THE CENSUS AS A SOURCE OF SECONDARY DATA

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By

CARLTON LESLIE McEACHERN

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AUTHOR	Carlton Leslie McEachern, B.A. (McMaster University)
SUPERVISOR	Professor Robert Drass
COMMITTEE	Professor Robert Drass Professor Franklin Henry Professor Peter Pineo Professor Alfred Hunter
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ABSTRACT

This thesis was an attempt at considering census data as a viable source of data for secondary social research. Through the use of hypothetical research problems, the data was examined for possible errors. Several were found but upon further examination, they were found to be insignificant in the distirtion of analysis of data. The findings of the hypothetical research problem, the construction of socio-economic scores for the Provinces of Ontario and Quebec, were as follows; no significant differences were found to exist between major occupational categories for Ontario and Quebec. There were some sizeable differences between some single occupations between the two provinces, but on the aggregate, these made little difference for comparative analysis. In sum, we found the census to be a usefull source of data for second ry analysis.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank my thesis committee, Robert Drass, Franklin Henry and Peter Pineo, for their encouragement and helpfull criticisms. I want, too, to thank B.R. Blishen, who provided me with confidential information which greatly assisted the accomplishment of the thesis.

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CHAPTER ONE

Introduction

Statement of the Research Problem

In the selection of a research topic for the following thesis, several considerations had to be examined. Among these was the fact that the emphasis on comparative studies among sociologists has been intensified in recent years. An example of this intensification was the creation of a Comparative Industrial Societies Programme, within the Department of Sociology and Anthropology at McMaster University. The objectives of this program as stated in the C.I.S.P. proposal are as follows:

> " 1. To provide training in the theory and methods comparative sociological research as these apply to modern industrial societies.
>
> 2. To promote comparative research *, with particular reference to the consequences of technological change for social structures and the processes in selected modern industrial societies.
>
> 3. To maintain a documentation and data centre for the societies which are the focus of the programme." 1

* Comparative research refers to the analysis of two or more societies at the subsystem or total system level.

A second consideration in the selection of a research problem, involved the emphasis placed on the substantive area of social stratification within the department. In view of these two factors, it was thought that a thesis dealing with both the comparative aspects of research as well as with the subject area of stratification, would be of most benefit to the participating members of the department.

With the above points to consider, a comparative orientation with a social stratification content, I found myself in a dilemma. It was clearly my ambition and intention to do a thesis in Research Methodology. The dilemma resolved itself in the following fashion. It was proposed that a methodology thesis be done. This thesis would in some way involve the two consideration of a comparative perspective and a stratification content, preferrably in a Canadian setting (author's bias). A review of the literature revealed a number of stratification studies which would lend themselves to a comparative perspective, but unfortunately, most of these did not appear suitable for a thesis dealing with some aspects of research methodology. Eventually, an area of stratification was selected. This area, socio-economic scales of occupations lent itself to a comparative

perspective, at the intra-national level and coincidentally, involved as one of its chief components, the use of census data, an excellent target for a methodological paper.

It was proposed that the thesis examine the census as a source of secondary data for comparative research. That is, given a particular set of census data and a particular research problem in stratification, how well does census data lend itself to that particular research problem?

One of the most popular uses of census data in stratification studies has been in the construction of socio-economic scales of occupations. So, if we selected a hypothetical research problem like the construction of socio-economic scales, this would involve, in major proportions, the use of census data.

The thesis would then be in a position to examine aspects of census data for such methodological problems as missing data, inaccuracy of reported statistics, compatibility with the methodology of the hypothetical research problem and some general criticisms regarding the general usefulness of census data to the area of socio-economic scales of occupations.

In order to be aware of the general characteristics and peculiarities of census data, a brief historical exploration

of population enumeration and a specific look at the 1961 Census of Canada, may prove helpful.

The Census in History

Researchers in sociology have at their disposal a variety of source materials for use in comparative studies. Historical records, human relations files, census data and various kinds of survey data collected by others and made available through the various Data Banks at universities in Canada and the United States, as well as various other countries throughout the world, form much of the bulk of the above mentioned source material. Perhaps one of the most complete sources of material for use in comparative studies is that of the census.

According to H. Alterman, author of the book, Counting People: The Census in History, the Babylonians have the earliest records of counting population that can be called census taking. He says, "As far back as 3800 B.C., they had developed a system of revenue control that involved the enumeration of the tax-paying segment of their population." [2] As time progressed, the object of the counting in a census changed from the enumeration of land as a tax unit to that of enumerating man. Since that time, the counting of man has continued without interruption.

The practice of the state enumerating people, for whatever reasons, is not a new one. The history of census taking on the North American continent dates back to 1665, when what was then La Nouvelle France, present day Quebec, was the scene of one of the first census enumerations. This census listed the inhabitants of the population by name, sex, marital status, and trade or profession. The total population at that time was 3,215. [3] Alterman goes on to say that not long after this census in La Nouvelle France, censuses took place in Nova Scotia and Newfoundland. In the ninety years following 1665, there were 14 more censuses in La Nouvelle France, seven in Nova Scotia and six in Newfoundland. In the United States, 1790 marked the first year of a dicennial census. The taking of this census was preceded by much argument and debate among members of the government, especially between members of the slave and free states, as the census was to be taken to determine representation in the House of Representatives. This census included 16 states and one territory and cost $44,377.28. It was estimated that the 1970 census in the United States cost 100 times this amount. [4]

In federated Canada, the first dicennial census was taken in 1871 and included the areas of Ontario, Quebec, Nova Scotia and New Brunswick. [5] The history of the census in other countries of the world may span a little more or less time.

In 1800, the Census Act was passed in England and the first census took place in 1801.[6] The first complete enumeration of the Italian people took place in 1861.[7] The first general enumeration of the population of Russia took place in 1897. This enumeration required that the urban population and those within the domain of the nobility submit written responses while the enumeration of the rural population was carried out by direct interview.[8]

A more detailed analysis of population enumeration in countries of the world can be found in Counting People: The Census in History, by H. Alterman, as well as in various works by other authors. Since our primary source of data in this thesis will come from the 1961 Census of Canada, it would be appropriate at this point, to detail some information about this Census.

The 1961 Census of Population has been described as more expensive, involving more personnel, producing more tabulations and reports, and as being more accurate than any previous Census in the history of federated Canada.[9]

The actual expenditures for the Census, to December 31, 1968 total to $17,529,679. Of this amount, the largest single expense was "payments to enumerators for services." This expense accounted for 36.5% of the total expenditures for the Census.

The cost of the 1961 Census nearly doubled the

1951 expenditures. The cost increase can be accounted for by the following factors; a) a record four million increase in the population; b) higher rates of pay to enumerators, and; c) increased salaries to temporary clerical staff.

In total, 18,785 enumeration areas were designated for the 1961 Census. This represented an increase of 69.6% over the 1951 figure. The provinces of Ontario and Quebec had the largest number of enumeration areas at 10,111 and 8,605, respectively. In addition, the number of tracted cities increased from 17 in 1951 to 23 in 1961 making a total of 1,639 tracts for the 23 cities.

