

# Methodological Issues in Statistics Canada's 2006 Aboriginal Children's Survey: Implications for Iiyiyiu Aschii

Prepared by Ellen Bobet  
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## Background

- The Aboriginal Children's Survey (ACS) was intended to cover children from birth up to just before their sixth birthday – or in StatCan terminology, children “0 to 5.”
- The survey's sampling frame was the 2006 Census, which took place in May 2006. The ACS itself took place over a six-month period from October 2006 to March 2007. In some areas, interviews apparently stretched over this entire period; in most places, including Iiyiyiu Aschii, the interviews took place in February and March 2007. It seems that the original plan was to complete the survey in the October–December period, but the schedule slipped.
- By and large, the questions on the survey can be divided into three main groups:
  - ▶ Those that applied to all children regardless of age (E.g., was child breastfed? How many siblings are in the home?)
  - ▶ Those that applied to children under two (developmental milestones such as when the child first sat up alone, etc)
  - ▶ Those that applied to children from age two to just before their sixth birthday. (developmental milestones for older children, Goodman Scale of Strengths and Difficulties)
- The questionnaire had a skip pattern built in, so that young children got the questions for children under two, and older children got the other questions. Because of this, users need not always specify an age range when asking for tables from the survey—one is defined *de facto* by virtue of the skip pattern. For example, any Goodman Scale results will be for the older children, because only older children answered those questions.

## The observation that sparked the investigation

In the Sharefile for Iiyiyiu Aschii, we find that the ACS sampled just 26 children under one year of age, whereas it sampled 110 children age 1, and comparable numbers of 2, 3, 4, and 5-year-olds. This is unexpected; normally, we would have predicted that there would be about as many infants as 1-year-olds. Investigation of this anomaly has revealed two points about the ACS methodology and administration that have serious implications for the data in Iiyiyiu Aschii.

## The problems

### *Exclusion of young infants from the sample*

The first issue affects the data for the children under two in particular. The problem is that children born between the time of the Census in May and the time the ACS was administered could not possibly be included in the sample, since the Census was used as the sampling frame. In areas where the ACS began in October, this means that children born between May and October would be excluded—in short, the “under two” category would in reality not include any children under five months of age. In Iiyiyiu Aschii, where the survey took place in Feb–March 2007, the category simply cannot include children under eight months of age. Iiyiyiu Aschii's children “under two” are in fact children “eight months to two years and a bit.”

*Skip pattern based on the child's "reference age" rather than age at time of interview*

The ACS asked for the child's exact birth date, and also its age. However, Statistics Canada chose to measure the child's age as of a single reference date near the beginning of the survey period—October 31, 2006. A child interviewed at the beginning of March, as many Iiyiyiuch were, would in fact be four months older than indicated. Crucially, *age on October 31 is the measure that the interviewers used for the skip pattern*, i.e. to determine whether a child got asked questions for the under-two age range or the older one. This has led to some children being administered the wrong set of questions for their real age. The result is that the data for children purportedly "under two" in fact include children up to the age of two years and four months. There is a corresponding gap in the data for children supposedly age two through five: in reality, the questions for this age group were only asked of children who were age two years and five months or older. Further, this group includes some children who were in fact aged up to six years and three months.

Why was this "reference age" variable created? Statistics Canada's methodologists explain that they had to choose a single reference date in order to calculate the sample sizes ahead of time. Every month that elapsed between the Census and the reference date would effectively remove a month's worth of children from the pool of 0–1-year-olds that the survey could draw on. So the agency faced a trade-off between having enough children to sample from, and having the reference date accurately reflect their age. Had the methodologists picked a reference date close to Census, they would have had a large pool of children from which to sample, but the children's real ages at time of survey would have been radically different from their reference age. Had they picked a later date, the reference age would have been closer to the child's real age, but there would have been too few children in the pool to draw a good sample. The agency compromised by choosing October 31 as the reference date. This decision would always have introduced a few months of inaccuracy in the child's age; its impact was magnified when data-collection slipped behind schedule. Table 1 shows the "reference age" cross tabulated by the child's real age at the time of the interview.

**Table 1: Reference age crossed by child's actual age at time of interview**  
**Unweighted counts for the complete sample (note: not the Sharefile) in Iiyiyiu Aschii**

Reference age (as of Oct 31, 06)	Child's actual age at time of interview						Total
	Under 1 yr	1 to <2 yrs	2 to <3 yrs	3 to <4 yrs	4to <5 yrs	5 to <6 yrs	
Under 1 yr	27	41	0	0	0	0	68
1 to <2 yrs	0	81	38	0	0	0	119
2 to <3 yrs	0	0	76	24	0	0	100
3 to <4 yrs	0	0	0	81	35	0	116
4 to <5 yrs	0	0	0	0	71	31	102
5 to <6 yrs	0	0	0	0	0	71	97
<b>Total</b>	<b>27</b>	<b>122</b>	<b>114</b>	<b>105</b>	<b>106</b>	<b>102</b>	<b>602</b>

Interpretation	Top age included in group
Of the 68 children whose “reference age” classed them as under one year old, 27 (40%) were in fact under one, while the other 41 (60%) were over one year of age by the time of the interview. The minimum age included in the “under one” group was eight months, and the maximum age was 16 months (1 year 4 months).	1 yr 4 mo
Of the 199 children classed as 1–<2 years old, 81 (68%) were truly age 1–<2, while 38 (32%) were two years old or more by the time of the interview. The top age included in this group was 28 months.	2 yrs 4 mo
Of the 100 children classed as 2–<3 years old, 76 were actually that age, while 24 were age three or more by the time of the interview. The top age was 40 months.	3 yrs 4 mo.
Of the 116 children classed as 3–<4 years old, 81 were actually that age, while 35 were age 4 or more, up to a maximum age of 52 months.	4 yrs 4 mo.
Of the 102 children classed as age 4–<5, 71 were actually that age, while 31 were four or more by the time of the interview, up to 64 months.	5 yrs 4 mo.
Of the 97 children classed as age 5–<6, 71 were in fact that age, while the other 26 children were aged from 72 to 75 months.	6 yrs 3 mo.

