

Statistics Canada Data Analysis Fair for High School Students, June 4, 2003

Summaries of Student Projects

Table of Contents

	Page
1. Does cohabitation affect divorce rates?.....	3
– <i>Using E-STAT data</i>	
2. Teen pregnancy rates vs. abortion rates.....	4
– <i>Using E-STAT data</i>	
3. Factors of continuous growth of obesity.....	5
4. Success is in the form of a woman.....	5
– <i>Using STC Education data</i>	
5. The great insurance scam.....	6
6. What affects students’ performance in school?	6
– <i>Using NLSCY data</i>	
7. How the economy affects casino performance and visitation.....	6
8. Teenage drivers: who rules the road?	8
9. Gender stereotypes in our school	8
10. Criminal behaviour of students.....	8
– <i>Using STC crime data</i>	
11. Obesity and its relationship to health risks.....	9
– <i>Using E-STAT data</i>	
12. Health status of children: asthma in Canada.....	10
– <i>Using CIHI and STC health data</i>	
13. Aids: a global epidemic.....	10
14. Factors affecting academic performance.....	11
– <i>Using NLSCY microdata</i>	
15. The gaming industry in Ontario.....	11
16. Relationship between childcare and social skills.....	12
– <i>Using NLSCY microdata</i>	
17. The Canadian dollar.....	13
18. Health care in Canada: A level playing field?	15
– <i>Using NPHS and CCHS microdata</i>	

19. A closer look at Canadian suicide.....	15
– <i>Using CCHS microdata</i>	
20. Spending on education and wealth.....	17
– <i>Using E-STAT data on GDP and education spending</i>	
21. What factors affect the success of an NHL team?	19
22. Factors affecting the income of Canadians.....	20
– <i>Using 1991 Census microdata and 2001 Census data</i>	
23. Factors influencing the GDP.....	20
– <i>Using E-STAT data</i>	
24. Education and income.....	20
25. Crime in Canada.....	21
– <i>Using STC crime data</i>	
26. Sustainability of human activity and the environment.....	22
– <i>Using STC’s Human Activity and the Environment publication</i>	

Acknowledgements:

We wish to thank Marketing and Information Services Branch of Statistics Canada, Texas Instruments, and Spectrum Educational Supplies for donating prizes for the students. We also thank our committee and judges for giving us their valuable time on this project.

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David Zimmer, math teacher and textbook author
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Committee:

Edmonde Laplante, Elise Mennie, Bernard Lefrançois, Joel Yan, Tom Steinke

For more information, see the [2-page descriptions for each project](#) on the following file on the MDM4U Treasure Trove CD-ROM in the Data Fair MDM4U Projects folder:

00. Description of 2003 data fair projects

1. Does cohabitation affect divorce rates?

By Chrissy Bourassa and Courtney Nikoloyuk, Brookfield High School

When deciding our project topic, we considered many factors in today's society such as teen pregnancy and how the media possibly has an effect on its rates, and teen pregnancy affecting drop-out rates. Both those topics were very hard to find information for, so we decided to keep searching for the right topic. After our Canadians Families course, we came about some information on cohabitation before marriage. We both thought this was fairly interesting and decided to compare its rates to divorce rates and see if there was any correlation.

We divided the project into three sections: 1) A comparison of marriage rates and cohabitation rates; 2) Comparison of marriage and divorce rates; Comparison of cohabitation and divorce rates. We looked up statistics from Internet sites and books; such as Statistics Canada and Profiling Canada's families, and finally using our Canadian Family textbook for references. We analyzed and created graphs that separated the data into province specific records to view where common-law relationships are more popular. We also viewed separate age groups and their unions, hoping to demonstrate the recent popularity of common-law unions.

The second section, titled the Comparison of Marriages and Divorce Rates, highlights the total number of marriages and divorces over the past thirty years in Canada. We created graphs to help display the information we found on the Statistics Canada Web site. We also compared the percentage of change in marriage and divorce rates of the provinces in 1998-1999.

The third and final section, titled The Similarities Between Divorce Rates and Cohabitation Rates, explored the increase in divorce rates and cohabitation rates. We retrieved information that showed the future of those who cohabitated: such as getting married, staying together common-law or breaking up/divorce. We compared these rates to the divorce rates of those who did not cohabit before marriage. As well, we obtained some statistics that show the divorce, marriage and cohabitation rates of the separate provinces. We also conducted our own survey. We surveyed the metropolitan area of Ottawa, doing an oral survey, using closed questions. We asked things such as: have you been married? Did you live with your partner before marriage, if so, for how long? Etc.

What we have been able to conclude from this project was that our hypothesis, that a correlation between cohabitation before marriage and divorce exists, was correct. We were able to confidently conclude that couples that live together before marriage are more likely to divorce. We also discovered an interesting statistic that we, with the help of our survey, were able to confirm. Couples who live together for less than eight years have a higher divorce rate than those who did not cohabit. However, if the couple cohabitates for more than eight years, the divorce rate is the same as a couple who has never cohabitated. (See also PowerPoint presentation)

2. Teen pregnancy rates vs. abortion rates

By Cindy Trang and Simone Hamilton, Brookfield High School

The topic we chose to research deals with teen pregnancies and abortions. Essentially statistics state that mostly all abortions are done because women simply do not want to be pregnant. Given that she may not be ready for the child, or an accident such as rape has occurred. It is said that only a small portion are done for medical necessary reasons, such as preventing the woman from dying, or preventing the pregnancy from causing her a major disability.