The 1961 Census of Population was the first Canadian Census in which most of the data processing was accomplished by means of an electronic computer system. As a result, more tabulations were produced than ever before. In total, 11,000 pages of statistical material contained in seven published volumes, as well as 3,000 pages of other reports, were issued, and comprise the results of the 1961 Census.

A quality check of the 1961 Census of Population was carried out to obtain an estimate of underenumeration. A target sample of 6237 people were selected from various enumeration areas for re-enumeration. After adjusting the results for deceased persons, and persons who had left the country, the underenumeration for Canada was calculated as 3.3 percent. This represented an improvement over the 1951

figure and was attributed to improvements in field organization and checking procedures.

As in the 1941 and the 1951 Censuses, the Housing Census was carried out on a 20 percent (non-rural) sample basis. The data on income, migration and fertility were collected on three different census forms; Form 2A, 2B and 4. The 1961 population sample was drawn by a systematic selection of every fifth private household. The sample excluded the population in collective type households, such as institutions, hotels and lodging houses ect. Furthermore, the income sample enquiry was addressed to non-farm households only (excluding the population in farm households in both rural and urban areas) and also excluded the population in the North West Territories.

After several data re-arrangements, the sample was weighted for all census tracts, cities of 30,000 people and over and counties, to the population total, of persons aged 15 and over and resident in private non-farm households in tracts, cities and counties. Tabulations were then prepared and are published in Volume 4 of the 1961 Census series.

A final point of consideration for the 1961 Census was a quality of enumeration check and a response variance check, both of which were carried out by I. P. Fellegi of the

Dominion Bureau of Statistics. As already mentioned, the underenumeration for Canada was calculated as 3.3 percent. Results of the response variance check discovered that questions dealing with ethnicity and mother tongue had extremely high levels of response variance relative to the other census questions.

In summary, the 1961 Census provides the social researcher with a rich source of data which has been checked for representativeness and accuracy within the financial and time restrictions governing such checks. In addition, a wide variety of tabulations are readily available as well as provisions for obtaining special tabulations. Certainly, such a source of data should not be neglected as inappropriate for social research purposes.

Generally, we expect every contemporary nation to have some form of population enumeration, although the specific history of the procedure varies. When and why the census was begun, the questions asked and the information collected, from whom and by what methods, are all cross-national variables.

For those who are interested in national research and in particular, international comparisons, there is no data as easily available as these censuses. As long as governments feel compelled to collect such information from their populations, the social scientist could thankfully use it. That is, the social scientist can do so, presuming there are no

great problems and difficulties with such secondary data. Such a presumption is dubious. Even the naive should be suspicious of census data, for reasons discussed in Appendices D and E.

However, from what we know of social research, there exist two broad categories of researchers; those who do not use census data and therefore ask no questions about its usefulness, and those who do use census data and who usually ask no questions about its usefulness. Perhaps, if someone would examine the data, they might discover that it is so promising as to convince the former to incorporate it as possible data or they might find it so replete with difficulties as to convince the latter to dismiss the possibility of using it as data.

In an effort to demonstrate the usefulness, as well as some of the methodological problems, in the use of census data for research, the following research problem was proposed: the construction of socio-economic scales for all occupations listed in the 1961 census, for the provinces of Ontario and Quebec. Thus, the research effort is one of intra-national comparison.

There are several precedents for such scales of occupations. In 1961, O. D. Duncan published a socio-economic scale for all

occupations used in the United States census. The scale employed prestige ratings of occupations which had been collected by the National Opinion Research Centre (NORC) as well as census data on income and education of the incumbents of each occupational title.[10] In all, 425 detailed occupations are listed in this index, which is based on the 1950 census of the United States. (Since our concern here is methodological rather than theoretical, the justification of such a scale will not be reviewed in detail. Suffice it to say that the theoretical reasoning relies almost entirely on the functional theory of stratification developed by Davis and Moore[11] as well as others.[12]) In 1963, and 1969, D. Bogue published scales of occupational status which were constructed from census data. Basically, the procedure used was a correlation of income and education data, obtained from the United States census, of the incumbents of individuals within each detailed occupation.[13] In a similar fashion, the 1958 occupational scale by B. Blishen, which contained socio-economic scores for the 320 occupations used in the census of Canada, was created.[14] In 1967, Blishen published a revised socio-economic scale for the detailed occupational list in the census of Canada.[15] The new Blishen scale was constructed using a different methodology which is outlined in detail in

the methodology section of this paper. Basically, however, the methodology used by Blishen, is similar to that of Duncan.

Perhaps the most influential work in the development of socio-economic classification schemes for occupations is that of Edwards.[16] His socio-economic groupings of occupations has been widely used in many studies of social stratification, and in addition, in 1940, his scheme of classifying occupations was adapted by the United States Bureau of the Census for use in classifying occupations in census analysis.

There have been other schemes for classifying occupation but the majority of them do not make use of census data, they need not be cited in detail. The majority of these other schemes use subjective ratings of "prestige" or "social standing" to arrange occupations in an index or scale. It should also be noted that many of these other schemes do not include scores for all occupations used by the census.[17] It should also be noted that all of the occupational scales, whether dealing with prestige, or socio-economic characteristics, were carried out at the national level. This has had the consequences of playing down the possible importance of regional differences. Indeed, one is hard pressed to find mention of regional variation in any of the publications presenting scales

or indices for occupations. Therefore, by focusing our analysis on occupational scales for the provinces of Ontario and Quebec, we hope to make a contribution to sociology by exploring the possible regional effects on socio-economic indices of occupations.

Although we will be constructing socio-economic scales for Ontario and Quebec, the main interest of the research problem will be to discover the utility of census data for comparative research within a nation. In general, our interest is a critical exploration of the process of using census data. We assume that the problems we encounter in our particular research would be relevant to other research with census data.

Problems inherent in Canadian census data, have not been extensively elaborated, previously. A search for literature pertinent to errors in census data, revealed only four articles which dealt with problems of error in Canadian census data.[18] In view of the fact that census data is widely used by researchers in comparative studies, it would appear that there is an obvious need for further detailed evaluation of census material at the intra-national level.

Thesis Structure

This thesis is an attempt to examine the utility of census data for the purposes of comparative research. The general format of the thesis will be as follows; Chapter 2 will deal with a description of the research methodology to be used for the purposes of the hypothetical research problem, the construction of socio-economic scales for the provinces of Ontario and Quebec. In essence, the methodology employed is the same as that used by Blishen. Chapter 3 is a presentation of the socio-economic scales for the two provinces as well as a comparison between the two provinces and between the provincial and national scales. Chapter 4 reports the main findings of the thesis and includes a discussion of their implications for research. Chapter 5 presents our main conclusions and final comments. Some evaluation is made of the method employed in the thesis for the discovery of census data errors. Finally, the appendices present the socio-economic scales for the two provinces, in rank order, reprints of various computer programs employed in the construction of the scales, various correspondence which took place during the research, upon which the thesis is based, and a review of the literature dealing with errors in census data as well as other general problems of census data that were brought to my attention during the execution of the thesis.

