

## MATHS ET CULTURE ?

### 1. Niveau - Chapitre de maths

**Terminales** toutes celles concernées par l'intervalle de fluctuation

### 2. Les documents

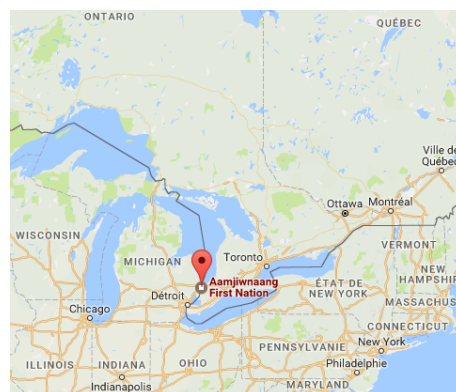
L'article de journal du 11 avril 2007 : *The mystery of the missing boys*

[http://www.aamjiwnaangenvironment.ca/NewsArchive/](http://www.aamjiwnaangenvironment.ca/NewsArchive/MysteryoftheMissingBoys041107.pdf)

[MysteryoftheMissingBoys041107.pdf](http://www.aamjiwnaangenvironment.ca/NewsArchive/MysteryoftheMissingBoys041107.pdf)

une étude : <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1281269>

L'énoncé classique : « Entre 1999 et 2003, 132 enfants sont nés dans la réserve indienne d'Aamjiwnaag, située au Canada. Sur ces 132 naissances, il y a eu 46 garçons. »



### 3. Déroulement

Parce qu'on se demande toujours d'où viennent les exemples « concrets » sur ce sujet...

Lecture en classe des grandes lignes de l'article de journal (certaines années, la lecture est reprise par le collègue d'anglais).

Milieu de la 3<sup>e</sup> colonne : « The situation in Sarnia, where nearly twice as many girls are being born than boys » (*La situation à Sarnia, où les naissances des filles sont près de deux fois plus nombreuses que celles des garçons*).

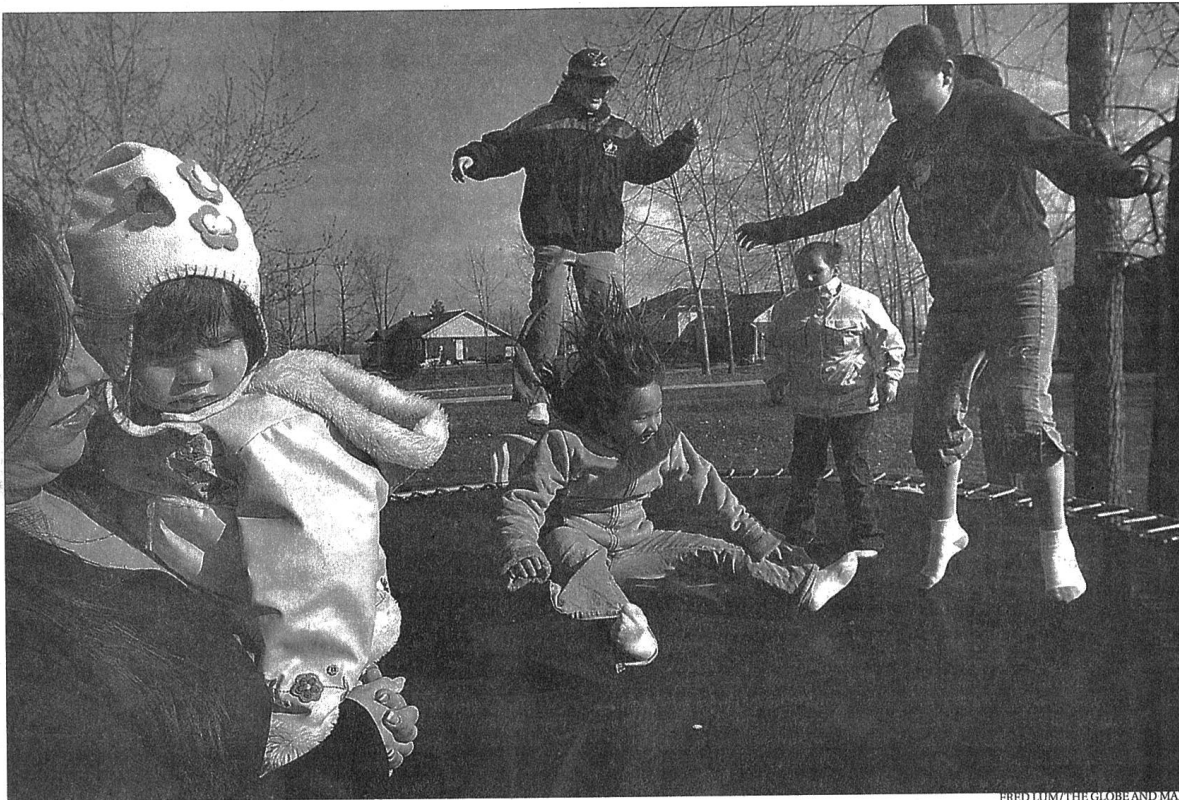
Puis 4<sup>e</sup> colonne : « It is considered normal in a large population for the number of baby boys to slightly outnumber girls, by a proportion of about 105 males to 100 females. » (*Il est considéré comme normal que, dans une grande population, le nombre de garçons dépassent légèrement celui des filles, soit environ 105 garçons pour 100 filles*).