However, the issue of teen pregnancy and Abortion has been and still is a major social issue in our society, (arguably). Modern technology has created the need for society to publicly debate this issue. As apart of this ongoing debate, this investigation is an analysis of whether there is a relationship between the rates of teen pregnancy and the rates of abortion. Moreover do teen pregnancies affect the rate of abortion?

Here are some questions to think about, that relate to our topic.

1. How do teen abortion rates compare to adult and non-teen abortion rates?
2. How many teen pregnancies result in abortion (percentage)
3. Is there a relationship between age and abortion rates?
4. Is there a change in abortion rates over time?
5. How do teen abortion rates compare with teenage live births? Is there an increase or decrease?
6. Is there a relationship between single mothers and abortion rates?

Using the computer, we gathered information from different resources such as Statistics Canada and the Canadian Institute for Health Information. We focused mostly on the charts and graphs they provided and analyzed these into our own. The main time period we studied was between 1974 and 1998. Using the techniques that we learned in our Data Management class this year, we performed an analysis and came up with our conclusion.

We concluded that teen pregnancy does in fact affect abortion rates. The overall abortion rate is increasing as well as the teen abortion rate, but the number of teen pregnancies are decreasing, therefore more of these pregnant teenagers are having abortions. In the past, there were a larger number of teen pregnancies than there are today but less of these pregnancies ended in abortion. Today, even though there are less teen pregnancies, a greater amount or more than half are ending in abortion.

3. Factors of continuous growth of obesity

By Anna Samsik and Ivana Imris, Mother Teresa Catholic High School

The Data Management Project we decided to pursue is obesity. The purpose of this topic is to research the major and also some of the less known factors of obesity. The thesis: there are many factors that influence the continuous growth of obesity around the world. We are going to try oppose the widespread belief that Americans are the most obese group of people in the world. This is a well-known stereotype that we will try to contradict with the help of the different factors of obesity. Our project will start off with basic information of obesity like for example age and gender. We will proceed into displaying the psychological aspects of obesity. We will try to establish, a correlation between the lifestyle of individuals that contributes to the rise of obesity in our world today. Some of these trends are; the more sedentary lifestyle and increasing synthetic food consumption.

The analytical approach for this project is to focus on the major and minor factors of obesity and present this in a way that easily displays the problem areas of obesity like the age area, gender or country with the highest obesity rate. From this, the intention is to research the factors causing the high amount of obese individuals. After presenting the causes, we will present the normal body masses for each height using the Body Mass Index chart to allow personal assessment of weight. We will show a variety of exercises to show their calorie burning rate and which dietary practices are the more efficient. The main conclusion to our project is to show whether our belief that Americans are in fact the most obese people or not. The concluding piece of total health costs of obesity by comparing with other leading illnesses to represent the overall societal impact that obesity has on health care for everyone. Even though there are a lot of people who are not overweight, they are somehow affected by obesity, because we will try to show how much obesity costs health care.

(See also complete report.)

4. Success is in the form of a woman

By Latoya Morgan, Mother Teresa Catholic High School

The purpose of this project is to analyze how the roles of women have changed throughout the years and to explain why “success” is in the form of a woman. The data used for this project is entirely from Statistics Canada and its links.

The data that will be analyzed are university enrolment statistics. By the end of this project, it should be very evident that women have made quite an increase in university enrolments and in jobs in the job markets. They are being paid more and have higher positions in their area of employment.

(See also complete report)

5. The great insurance scam

By David Sullivan, Mother Teresa Catholic High School

The purpose of my project was to analyze any statistical data that backs up insurance company claims regarding their policies of charging teenagers more for driving insurance. I used various driving statistics involving crashes, alcohol and fatalities based on age and gender. I also took a survey of insurance rates for a range of cars, based on age and gender.

I analyzed data using mean (for insurance) but more importantly by using charts/graphs to compare data. My conclusion was that insurance companies are flawed in charging teenagers more than other older age groups, based on the statistics.

(See also the PowerPoint presentation)

6. What affects students' performance in school?

By Justin Caldwell, St. John Catholic High School, Perth

Purpose: to determine whether specific factors affect a student's performance in school

Data: National Longitude Survey of children and a personally created and distributed survey

Analytic Approach: graphical and mathematical comparison and analysis

Conclusion: only some variables have a significant effect on the academic achievements of students

(See also the PowerPoint presentation)

7. How the economy affects casino performance and visitation

By Andrew Wright Stanzel, St. John Catholic High School, Perth

The subject I am going to explore is the connection between the economic situation of a province and how this affects the visitation and profits of the casinos, which operate in that province. This connection has interested me because as the economic situation in Ontario is being described as in a downturn, the prizes of the Ontario Lottery Corporation's draws are increasing. This pattern does not seem to make sense. If people had a lower amount of disposable income would they not then save their money instead of spending it on Lottery tickets. At the grocery store where I work I have to stop and marvel at the fact that during these supposed trying economic times, people are still flocking to casinos and to the lottery kiosks to buy tickets. I decided that the best method to examine this trend is to compare common economic indicators such as the unemployment rate, personal disposable income per person and the personal disposable income by province to examine if a trend is actually present. I am going to examine the

provinces of Ontario and British Columbia. Also as an interesting side note I am going to examine the probability of picking an Ontario citizen over the age of 18 who has been to a casino during a specific year.

