	43,000	11,000 to 43,000	11,000
8 - 11 years	43,000	11,000 to 43,000	11,000
TOTAL	**41,000**	**10,000 to 41,000**	**10,000**

GEOGRAPHICAL RELEASE CUT-OFFS
LONGITUDINAL SAMPLE

Province	**Acceptable - Estimates at or above**	**Marginal - Estimates between**	**Unacceptable - Estimates at or below**
Newfoundland	7,000	2,000 to 7,000	2,000
Prince Edward Island	3,500	1,000 to 3,500	1,000
Nova Scotia	13,000	3,500 to 13,000	3,500
New Brunswick	9,500	2,500 to 9,500	2,500
Québec	63,500	16,500 to 63,500	16,500
Ontario	67,500	17,000 to 67,500	17,000
Manitoba	18,000	4,500 to 18,000	4,500
Saskatchewan	13,000	3,500 to 13,000	3,500
Alberta	36,500	9,500 to 36,500	9,500
British Columbia	52,000	13,500 to 52,000	13,500
Atlantic provinces	10,500	2,500 to 10,500	2,500
Prairie provinces	27,500	7,000 to 27,500	7,000
Total	58,000	14,500 to 58,000	14,500

RELEASE CUT-OFFS BY AGE GROUP
LONGITUDINAL SAMPLE

Age Group	Acceptable - Estimates at or above	Marginal - Estimates between	Unacceptable - Estimates at or below
0 - 23 months	19,500	5,000 to 19,500	5,000
2 - 3 years	33,000	8,500 to 33,000	8,500
4 - 5 years	38,000	9,500 to 38,000	9,500
6 - 7 years	37,000	9,500 to 37,000	9,500
8 - 9 years	36,500	9,500 to 36,500	9,500
10 - 11 years	38,500	10,000 to 38,500	10,000
0 - 3 years	29,000	7,000 to 29,000	7,000
4 - 11 years	47,000	11,500 to 47,000	11,500
4 - 7 years	47,000	12,000 to 47,000	12,000
8 - 11 years	50,500	12,500 to 50,000	12,500
	58,000	**14,500 to 58,000**	**14,500**