## Implications for the data in Iiyiyiu Aschii

### 1. Questions that applied to children under two

As a result of the issues described above, the data for the “under two” age group actually contains

- Five months’ worth of children who in reality ranged from 24 to 28 months old by the time the survey was administered (i.e., the sample for this age group included 38 children whose real age was somewhere between two years and two-years-and-four-months).
- All the children age one (12–23 months)
- Just four months’ worth of the infants under one (27 infants). The missing eight months’ worth were born between the time of the Census in May 2006 and the time the ACS was actually administered in Iiyiyiu Aschii. An infant surveyed in February had to be at least eight months old to have been included in the sampling frame, while those surveyed in March would have been at least nine months old.

In sum, the sample of 187 children\* in this age band included 38 children who were overage, and excluded an unknown number of children under 8–9 months of age. (If the birthrate in Iiyiyiu Aschii is constant from year to year, then we can deduce that that unknown number is around 75.) As shown in the survey’s codebook, the default denominator for most of the variables in this segment is “all children under two,” yet in reality the children referred to are aged from 8 months to slightly over two. Given the speed at which children change in the first two years of life, this is likely to produce very misleading results.

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\* These are unweighted counts.

## 2. Questions that applied to older children (age two to 6)

The sample for this age band contains

- 26 children who were in fact six or over (those whose birthdays fell between the October 31 reference date and the time the survey was actually administered, making them from exactly six years old to six years and three months)
- All the five-year olds (incorrectly described as four years old in some cases, but this makes little difference since in either case the child would be assigned to the “2 to <6-year” category)
- All the four-year-olds (ditto)
- All the three-year olds (ditto)
- Seven months’ worth of two-year-olds (those born between March and September 2004)

The sample for the older age group *excludes* the other five months’ worth of two-year-olds—the 38 children whose birthday fell between the reference date and the time the survey was actually administered. Because the survey’s skip pattern was based on reference age, those 38 children received the questions for children under age two.

In sum, the sample of 415 children in this age band includes 26 children who were overage and is missing another 38 children who should have been included. The data are probably still usable, but users need to bear in mind that they are skewed to the upper end of the age range—they omit almost half the two-year-olds, and include a few six-year-olds. This will complicate any comparisons to the NLSCY figures for Canadian children in general. It may still be possible to compare to the ACS figures for off-reserve First Nations, since those presumably suffer from some of the same variations.

## 3. Questions that applied to all ages

Questions that applied to all ages will not be greatly affected, so long as users realize that in fact this sample of “children under six” under-represents infants and contains a few children up to six years and three months old. This seems unlikely to affect the results for general questions like “how often did you tell the child stories?” These data are probably usable.

## Can the problems be fixed?

The ACS data file does provide the child’s real age at the time of the interview, so it is possible to fix part of the problem by going back and screening out the over-age children in each group. Some children can also be re-assigned to the correct age. Nothing, however, will fix the fact that some children were given the wrong questions for their “real” age; they can be screened out of the age group to which they don’t belong, but they cannot be “screened in” to the correct age group, because they were never asked the questions for that age group. In short, this remedy will generate many missing values. Similarly, nothing can be done at this stage about the elapsed time between the Census and the ACS administration, and the number of infants that this removed from the sample.

### *What can be gained by applying this partial fix to the youngest age group (under two)?*

Crosstabulating by the child's real age at time of interview will eliminate five months' worth of "overage" children from the youngest age group. However, it will not solve the problem that all infants under eight months of age are missing from the data.

### *What can be gained by applying this partial fix to the older age group (two years and over)?*

Crosstabulating by Age At Interview will screen out the children who are over six. However, it will not supply the missing information for the 5 months' worth of two-year-olds who mistakenly got asked the questions for children under two.

Given the amount of effort involved in re-running the tables, this partial fix was not used for the ACS Factsheets produced in Iiyiyiu Aschii in 2009. Instead, the data were left as is, with notes added to warn users that the true age range was actually from two years and five months up to six years and three months.

## **Decisions taken for the ACS analyses carried out in 2009**

For purposes of the ACS analyses conducted in 2009, the final decisions were:

- To refrain from conducting any analyses focused on the youngest age group (children under two), given the gaps and anomalies in the data for this group.
- To leave the situation "as is" for the analyses focusing on children age two and over, adding appropriate warnings for users. However, comparisons to Canadian children in general were ruled out, since they would involve comparing children of dissimilar ages. Comparisons to off-reserve First Nation children included in the 2006 ACS were considered acceptable. These decisions applied to the Factsheet on Developmental Milestones for Children 2 ½ to 6, and to the Discussion Paper on results of the Goodman Scale of Strengths and Difficulties in Iiyiyiu Aschii.
- To similarly leave the situation "as is" for any analyses that covered children of all ages, again adding appropriate warnings for readers. This decision applied to the factsheet on Childrearing and Home Environment prepared by Statistics Canada for the Cree Health Board; the one on Health of Children under Six; and the one on Breastfeeding and Nutrition.