The data on the casinos located in Ontario was found on the Ontario Lottery and Gaming Corporation website. It was located in the media release section and consisted of tables. These tables list the 4th quarter and total year-end revenues for the casino, the average number of daily patrons for each casino and the year-end total of visitors to each of the casinos. This data was transmitted in PDF form and then I organized it on Excel. The data on the Casinos located in British Columbia was found on the British Columbia Lottery Corporation website. This data was located in the annual report section and is also transmitted in PDF format. The data used was contained in the corporation's annual public report. The report on the operation of casinos in province consisted of a chart listing casino location, operator, types and amount of games and the casino revenue totals for year. Both of these sites used the traditional fiscal year format when presenting their information. The information about the economic indicators of the provinces was found on Statistics Canada's E-stat website. The data was found in the Cansim II database using a keyword search of economic indicators. The data I used to calculate the probability of meeting an Ontario resident who went to a casino was also found on the E-stat website. I used the information gained from a travel survey commissioned by Statistics Canada, which contained a question asking if you had visited a casino in the last month. Using this data and populations of Ontario I am able to estimate the amount of Ontario residents who visited a casino. Then I used those same population figures, which were found with the economic indicator information to calculate probability of meeting a Canadian who visited a casino.

The method of analysis I used was to compare the economic indicators on a scatter plot and then find the corresponding r and r^2 values to calculate the strength of the relationship. I used Excel to do this analysis by first organizing the data on spreadsheets and then using the graph option to place the data into a scatter plot. Then I added a trend line and automatically calculated the r^2 values. The type analysis used to calculate the probabilities was to use the formula $\frac{\text{outcome wanted}}{\text{all the possible outcomes}}$, the "wanted outcome" being the estimated number of casino visitors and all possible outcomes being the total population of Ontario.

A tentative conclusion based results so far (I am in a second semester class and have not completely finished my study) is that at least in Ontario as economic conditions worsen, the performance of the casinos in that province increases. Similarly, when the economic indicators are showing a better economy, the casinos are not as profitable. However, this conclusion is only based on 4 years worth of results, as the OLG would only release the last 4 year's annual reports. This is why I have chosen to also examine the casino performance for British Columbia but again as in case of Ontario the BCLC will only release the last three year's results. So at this point in time based on my Ontario research, the trend of increased gambling in times of economic stress seems to hold true.

(See also PowerPoint presentation)

8. Teenage drivers: who rules the road?

By Meaghan Lamothe and Erin Bureaux, St. Peter Catholic High School

The purpose of our data analysis is to determine which gender is the better driver in senior high school grades. To gain information to be able to make a conclusion, we have created a survey to be given out randomly to 50 males and 50 females. We will also be using secondary data, from such sources as Statistics Canada and MADD. We will be using certain techniques learnt throughout the Data Management course, such as appropriate surveying techniques, graphing data, and making a conclusion from the data collected. Our main conclusion based on the data we collected through our surveys and the secondary sources were that both genders are equal drivers with problems in different areas. Males seem to have more problems with tickets, especially speeding tickets, whereas females have more problems with accidents, especially in parking lots.

(See also the PowerPoint presentation.)

9. Gender stereotypes in our school

By Tamara McIlhinney, Lea Cadman and Jon Vollebakk, St. Peter Catholic High School

The purpose of this project was to determine if adolescent gender stereotypes exist in our society. Throughout our presentation we attempted to prove that ten specific stereotypes were a reality among the grade eleven and twelve students at St. Peter's Catholic High School in Orleans.

The primary data was collected by surveying four classes of different types in each grade. In doing so, we performed a cross-sectional study from a sample of the student body. These ten stereotypes were chosen using stratified random sampling. First, by dividing thirty-two gender stereotypes found when researching, into male and female strata. From the gathered data, the stereotypes were put into a hat and five of the stereotypes were chosen for each stratum. Our study resulted in the conclusion that adolescent gender stereotypes exist in our society. The study proved that nine of the ten analyzed stereotypes are a reality among our chosen population.

See also the PowerPoint presentation.

10. Analysis of Youth Crime - Criminal behaviour of students

By Alain Gauthier and Nicolas Ferland, St. Peter Catholic High School

This project was designed to determine the levels of youth crime within the Saint Peter High School community. More specifically, to see how youth are gradually exposed to the criminal world. To gather information for the task at hand, random students from

grades 9 to OAC were asked to complete a survey. To cause the study to be a little bit more interesting, the males and the females were questioned separately.

We expect to see a rise in criminal activity as the students grow older. Also, we believe that the males will be more involved than the females, in criminal activities. The results are now in, and they have been organized by grade, sex, and type of offence.

The results regarding the amount of male crimes compared to those of female crimes shows that males participate more than females in criminal activities. There are a few cases where females participate more in criminal activities than males, in certain categories of crime. When comparing each grade a pattern emerges for the substance abuse category. In three out of five grades, the females have participated more in criminal activities. The types of crimes that are present in this category are use of illegal drugs, having drunk alcohol and/ or smoked cigarettes while under age, trafficking, and the use of medical drugs not prescribed. For every other category of crime, there are no patterns present for females being more involved than males.

As for the criminal activity growing as the student gets older, an interesting result appeared. The criminal activity of the grade 9 students is surprisingly high. In every category of crime, the grade 9 students partake in more criminal activity than the grade 10 students. In some cases, the grade 9 students even surpass the grade 11 students in their crimes. These results are very shocking to us and so we believe that there may be some bias present. The grade 9 students may not have taken the survey seriously and therefore gave false results. As for the students surveyed in other grades, they demonstrated the predicted pattern of growth in crime. As they grow older, they participate in more criminal activities.

(See also the PowerPoint presentation.)