NOTES

1. Department of Sociology and Anthropology, McMaster University, Comparative Industrial Societies Programme: A Manual For Data Users, F. Jones (supervisor), p. 1.

2. H. Alterman, Counting People, The Census in History, (N.Y., Harcourt, Brace and World, Inc., 1969), p. 18.

3. Ibid., p. 58.

4. For a description of the areas i- this census, and their populations, see H. Alterman, op.cit., p. 201.

5. Ibid., p. 58.

6. Ibid., p. 41.

7. Ibid., p. 53.

8. Ibid., p. 56.

9. The facts and figures cited in the following paragraphs are from the Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin 7.2 - 12, Ottawa, The Queen's Printer, 1969.

10. For a detailed description of the methodology used, see Duncan, O.D., "A Socio-Economic Index For All Occupations," in A.J. Reiss Jr., Occupations and Social Status, (U.S.A., The Free Press, 1961), pp. 109 - 138.

11. Davis, K. and W.E. Moore, "Some Principles of Stratification," American Sociological Review, 10 (April,1945), 242 - 249.

12. Parsons, T., Essays in Sociological Theory, (U.S.A., The Free Press, 1964), pp. 69 - 88.

13. Bogue, D.J., Skid Row in American Cities, (Chicago, Community and Family Study Centre, 1963), Chapter 14, Appendix B; also see by the same author, Principles of Demography, (U.S.A., J. Wiley and Sons, 1969), Chapter 14.

14. Blishen, B.R., "The Construction and Use of an Occupational Class Scale," Canadian Journal of Economics and Political Science, 14 (November,1958), 519 - 531.

15. Blishen, B.R., "A Socio-Economic Index For All Occupations," Canadian Review of Sociology and Anthropology, 4 (February, 1967), 41 - 53.

16. Edwards, A.M., Comparative Occupation Statistics For the United States, 1870 - 1940, (Washington, D.C., U.S.G.P.O., 1943).

17. For a discussion and summary of these studies see Hodge, R.W., et.al., "A Comparative Study of Occupational Prestige," in R. Bendix and S.M. Lipset, (eds.), Class, Status and Power, (2nd. edition, New York, The Free Press, 1966), 309 - 321; also see P.C. Pineo and J. Porter, "Occupational Prestige in Canada," The Canadian Review of Sociology and Anthropology, 4 (February,1967), 24 - 40.

18. For example, see Lieberson, S., Language and Ethnic Relations in Canada, (J. Wiley and Sons, 1970), pp. 17 - 20; "Language Questions in Censuses," Sociological Inquiry, 36 (Spring,1966), 262 - 279; Ryder, N.B., "The Interpretation of Origin Statistics," Canadian Journal of Economics and Political Science, 21 (November,1955), 466 - 479; I.P. Fellegi, "Response Variance and Its Estimate," Journal of the American Statistical Association, 59 (1964), 1016 - 1041. See Appendix E for a discussion of these articles.

CHAPTER TWO

Methodology

The Format for Replication

Since the methodology of the thesis was necessarily outlined in the previous chapter, our attention in this chapter will be primarily devoted to an outline of the methodology for the construction of socio-economic scales of occupations. More specifically, we will focus on the methodology used by Blishen.

In order to construct a socio-economic scale for all census occupational titles in the provinces of Ontario and Quebec, it was decided that the methodology used by Blishen, in his 1961 scale, would be replicated, in so far as it is possible. Since Blishen used the same methodology employed by Duncan in his Socio-economic Index for all Occupations, it will suit our purposes to examine Duncan's methodology in an effort to discover its logic. Duncan notes that Reiss demonstrates that the NORC prestige scores for the 45 occupations considered equivalent to census titles in the United States, correlate highly with certain other social characteristics, particularly income and education. Reiss reports these correlations (Kendall's tau) of the 45 occupations in the NORC list with the median income level to be + .85 and + .83 for the median level of educational attainment. This indicates that "roughly 72 percent of the variance in (the NORC) prestige scores there-

fore is accounted for by income, and 69 percent of the variance (of the prestige scores) is accounted for by educational attainment."[1] Reiss goes on to say that either income level or educational attainment is a surprisingly good predictor of the general standing of an occupation.

Duncan also points out that the use of income and education to measure the socio-economic status of an occupation has both "precedent and theoretical justification."[2] He cites Edwards "socio-economic groupings"[3] as a point in case. According to Edwards, "Education is a very large factor in the social status of the workers, and wage or salary income is a very large factor in their economic status."[4] Duncan states essentially the same argument in terms which are perhaps a little less ambiguous. "A man qualifies himself for occupational life by obtaining an education; as a consequence of pursuing his occupation, he obtains income. Occupation, therefore, is the intervening activity linking income to education."[5] Thus, each occupation, has a prevailing level of education and income attached to it. In view of this, it would seem logical to use the two, education and income, as predictors of socio-economic status. In addition, it does not seem unreasonable at all to expect the two, when used in combination, to form some measure of a socio-economic status scale.

One additional point of precedent to keep in mind is the socio-economic scale constructed by Blishen in 1958. "Occupations listed in census publications could be ranked in terms of socio-economic status: the system made use of data on education and income characteristics of incumbents of these occupations obtained during the 1951 census."[6 & 7]

With the above arguments in mind, we can now turn our attention to the actual mechanics involved in the construction of a socio-economic scale, in this case for the provinces of Ontario and Quebec. The first step in the construction of such a scale would be the selection of the variable to be predicted. In this case the most obvious choice would be the prestige ratings of the occupational prestige scale developed by Pineo and Porter,[8] since Blishen used these same ratings. As mentioned in the preceding chapter, this scale was constructed using the subjective ratings of a smaple representing the entire Canadian population. Since the scale contains 204 occupations, which include only a partial overlap of the actual number of occupations listed in the census, because of non-equivalent titles, it is necessary to assign approximation of this prestige scale to all census occupational titles. At this point, we must depart from the methodology used by Blishen, since he was interested in a national socio-economic scale and therefore had to use national prestige ratings, and our primary concern

is with the provinces of Ontario and Quebec. Thus, we will use Provincial Prestige ratings.

Using the raw data from the Pineo-Porter study, occupational prestige scales were constructed for the provinces of Ontario and Quebec. The 88 occupations in the Pineo-Porter study which overlap with the census titles were then used in the construction of the socio-economic index for each province. It should be pointed out that these titles were the same 88 occupational titles used by Blishen in the construction of his socio-economic index for occupations,[9] although he used national prestige ratings from the Pineo-Porter study, whereas we used Provincial Prestige Ratings. At this point, we shall return to the methodology used by Blishen in order to complete the construction of the two socio-economic scales. With this in mind, the next step is to select, from the census, the percent of males in each of the 88 target occupations whose income was reported to be %5000 dollars or over during the preceding twelve month period, and the percent who had attended at least the fourth year of high school. A regression equation was then constructed using the 88 occupational prestige scores, from each province, as the dependent variable and the corresponding income level and educational level percentages mentioned above, as the independent variable. The operation was, of course, performed separately for the provinces of Ontario and Quebec. This operation rendered an equation expressing

the estimated prestige rating as a function of the two predictors, income and education level, for each province. These regression functions were then applied to the income and education data, for all of the census occupational titles, for each province.