L'article de recherche nous apprend (Table 1) que pour la période 1999-2003 le nombre de naissances est 132 et que la proportion de garçons est 0,348, d'où les 46 naissances de l'énoncé (on retrouve la proportion de l'article de journal).

On fait l'hypothèse que « la probabilité qu'un nouveau né soit un garçon est de  $p = \frac{105}{205} \approx 0,512$  »

la fréquence observée est :  $f = \frac{46}{132} \approx 0,349$

donc...



FRED LUM/THE GLOBE AND MAIL

Lisa Joseph stands with her five children outside their home on the Aamjiwnaang First Nation Reserve near Sarnia, Ont., yesterday. Surrounded by petrochemical plants, the reserve is said to have the world's most skewed sex ratio, with nearly twice as many girls being born as boys.

### ENVIRONMENTAL HEALTH

# The mystery of the missing boys

## Chemical pollutants flagged in new study as possible factor in skewed sex ratio

BY MARTIN MITTELSTAEDT  
ENVIRONMENT REPORTER

Where are all the missing boys? It is a question posed by a new study that has found the proportion of boys born over the past three decades has unexpectedly dropped in both the United States and Japan. In all, more than a quarter of a million boys are missing, compared to what would have been expected had the sex ratio existing in 1970 remained unchanged.

The study also says the world's most skewed sex ratio is in Canada, in a native community surrounded by petrochemical plants in Sarnia, Ont., where the number of boys born has plunged since the mid-1990s at a rate never seen.

Although the researchers do not know why boys are taking a hit, they suspect contributing causes could include widespread exposure to hormone-mimicking pollutants by women during pregnancy and by men before they help conceive children.

"We hypothesize that the decline

in sex ratio in industrial countries may be due, in part, to prenatal exposure to metalloestrogens and other endocrine disrupting chemicals," said the study, issued this week in *Environmental Health Perspectives*, a peer reviewed journal of the U.S. National Institute of Environmental Health Sciences.

These types of chemicals include some pesticides, dioxin and methylmercury, a pollutant from coal-fired power plants and many industrial sources commonly found in seafood.

The study also flagged a host of other possible factors, including rising obesity rates, older parental age, growing stress levels, and the increasing number of children being conceived using fertility aides. Other research has shown some associations between these factors and a drop in boy births.

The study was conducted by researchers in both the U.S. and Japan, and led by Devra Lee Davis, a prominent epidemiologist and director of the Center for Environmental Oncology at the University of Pittsburgh Cancer Institute.

In an interview, Dr. Davis said that although the cause of the decline isn't known, it could be linked to the increasing number of other male reproductive problems, such as falling sperm counts and rising testicular cancer rates.

She said that males during fetal development may be more sensitive to pollutants that mimic hormones, leading to increased fetal deaths and reproductive problems later for the surviving males.

The situation in Sarnia, where nearly twice as many girls are being born than boys on the Aamjiwnaang First Nation, is internationally significant, according to the study. "To our knowledge, this is a more significantly reduced sex ratio and greater rate of change than has been reported previously anywhere," it said.

The reserve is located in the heart of Sarnia's chemical valley, and the native community, along with researchers at the University of Rochester and the Occupational Health Clinics for Ontario Workers, are trying to find the cause of the unusual sex ratio.

Fewer boys than expected are being born in the non-aboriginal community downwind of the petrochemical plants in the area, but not to the same degree as on the re-

serve. The work force in Sarnia has not been studied, something that would shed light on whether pollutants are the cause.

Researchers in many countries have been reporting a drop in the ratio of boys to girls being born over the past few decades.

It is considered normal in a large population for the number of baby boys to slightly outnumber girls, by a proportion of about 105 males to 100 females. It is widely thought that more boy births are a way nature compensates for higher rates of male mortality.

But the ratio has not been static in industrialized countries, and researchers suspect that increasing numbers of male fetuses are being miscarried, a kind of sex-based culling in the womb.

In Japan, the sex ratio fluctuated with no trend from 1949 to 1970, but then declined steadily to 1999, the end of the study period there.

The decline in the number of boys in Japan equals 37 out of every 10,000 births.

In the U.S., the sex ratio also declined from 1970 to 2002. The drop in the number of boys equals 17 out of every 10,000 births.

The U.S. change was concentrated among whites. There was almost no change among blacks.

## 4. Contacts - compléments d'informations

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