11. Obesity and its relationship to health risks

By Anusha Raymond and Laura Gleeson, St. Pius X High School

Our topic deals with obesity and its relation to health risks in North America. The main problem with the rise in obesity can be found in the habits young children grow into. Either it is the lack of exercise a child receives and a growing amount of television being watched or it could be the promotion of fast food eating and the decrease of metabolism by 2% every year. Either way obesity is definitely causing a rise in the health risks of adults all over North America. Our mission is to find out what happens to an obese person that makes them more susceptible to health problems and what are the health risks they are encountering.

In our research thus far we have determined that type 2 diabetes is a major health risk that is influenced by obesity. In our next month we hope to understand why it is and changes our society can make to decrease this problem.

Also we are trying to determine whether obesity provides a direct correlation with health problems. Maybe if the person is healthier than the health risks of an individual getting it may decrease.

(See also the PowerPoint presentation)

12. Health status of children: asthma in Canada

By Holly Shaw, St. Pius X High School

The purpose of this project was to determine how the health status of Canadian children could be improved by decreasing the prevalence of asthma in Canada. As a result, primary data was first used to locate the health problems affecting students in St. Pius X High School. Upon completion of the survey and graphical analysis, it was determined that 38% of students suffered from asthma or allergies. Other topics were also examined to determine if students suffering from these conditions were more or less likely to live in a smoking environment, to be hospitalized, or to participate in outdoor or physical activities. Extensive research was also conducted to establish relationships between children suffering from asthma in St. Pius X High School and in the remainder of Canada. Secondary data was analyzed under the headings: the number of hospitalizations due to asthma, the gravity of asthma in Canada, how Canadians are affected by the prevalence of asthma, and the direct and indirect causes of asthma attacks.

Consequently, asthma affects the lives of numerous children in Canada. However, the number of incidences of asthma will decrease amongst Canadian children if effort is made to decrease children's exposure to known triggers and indirect causes.

(See also the PowerPoint presentation)

13. Aids: a global epidemic

By Paolina Calabro, St. Pius X High School

Though statistical analysis of the spread of aids in developing countries and developed countries I will show that the spread of HIV/Aids is greater in developing countries. The primary data used is survey data that gives information on the grade 12 students' perception on the development of aids. The secondary data was compiled from the UN Aids foundation, The Avert organization, and Statistics Canada.

The data was analyzed through the utilization of the standard deviation, trends, mean & medias and other statistical procedures. The main conclusion drawn is that the spread of Aids is greater in developing countries.

(See also the PowerPoint presentation)

14. Factors affecting students' academic performance

By Pat Graham and Tyler Habley, St. Pius X High School

Purpose: To determine factors that affect the academic performance of students.

Data Used: Statistics Canada data – Ontario Youth Survey (NLSCY) – and data collected from students at high school.

Analytic Approach: We analyzed the same factors from each survey.

Conclusions: Smoking, alcohol, time spent sleeping and stress have a great effect on students' academic performance.

(See also the PowerPoint presentation)

15. The gaming industry in Ontario

by Tamara Webb and Sara Uddin, Sir Robert Borden High School

An increased dependency on gambling revenues will destroy the Canadian economy. This belief is a result of the steady increase in the gaming revenue over the past decade in Canada, absorbing revenue from local businesses. Although the gaming industry is not the largest sector of the Canadian economy, it is one of the fastest growing sectors considering its contribution to the gross domestic product and high employment rates. In the U.S., casinos have already contributed to a diminished local sector. Given the increasing entertainment value and services available at our local casinos, local businesses revenues will decline in the future.

From 1992 to 2000, the gaming revenue has had an exponential growth of 366%. The gaming industry has outpaced all the non-gaming industries with a high increase of employment rates and gross domestic product. This industry has created more than 7700 jobs throughout Ontario, and since 1975, has distributed more than \$170 billion into worthwhile causes within Ontario. Through analyzing statistics over the past decade, the belief is that this thriving industry will not level off but continue to grow at a fast pace.

Casino Niagara has become the number one tourist attraction within Canada, which has their tourism industry expecting over \$1 billion over the next four years. The casinos have now invested in making the consumers visit one of full entertainment value with the addition of restaurants, theatres and hotels. People are now choosing to spend the night gambling as opposed to going to the movies or even bowling. With all of these services offered in one location, they are absorbing revenue from local businesses who expected increases in revenue with the new tourist attraction of a casino. Local businesses in the US, such as restaurants, fell out of the economy because of the casinos tendency to absorb high amounts of local revenue. In periods of five to ten years when

casinos were ultimately being built by the numbers in seconds, these restaurants were falling out as fast as the casinos were being put up. As we tend to follow in the footsteps of our neighbors, it is inevitable that we will end up with the same results.

As a growing economy, the government is worried about heavy reliance on the gaming industry. The current issue in Alberta, in relation to gambling revenue, is that with the decline of oil revenue, the province will become increasingly dependant on gambling profits. The gaming industry has reached an economy of scale in that its outputs are significantly outweighing its inputs. As a result, provincial governments are paying closer attention to the success of the gaming industry, which is interesting in the sense that the province is supporting a bad habit. On the other hand, revenues from this “immoral” industry are aiding provincial funds such as healthcare and education, plus a guaranteed 2% of annual revenue given to Ontario programs for research, treatment, prevention and public awareness for problem gambling. In terms of aiding the community, the Ontario industry gave back \$247 million in its annual payroll. With employees amounting to 7700 in Ontario, employment rates are sky-rocketing. Though the industry may not hold the largest revenue, it is leading in increasing GDP and employment rates. It is difficult to determine whether or not the rewards of the gaming industry outweigh the costs, yet the belief is that the increasing revenues will be detrimental to the economy.