The last step in the construction of the two scales was the ranking of the 320 occupations for each province according to their socio-economic value. An additional step was the grouping of these occupations into class categories, similar to those used by Blishen.

As a final comment to this chapter, the reader is reminded that the construction of socio-economic indices is only a secondary function of this thesis. The evaluation of census information as a secondary source of data, is in fact, our foremost concern. More specifically, the discovery of inaccuracies, missing data and discrepancies in information, will determine the eventual value of the thesis to social research.

NOTES

1. A. J. Reiss Jr., Occupations and Social Status, (U.S.A., The Free Press, 1961) p. 84.

2. O.D. Duncan, "A Socio-Economic Index for All Occupations," in A.J. Reiss Jr., op.cit., p. 115.

3. A.M. Edwards, A Socio-Economic Grouping of the Gainful Workers of the United States. (Washington, D.C., U.S.G.P.O., 1938).

4. A.M. Edwards, Comparative Occupation Statistics for the United States, 1870 - 1940, (Washington, D.C., U.S.G.P.O. 1943), pp. 180 - 182.

5. O.D. Duncan, op. cit., pp. 116 - 117.

6. B.R. Blishen, "The Construction and Use of an Occupational Class Scale," The Canadian Journal of Economics and Political Science, 24 (November, 1958), 519 - 531.

7. For a list of studies employing scales of occupations see, A.J. Reiss Jr., op. cit., footnote 10, p. 7.

8. P.C. Pineo and J. Porter, "Occupational Prestige in Canada," The Canadian Review of Sociology and Anthropology, 4 (February, 1967), 24 - 40.

9. The list of these 88 occupational titles was obtained in confidence from B.R. Blishen, then at Trent University. Peterborough, Ontario, Canada (see Appendix B).

CHAPTER THREE

The Socio - Economic Indices

INTRODUCTION

Comparative research of regions within a nation, poses many methodological problems for the social scientist. Among these, is the use of national scales, such as the socio-economic index of occupations (Blishen, 1967) or scales of occupational prestige (Pineo-Porter, 1967). Researchers involved in work at a sub-national level, frequently use scales which were created from national data. Therefore, these scales might not reflect an accurate picture, of the social hierarchy, of the region the researcher is concerned with. If this were the case, its implications for research, past, present and future, would be of great interest in the field of comparative study.

For example, studies comparing the social mobility of incumbents of various occupations, cannot take into account the possibility of significant regional variation when a national socio-economic index is used as a basic measure of mobility. For instance, two occupations in Ontario will have a measurable difference in occupational status. Using a national index of occupational status will yield a quantitative measure of mobility. However, this quantitative measure will be the same for these two occupations whether their incumbents are resident in the Maritimes or in British Columbia. In other words, use of a national scale in this way will simply not reflect the true distribution of mobility in terms of prestige, income and educational rewards.

This technique does not allow for the possible unique fluctuations, which might exist in occupational status within each region, to become apparent.

The purpose of this chapter then is to explore what differences might exist between a province and the nation, in terms of socio-economic indexes of occupations, and in addition, what differences exist between provinces. An awareness of the need for such a comparison has been demonstrated in the literature by Blishen. He states that, "A ranking of occupations at the national level will not necessarily coincide with a similar ranking at the provincial level". And latter, "... a class scale based on ranking of occupations at the national level may introduce some inaccuracy in the measurement of provincial differences in class distribution".[1] More specifically, this chapter will present a socio-economic index for occupations in Ontario and Quebec. The focus will be on the discovery of differences which may or may not exist, between the provincial scales and the national scale.

Initial Results

Using the methodology, as previously outlined, the initial results were as follows. After obtaining the 88 census occupational titles from Blishen, it was discovered that only 83 of these could be used for Ontario and 78 for Quebec. This was due to census publication irregularities,

which will be discussed in a later chapter.

Using raw data from Pineo-Porter's study (1967), a new prestige score was constructed for each of the 83 and 78 occupations in Ontario and Quebec, respectively. Thus, instead of 793 raters used in the tabulation of the national prestige scale, the new prestige scores are based on 273 raters for Ontario and 213 raters for the province of Quebec. In other words, when Pineo-Porter constructed their national prestige scale, their sample contained, among people from the other provinces, 273 people and 213 people from the provinces of Ontario and Quebec, respectively.

Combining these two sets of prestige scores with the respective census data for each province, the two regression equations were constructed. By this procedure, unstandardized regression weights and an intercept were obtained. The unstandardized regression weights produced by this regression analysis were + .255 and + .222 for income and + .309 and + .267 for education, for Ontario and Quebec respectively. The intercepts were 22.57 and 27.05 for Ontario and Quebec respectively.

Two equations of the form

$$D = b_1 \quad l_1 \quad + b_2 \quad l_2 \quad + c$$

where D = dependent variable

b_1= unstandardized regression weight for income

l_1= independent variable income

b_2= unstandardized regression weight for education

l_2= independent variable education

c = intercept

were used to generate socio-economic occupational scores for each province. The two equations, along with the equation from Blishen's study (1967) are presented below.

National $D = .202\ (l_1) + .327\ (l_2) + 24.62$[2]

Ontario $D = .255\ (l_1) + .309\ (l_2) + 22.57$

Quebec $D = .222\ (l_1) + .267\ (l_2) + 27.05$

One simply has to insert the percentage of incumbents of each census occupational title who 1) earned $5000 or more in the 12 months prior to the 1961 census in the l_1 position and in the l_2 position the percentage of incumbents of each occupational title who had attended at least grade 12 high school. The equation is then solved for each occupational title and one is left with a socio-economic score for each census occupational title.

In order to facilitate this operation, a computer program was created and is included in Appendix C.

Table one illustrates the basic differences in income, education and occupational prestige for the two provinces. The mean scores for all three variables are higher in Ontario than Quebec with prestige having the least difference between the two provinces. Thus, if any differences arise in socio-economic scores between the two provinces, we can assume that the differences were created principally by actual differences in income and education for each particular occupation.

The co-efficient of multiple correlation between the Pineo-Porter prestige scores and the income and educational level scores was .883 for Ontario and .897 for Quebec. Blishen interprets his multiple-correlation of .919 for the 88 occupational titles he used as follows, "the Pineo-Porter prestige scores could be estimated with a relatively high degree of accuracy."[3]

Since there are no significant differences between our co-efficients of multiple correlation and that obtained by Blishen, we can assume that the provincial prestige scores can also be predicted with a high degree of accuracy from the provincial education and income level scores.

Table Two presents simple product-moment correlations between income, education and occupational prestige for the two provinces. All correlations are above .81 which appears to be high for variables of this nature. Scatter-grams were generated to demonstrate the linear character-istics of the three variables. They appear as Figures one through six.