With higher GDP and employment rates, it is hard to believe that the industry may hurt the economy in the future. What needs to be focused on is the effects the industry has on the rest of the economy and the money it is taking from it. Local corporations and businesses are losing a percentage of profits they would otherwise have had if not for the legalized gaming industry. Canadians should not be fooled into thinking that high gambling revenues mean the government should increase their support of this industry. All revenues have a high social and economic cost to the surrounding communities. Only the future will tell what there is in store for the gaming industry.

(See also the PowerPoint presentation)

16. Relationship between childcare and social skills

By Meira Yan, Sir Robert Borden High School

My original thesis question was:

Are there any relationships between the activities performed in the first years of life and individual's self-esteem, ability to interact with others, and capability to do well in school?

Due to difficulty finding data and limited amount of time, I decided to only focus on the relationships between type of child care and social skills.

Data Used: Cycle 2 of the NLSCY. The variables I used were:

- Child Care in Daycare Centres

- Child Care Outside of Home by Relative
- Child Care Outside of Home by Non-Relative
- Child Care in Home by Relative (not brother or sister)
- Child Care in Home by Non-Relative
- Before and After School Programs
- Prosocial Behaviour
- Separation Anxiety
- Indirect Aggression
- Physical Aggression

Analysis Methods Used:

I extracted micro-data from the NLSCY using SAS, brought it into Excel and then into Fathom to compare the results for the social behaviour variables above, related to the type of child care received.

Conclusions:

In my hypothesis, I had predicted that children who attended the child care types, daycare centres or before and after school programs, would be the most social because they would interact with the greatest amount of other children. Although I cannot draw any definite conclusions because I did not find any strong relationships, from the ribbon charts, it appears that children who are in the child care types, home by relative and other's home by relative, are the most social. I believe that these children are the most social because:

- child care type, home by relative, showed the largest amount of children with high prosocial behaviour scores, low physical aggression scores and low indirect aggression scores
- child care type, other's home by relative, showed the largest amount of children with low emotional disorder scores, low physical aggression scores and low indirect aggression scores

My observations completely disproved my hypothesis. I believed that by interacting with more children a child would become "more social", however, it appears that the children who were not in a child care with many other children have the highest social skills.

(See also PowerPoint presentation and full report.)

17. The Canadian dollar

By Prashanta Dhakal, Sir Robert Borden High School

Benefiting from a Strong Dollar

Canada moved to a *flexible exchange rate* monetary policy in 1970 and the Canadian dollar has seen drastic changes in its value since then. With these fluctuations, comes the question in many Canadians' minds: "What is better: high value of dollar or low?" Of course, the position Canadians take on this issue depends on who they are. The exporters say that depreciation of dollar is good without hesitation. However, higher dollar does

have advantages that outweigh its disadvantages. Higher dollar lets Canadians import foreign goods for less, allows Canadian companies to adopt more productive technologies, and allows businesses - whose expenses are based on foreign currency - to be viable.

The relationship between dollar value and purchasing power is simple. With a higher dollar, goods produced in other countries become cheaper for Canadians. Televisions made in China, cars made in Japan, and computers made in the United States all become cheaper so more of these goods can be added to the list of purchases to be made. The effect of sliding dollar is seen when comparing the prices of books in Canada and the United States. The price, noted in the back of the books, from the 70s and 80s used to be only slightly higher in Canada in Canadian dollars. Now, the books cost about 40 percent to 50 percent more here than in the US. Although the financial well being of Canadians, who earned approximately the same amount as Americans when currency exchange is not taken into account, may have improved in the last three decades, it has gotten worse in relation to the Americans. This has been a matter of concern to Canadians. After all, relative wealth matters.

It is obvious that not all technological advancements occur in Canada. Therefore, we must buy the improved technologies and equipment from foreign countries to stay competitive. Without the productive capital, more human resources must be used to produce the same amount of goods. Since the average Canadian is able to produce less than the average American, it eventually translates into relatively fewer purchases being made in Canada, i.e. lower standard of living. A country, therefore, must strive to stay at the front in the race for productivity.

Many professional sports leagues have franchises in both the USA and Canada. The teams pay their players in US dollars no matter where they are located. The problem with a lower value of dollar for Canadian franchises is that their expenses start to look bigger. They cannot start paying the players in Canadian dollars for the obvious reason that the athletes are professionals, trying to make money! This means that devaluation of dollar makes the Canadian teams either less competitive or simply unable to balance the books. We are seeing this with

the *Ottawa Senators*, which recently went through a bankruptcy protection, even though they have above-average attendance among NHL leagues. It has been shown that the loss of a professional sports team does not hurt the economy of the city, but certainly hurts the pride and joy of the many city dwellers.

Although the devaluation of dollar helps increase the amount of goods produced for exports, it reduces the amount of goods produced for local consumption because productivity gradually decreases. Even in the short-term, many foreign goods become too expensive for us to enjoy with a lower value of dollar. We may also suffer culturally as we become unable to keep the things that we take pride in, such as NHL franchises. It is better to keep high level of productivity and have a strong economy in the future than to go for short-term gains that result from a weaker dollar.

(See also the PowerPoint presentation)

18. Health care in Canada: a level playing field?

By Mike Ben-Ezra, Sir Robert Borden High School

The purpose of the project was to find the number of Canadians with 10 diseases (heart disease, diabetes, emphysema, etc.) who did not receive medical care for their condition (“CNR”), the number of patients for whom cost or waiting times were the cause of their lack of treatment (“CNRC”, CNRW”) and whether their income inadequacy had an effect on these variables. The analysis was based on data from the National Public Health Survey. By calculating the total percentage of CNR patients and analyzing the breakdown of this group into CNRW and CNRC categories, it became apparent which obstacle(s) – costs, waiting time or neither – were affecting a greater number of patients.