Table 1 : Mean and standard deviation of the percentage of people reporting a total income of $5000 or more from employment, attendance to at least the fourth year of highschool, 1961 and the Pineo-Porter occupational prestige scores for 83 Ontario occupations and 78 Quebec occupations.

	Ontario		Quebec	
	mean	standard dev.	mean	standard dev.
income	35.04	28.89	29.59	28.09
education	37.33	33.75	34.54	33.33
prestige	43.03	18.96	42.85	17.22

Table 2 : Correlation coefficients of the percentage of people reporting a total income of $5000 or more from employment, attendance to at least the fourth year of highschool, 1961 and the Pineo-Porter occupational prestige scores for 83 Ontario occupations and 78 Quebec occupations.

	Ontario			Quebec		
	income	education	prestige	income	education	prestige
income	1.000	.815	.836	1.000	.871	.812
education	.815	1.000	.866	.871	1.000	.832
prestige	.836	.866	1.000	.812	.832	1.000

For Figures one through six, one occurrence is represented by an asterisk, two to nine by the numbers 2 through 9; every occurrence exceeding nine is represented by a number 9. The verticle axis is divided into forty-five units and the value of the variable is printed every five units. The horizontal axis is divided into ninety units and the value of the variable is printed every ten units. A visual inspection of these scattergrams demonstrates that each of the three variable pairs does form an approximate linear pattern. Since the significance level of all correlations was .00001, we would like to assume that these three variables are tied together in some type of linear configuration.

Figure 1: Scattergram of Education by Income Data for Ontario

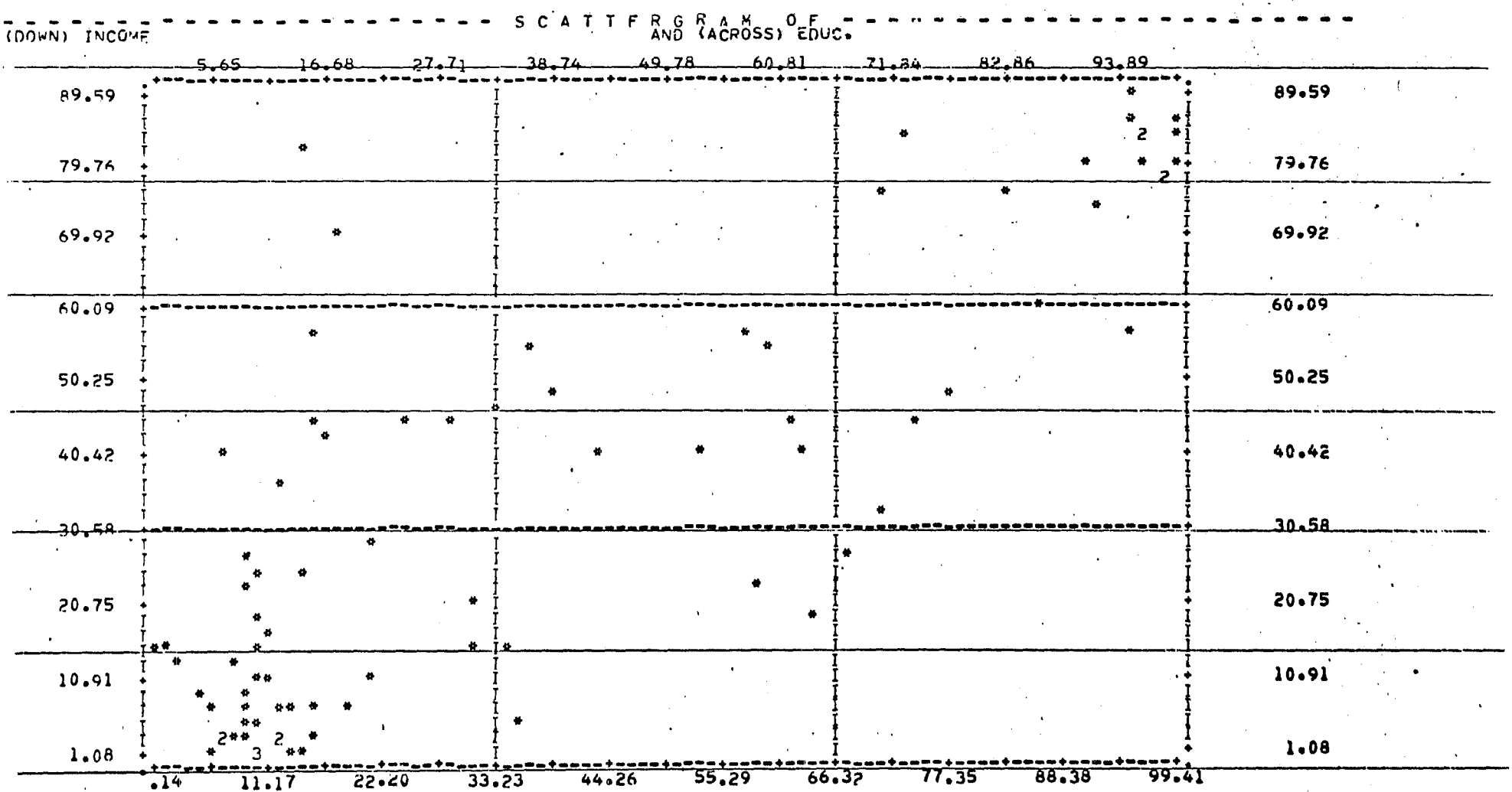


Figure 2: Scattergram of Income by Prestige for Ontario.