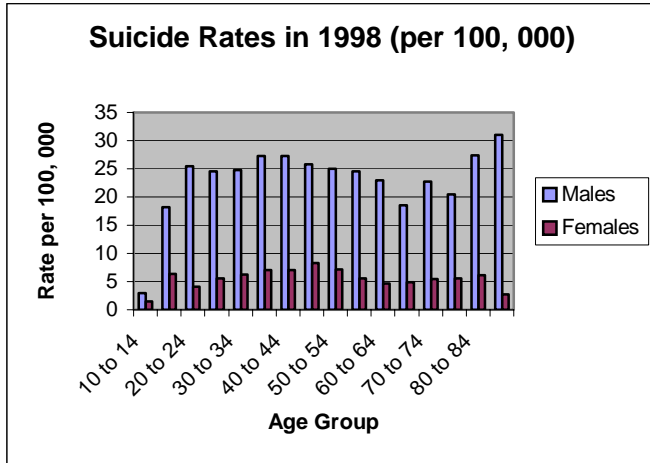
The main conclusions were that low-income individuals are put at a disadvantage when seeking care for some conditions, but that waiting times are an obstacle in the way of nearly three times as many patients. However, the situation is quite complex. Each disease had a unique situation and must be explained individually.

(See also the full report at <http://www.ocdsb.edu.on.ca/SRBHweb/> under the Math course site for MDM4U http://www.ocdsb.edu.on.ca/SRBHweb/math/Data%20Management/Data_Management_Page.html)

19. A closer look at Canadian suicide

By Jessica Laks, Sir Robert Borden High School

“A Closer Look at Canadian Suicide” is a research project dealing with suicide rates in Canada. The original focus of my project was to primarily look at suicide between the ages of 16 to 19. However, early on in my research I found interesting information about the suicide rates in elderly males and middle-aged females:

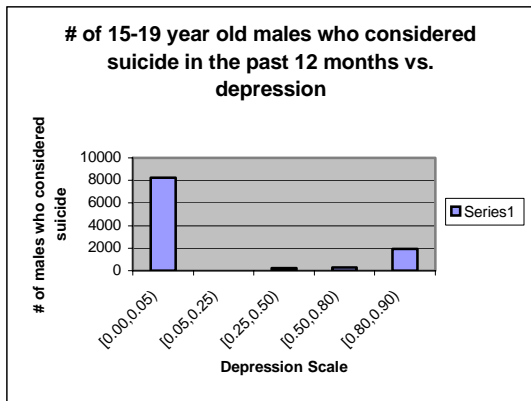


So I decided to look at those age

groups as well.

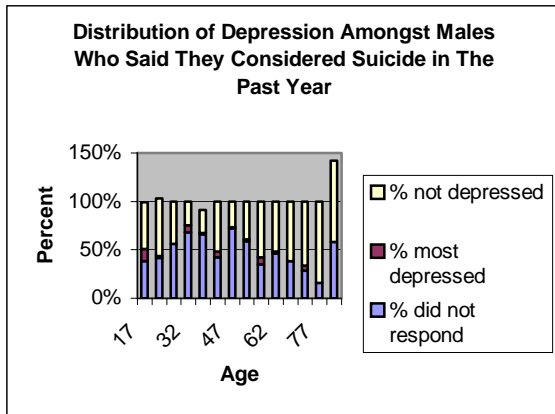
My inspiration for this project came after hearing a devastating story about a teenage boy in the US who committed suicide and didn't leave a note. I decided to look at the factors affecting suicide and suicide rates in order to see if there was any type of correlation between the two. The four main factors I chose to look at were: depression, self-esteem, emotional status and alcohol dependency. I hypothesized that these four factors would have a huge effect on suicide. I was very lucky to have case data straight from Stats Canada's "Canadian Community Health Survey," on the number of people who experienced these factors and their suicide inclination in the past 12 months.

What began as a simple study between factors, ended up a complex research project that focused more on the effects of non-response to a survey rather than the effects the factors have on suicide. I followed the same type of analysis for every factor in question. Using the depression factor for 15-19 year olds, I'll briefly demonstrate what was found throughout my research.

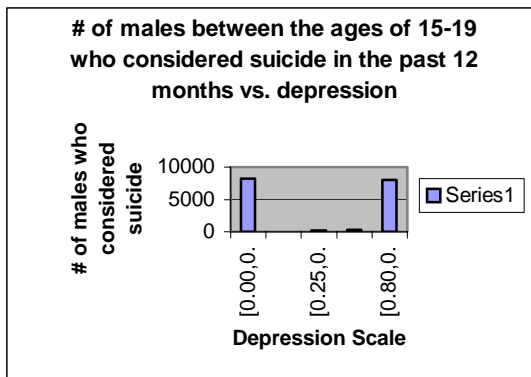


When I looked at this data, I was very shocked and confused to see that the highest suicide inclination was highest at the lowest depression rate. I refused to just conclude that this was right, so I decided to look at

response rate. I noticed many people responded to suicide inclination but then didn't respond to their depression rate. So, I graphed the percent of males and females at every age group who responded, were depressed and didn't respond in a stacked column graph.



If you'll assume, as I did that the % did not respond also is most depressed (this assumption is made because those that are most depressed may not have been willing to talk about it) then we see that blue/maroon bar has a significant effect in both men and women. This means that depression would have an effect on suicide inclination. Using what I just found, I plugged the new data back into my original graph and found:



This time my graph made a bit more sense. Many people still had high suicide inclination and low depression, but it balanced out with those that have high suicide inclination and high depression. Thus leading me to believe that depression does have an effect on suicide inclination and suicide rates.

The rest of my factors were also analyzed and concluded upon using them same form of research and analysis. My project consists of interesting facts on suicide, assumptions, conclusions, an index and much more information on suicide in Canada and around the world. Please come take a look at my project and to learn not only what has an effect on suicide, but valuable information on the data and surveys done by the Canadian Community.

(See also the PowerPoint presentation and full report on the CD-ROM)

(See also the full report at <http://www.ocdsb.edu.on.ca/SRBHweb/> under the Math course site for MDM4U

20. Spending on education and wealth

By Hazel Nicholls, Sir Robert Borden High School

I wanted to find a relationship between a country's spending on education and its economic wealth. I found the *United Nations Briefing Papers for Students* and read the *Education Briefing Paper*¹. Common sense suggested to me that by spending more on education, a country would be making an investment in its future workers and thus, its wealth and productivity would increase. The *Education Briefing Paper* confirmed the reasonableness of my hypothesis by stating "Education is the key to the new global economy, from primary school on up to life-long learning. It is central to development, social progress and human freedom."² and:

Education is an effective weapon to fight poverty. It saves lives and gives people the chance to improve their lives. It gives people a voice. And it increases a nation's productivity and competitiveness, and is instrumental for social and political progress.³

I would need to decide how long it takes the spending to affect wealth, so I would need data for both education spending per student and gross domestic product (GDP) per person that would span a period of years and be available for many countries.

Due to the lack of international data available, I decided to take another look at my topic. It seemed that the same sort of relationship with spending and wealth would be true at home in Canada. Since education is a provincial responsibility, I would need data for provincial spending per student and provincial GDP per person that would span many years. I would also need the Consumer Price Index (CPI) in order to adjust for inflation.

I went to EStat and was able to locate data over a range of years. I was able to manipulate this data to fit my requirements, providing me with the spending per school age child (SPSAC) adjusted to 1986 dollars for the years 1954-1995, and the provincial GDP per person adjusted to 1986 dollars for the years 1961-1991.

For each province I graphed both GDP per person and SPSAC on the same axis. I made the scale of each axis the same for all provinces to offer a fair comparison. To make

¹ "Education," *Briefing Papers for Students*, n.d., UNESCO, April 28 2003
<<http://www.un.org/cyberschoolbus/briefing/education/index.htm>>.

² "Education".

³ "Education".

the trends easier to see and analyse, I created a three year moving average and a line of best fit for both the GDP and SPSAC.

After graphing both SPSAC and GDP over time, it seemed that GDP had the impact on SPSAC rather than the opposite. Generally if GDP is decreasing, a province either leaves SPSAC the same, increases it at a very slow rate, or decreases it.

When graphing each province's SPSAC and GDP, I also noticed a wide disparity between the provinces in both SPSAC and GDP. It seemed that the "poorer" provinces were spending a larger portion of their GDP on education. I then realized that since "poorer" provinces receive equalization payments to ensure that ". . . regardless of their ability to raise revenue, [they are able] to provide roughly comparable levels of services at roughly comparable levels of taxation..."⁴ This statement on a federal government website made it sound like since there are equalization payments, a student in PEI, for example, should expect a "roughly comparable" amount of money to be spent on his or her elementary and secondary education as a student in Ontario. To see if the amounts were "roughly comparable" I graphed each province's SPSAC over time on one graph. In order to get a better idea of how the spread of spending changed over time, I drew a box and whisker plot.

Generally, the size of both the box and the length of the whiskers increases over time. This indicates that the spread not only on the extremes but in the middle half of the data is increasing, and seems to support a conclusion that in recent years the provinces do not spend "roughly comparable" amounts on education.

I also wanted to compare the spread of the SPSAC of each province on one graph, so using Fathom I drew another box and whisker plot with the provinces on the x-axis. From this plot I could see that the median was quite comparable in Alberta, British Columbia, Manitoba, Ontario, and Quebec. Astonishingly, the ends of the whiskers of the Atlantic Provinces were below the lower bounds of these provinces' third quartiles. This confirmed my finding that the levels of funding are not "roughly comparable" across provinces. I would expect the actual cost of delivering education in each province, and at different time periods, to vary slightly; however, the dramatic differences seen here suggest that education spending and the relative ability to deliver a quality education vary substantially from province to province. In fact, a province in the bottom half of GDP has never been in the third quartile (top 25%) of SPSAC during the years 1961-1991. I also used the normal distribution to show that high SPSAC is not randomly distributed throughout the provinces.

⁴ "equalization," Glossary of Frequently Used Terms, 28 Jan. 2003, Department of Finance Canada, 20 April 2003 <http://www.fin.gc.ca/gloss/gloss-e_e.html#equal>.

I was able to find that generally, if a province's SPSAC is high, that province usually has a high GDP. However, there are several points where SPSAC is sometimes higher in one province with a lower GDP than others. I speculate that the politics of the day, when it comes to choices in government spending, probably play as big, if not a bigger role, as does GDP.

I would like to see governments increase the SPSAC, especially in those provinces where GDP is low. At a national level, more should be done to reduce the spending gap between the "haves" and the "have-nots". Hopefully in the future, a baby born in Newfoundland will have the same chance of having as large an investment made in his or her education as a baby born in Ontario would expect; that high spending on education will become independent of a low GDP. Perhaps it is only then that we will begin to see GDP rise as a result of spending.