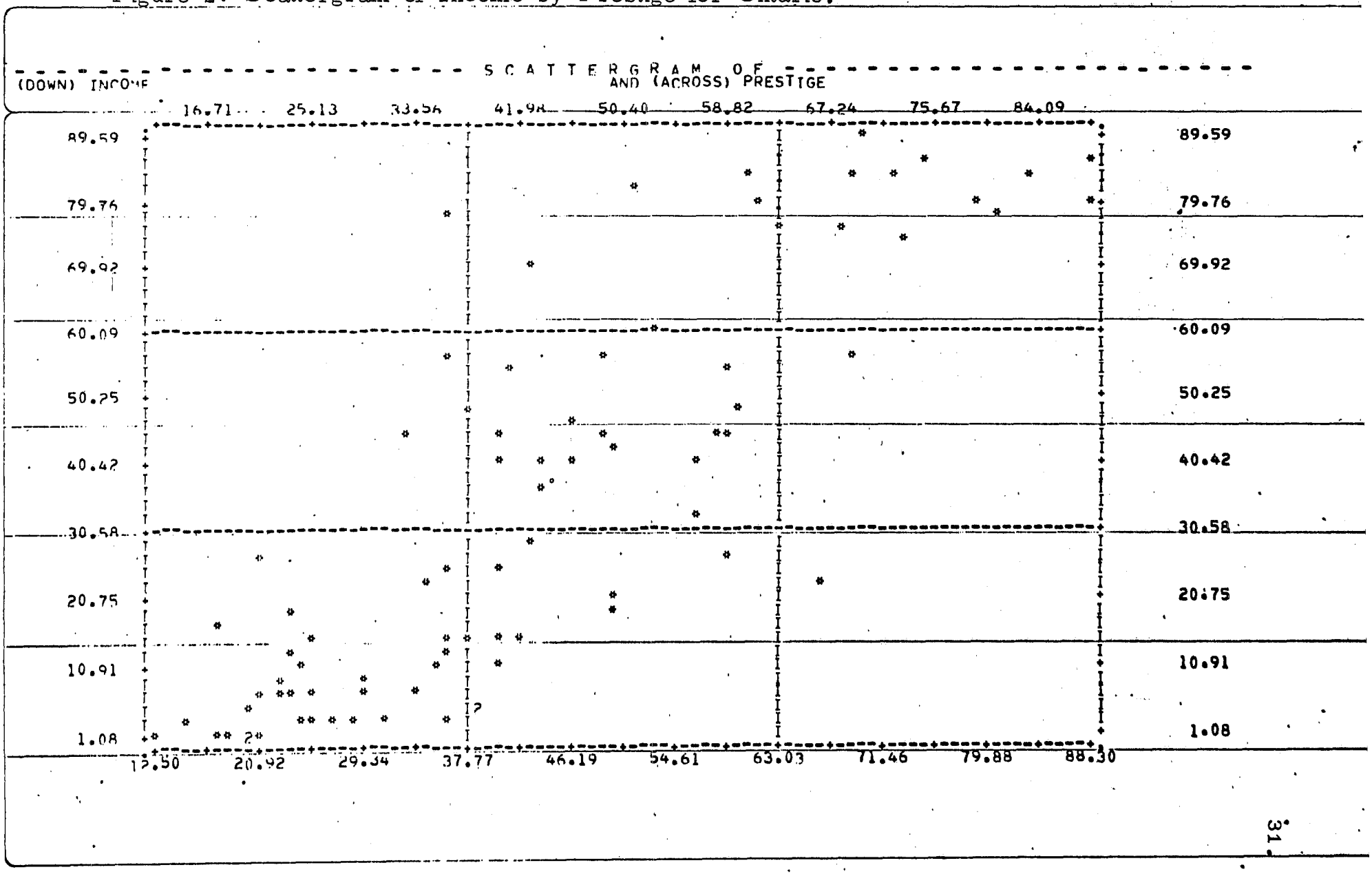


Figure 3: Scattergram of Education by Prestige for Ontario.

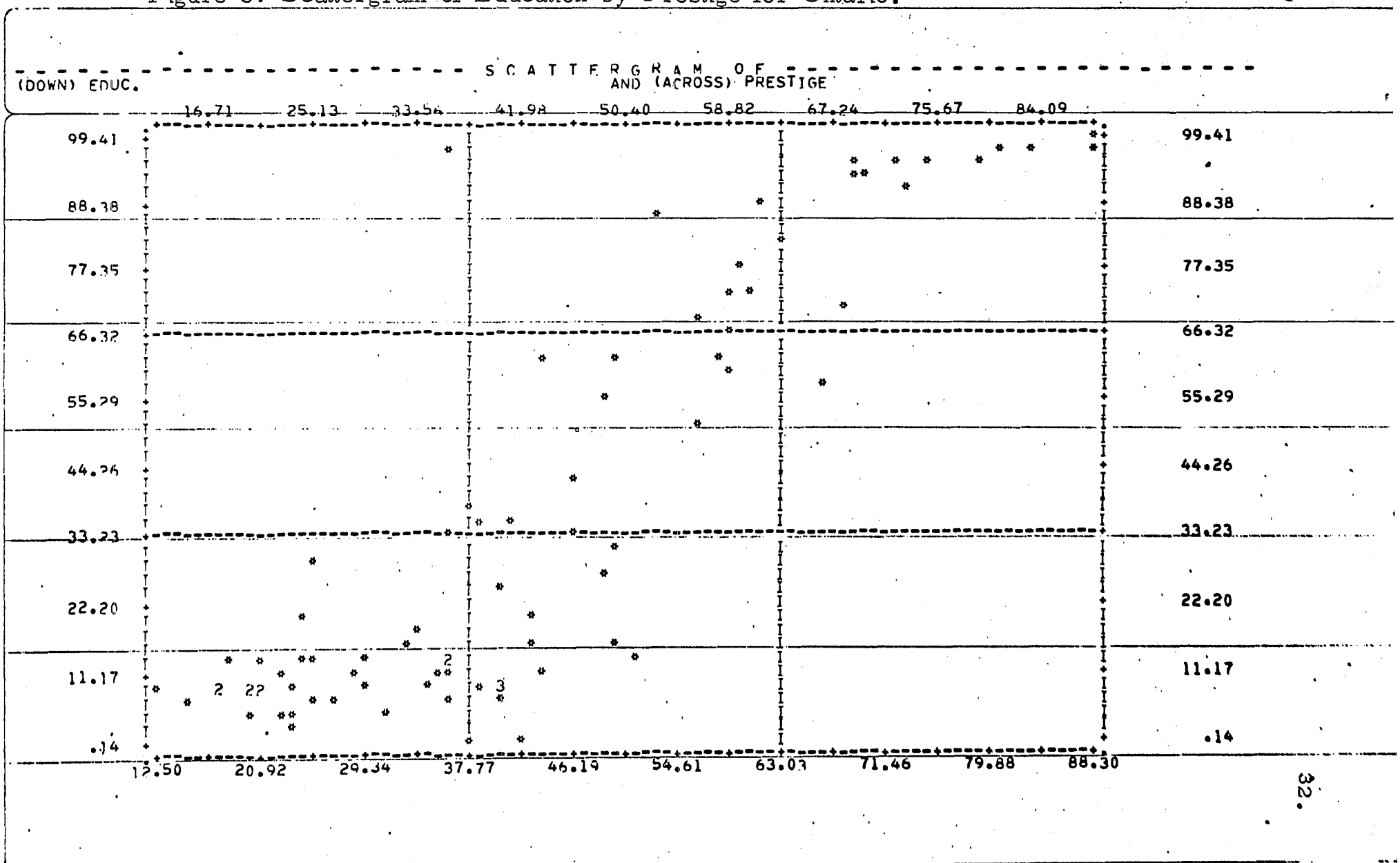


Figure 4: Scattergram of Education by Income for Québec.