(See also the PowerPoint presentation and full report)

21. What factors affect the success of an NHL team?

By Laykeat Wong, Merivale High School

The purpose of this project was to determine the factors which were the most important to the successful NHL team. The factors were shots, stadium attendance, goals for, goals against, and team salary. The data I used came from the web site NHL.com. I compared the factors to the team's standings based on the 2002-2003 regular season. In conclusion, even with all these factors, a team's success cannot be calculated by numbers. It is the chemistry between the players which will ultimately determine a team's success.

(See also the PowerPoint presentation and full report.)

22. Factors affecting the income of Canadians

By Michael Curridor and Jodi Morden, Sacred Heart Catholic High School

The purpose of the project was to determine what factors increase or decrease one's income. We used data off the Statistics Canada website from the 1997 Census. Also, we took advantage of the microdata from the 1991 Census. We analyzed the following factors: age, gender, location (province, city) and education.

We concluded that all have a dramatic effect on one's income, but that location and gender would have the most.

(See also the PowerPoint presentation)

23. Factors influencing the GDP in Canada

By Michael Hahn, Sacred Heart Catholic High School

The Purpose was to prove which factors influenced GDP in Canada. The variables used were manufacturing, bankruptcy, employment rates and agricultural products. All data was acquired from the E-STAT website. The main source of analysis is r^2 values and comparison of charts. Mean and standard deviation are used to predict average values. The conclusion was that manufacturing and employment rates influenced the GDP the most.

(See also the PowerPoint presentation)

24. Education and income

By Chelsea Corcoran, St Matthew Catholic High School

The hypothesis for my project is that despite the fact that in Canada education is a social benefit that is universal, does household income have an effect on academic attainment and what other factors does income affect that cause a student to fail or achieve in their studies? I thought that income would definitely affect educational attainment because of everything else (nutrition levels, social factors) it affects. After doing some analysis I found that income really only had a small effect on elementary and secondary education but made a difference in enrolment in college/university. This is because up until the time a student reaches the end of high school, education is universal. The funds for post secondary education generally come from the family's own bank account. To look further into funding issues I looked at the relationship between government funding and educational attainment. I did not find a strong correlation but both education funding and the number people with high school diplomas keep rising.

Some of the variables I wanted to look at, such as social factors (nutrition (lack of breakfast etc.), certain social conditions (drugs etc.) or home environment) were not available and others had little to no correlation, but I was able to establish certain relationships and my analysis did give me some insight into what is happening in Canadian education. My conclusion, income has only a little effect on elementary and secondary education but plays a larger role in college/university attendance. I believe, though, that the money put into providing an education for all youth is worthwhile and does have an effect. Before education became universal income determined your level of schooling. Today that limit is close to being eliminated.

(See also Corel presentation)

25. Crime in Canada

By Dave Andrews, St Matthew Catholic High School

The thesis for my project is "It is believed that there are many affecting factors which lead to the increase or decrease of crime." Using the Statistics Canada website, I looked at crimes in Canada and the many variables available. I chose to specifically look at the murder rate, property crimes, assaults, and total crimes and compare them to the unemployment rate, the number of police officers, population per police officer, post secondary education rate, average after tax income, and the immigration rate. I was hoping that I would find very strong correlation between rates of crime and these factors. (Specifically, I expected that crime would go down as number of police officers increases; as education levels increase; as incomes increase; and as immigration populations decrease). I used Fathom to create the many graphs which I then used to come to my conclusions.

In many cases I was disappointed because there was either very weak correlation or in some cases the data proved the opposite of what I expected. With much of my data

the apparent trends could be modeled using exponential, quadratic and cubic functions, although with cubic and quadratic equations it is very difficult to define future trends. The strongest set of related variables was immigration compared to the total number of crimes. There was a linear relationship, with a coefficient of correlation of 0.79, which for my sets of data was very strong. While blaming crime on immigration rates is obviously a very sensitive issue, my data and some research does suggest that large crime increases coincide with a larger and ever growing immigrant population. In general, I found that it is difficult to predict crime patterns in Canada. There are simply too many factors contributing to rates of crime in such a large country. While my research did not conclusively link any factors with crime, I believe that looking at ages of criminals and regional locations of crime may help to shed some further insight into Canadian crime patterns.

(See also the PowerPoint presentation)

26. Sustainability of human activity and the environment

By Jean Michel Lauzon, St Matthew Catholic High School

My project was a look into the effects that humans have on the sustainability of the environment. Over the last decade, human impact on the environment has continued to increase. It seems quite likely that the environment will not be able to continue to sustain our current quality of life in the future. My analysis looked at different aspects of population and how they relate to different environmental characteristics. Specifically, I looked at petroleum, crude oil, natural gas, electricity, aquaculture and natural metals (lead, copper, and zinc). In general, I was trying to find graphical and numerical evidence on whether humans are using the environment in a non-sustainable way. °-Stat was the source for all of the data I used in my project, as well as my main source of non-numerical information. I consulted *Human Activity and the Environment 2000*, a report compiled by Statistics Canada, numerous times in my examining of the topic.

My PowerPoint presentation is a wonderful blend of different media including factual information, graphs and sounds. A portion of my data is presented in the form of graphs and tables. An in-depth analysis of several human-based activities that affect the environment is presented in a clear and professional format. The results of my research demonstrated that there is a strong correlation between characteristics of population and the impact on the environment based on the factors discussed above. In general, my results showed that our current standard cannot be sustained in our environment.

(See also the PowerPoint presentation)