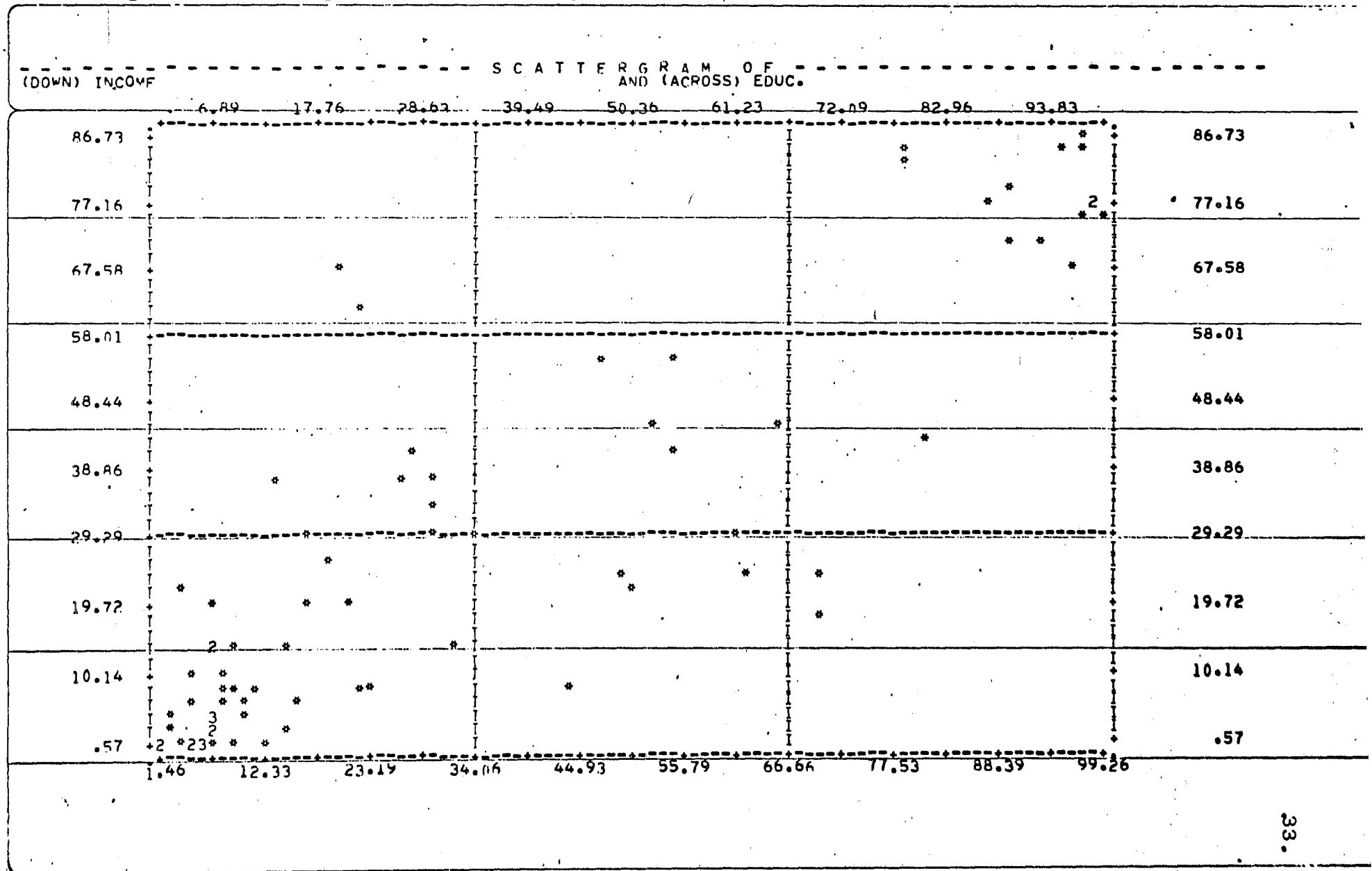


Figure 5: Scattergram of Income by Prestige for Québec.

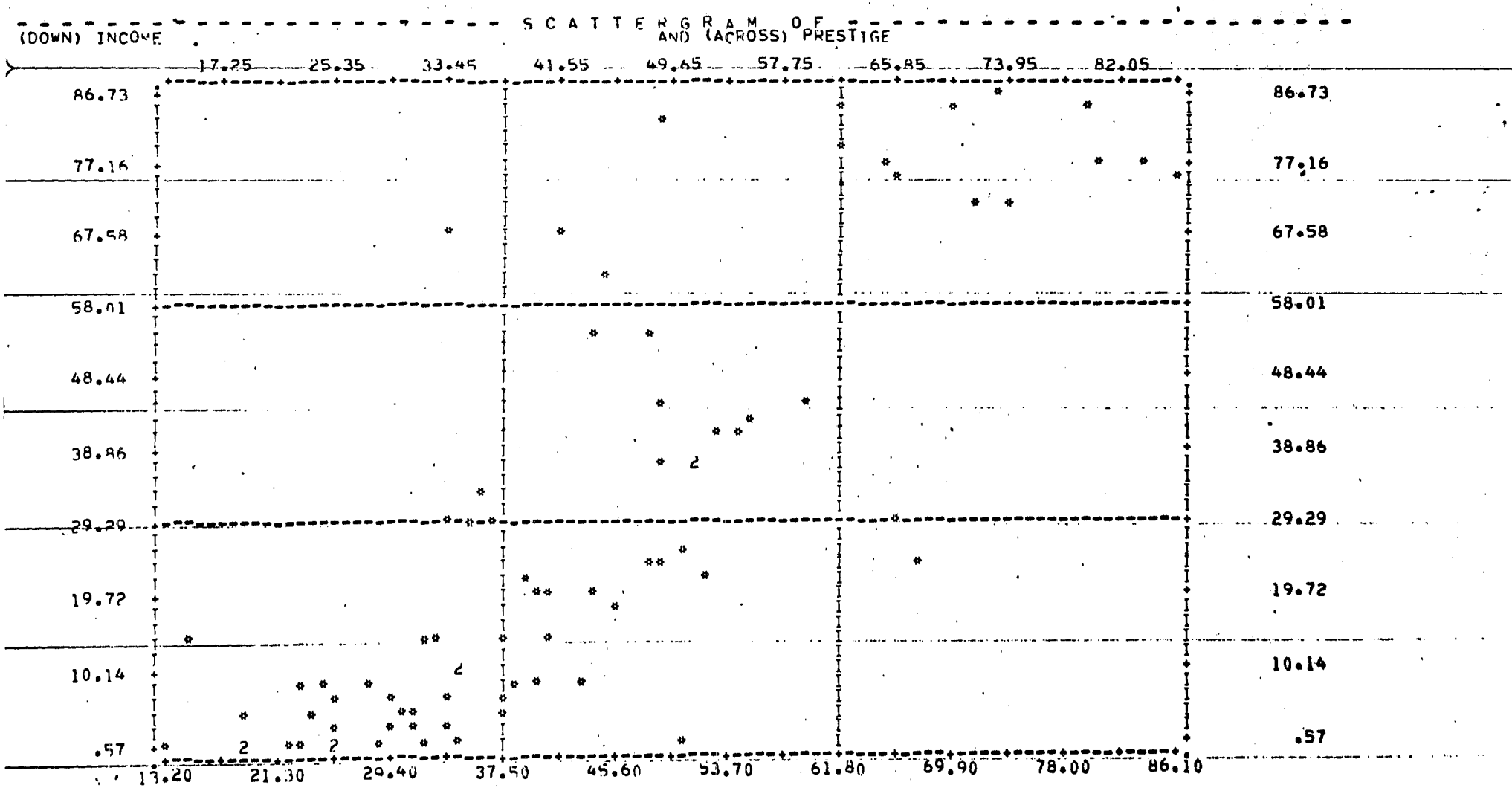
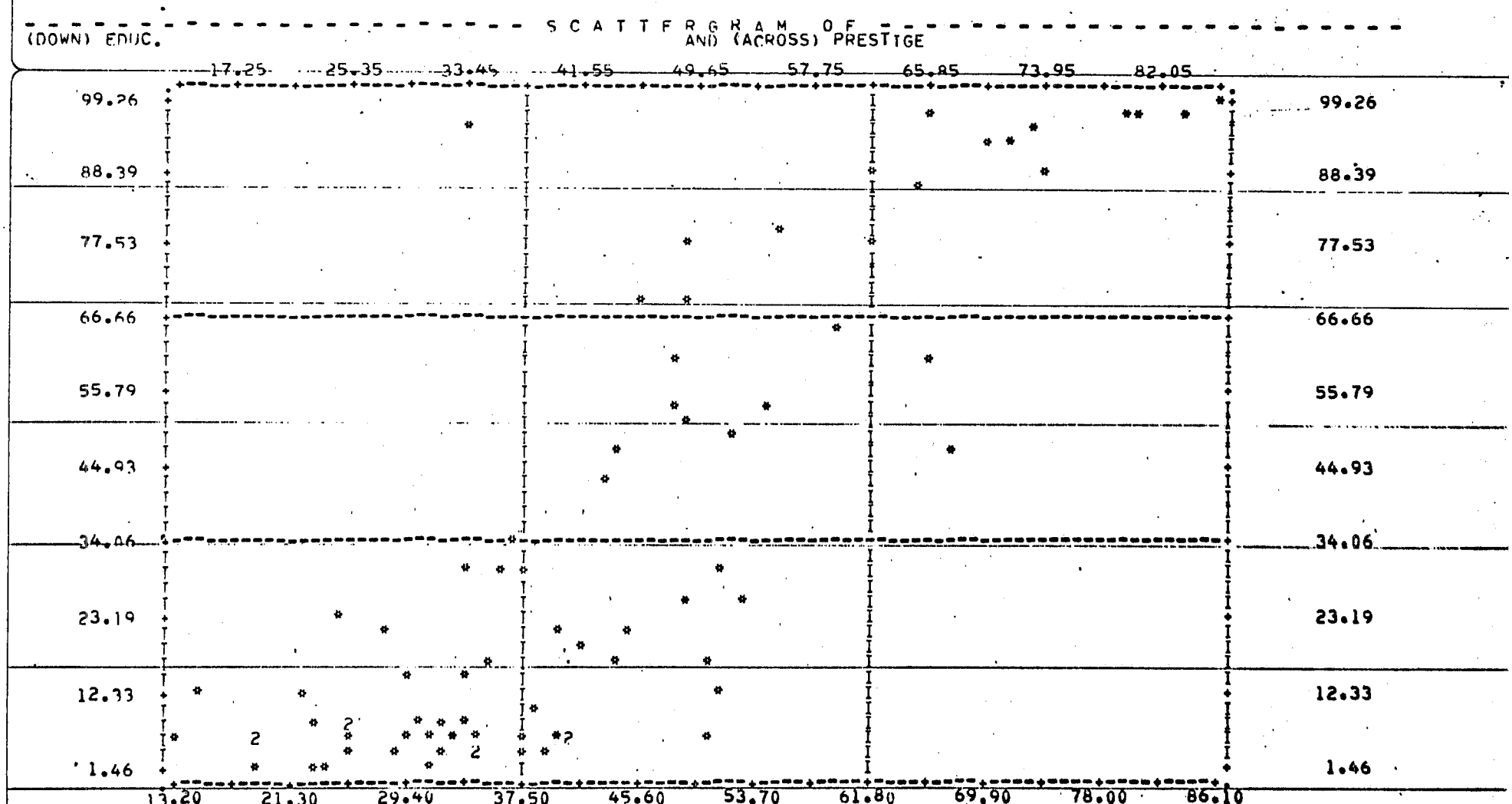


Figure 6: Scattergram of Education by Prestige for Québec



In an effort to examine the co - linearity of these three variables, we computed "eta"[4] co-efficients (a descriptive index of the total relationship in a given set of data) for the following bivariate distributions: income with education, prestige with education and, prestige with income. These co-efficients are shown in Table Three. All of these co-efficients are only slightly higher than the product - moment co-efficients shown in Table Two.

Further examination of co-linearity was done by performing logarithmic and exponential transformations on the data for the above variables. Product - moment co-efficients were then calculated and these appear in Table Four. None of these co-efficients are higher than those presented in Table Two. We can therefore conclude that the combinations of bivariate relationships between education, income and prestige approximate a linear form closely enough to make the calculation of product - moment correlation a realistic operation.

An examination of education and income data for each of the twelve major occupational groupings in Ontario and Quebec, may give us a more complete conception of the relation between the two variables, and their relation to socio-economic scores.

Table 3 : Eta Coefficients for the Bivariate Distributions in Figures One Through Six.

	Ontario N=83	Québec N=78
Distribution		
Income (dependent) X Education	.868	.968
Prestige (dependent) X Education	.885	.906
Prestige (dependent) X Income	.880	.896

Table 4 : Correlation Coefficients for the Bivariate Distributions in Figures One, Two, Four and Five, With Logarithm and Exponential Transformations on the Income Values.

	Ontario N=83		Québec N=78	
Distribution	Log.	Exp.	Log.	Exp.
Income (dependent) X Education	.698	.211	.762	.349
Prestige (dependent) X Income	.788	.179	.745	.322

The socio-economic index, as constructed from a regression equation, is a composite of two factors, namely, education and income. If there are differences in these two factors between provinces, then we should also expect to see differences in the socio-economic scores of occupations, between provinces. Therefore, an examination of these two variables for Ontario and Québec may give us an insight into possible differences in socio-economic scores. With this in mind, table five presents the relevant data for education and income by 12 major occupational groupings for Ontario and Québec. Basically, these data can be analized in three ways, namely, education can be correlated with income for each province, secondly, education in Ontario can be correlated with education in Québec, and similarly for income, and thirdly, rank order correlations can be computed between education and income intra and inter-provincially.

With the above scheme in mind, let us proceed. The product moment correlation between education and income in Ontario is .811 and .881 in Québec. The correlation between education in Ontario and Québec is .996 and for income between Ontario and Québec .969 . There are no statistically significant differences between Ontario and Québec for education. For income however, differences significant at the .05 level or better were found for the following groups: farmers, loggers, fishermen and miners. All other categories had non-significant differences.

Finally, if the occupational groupings are ranked by education and income (see table six), Spearmen rank order correlations can be calculated. For Ontario, the rank order correlation between education and income is .692, and for Québec, .860 . If the education data for Ontario is ranked with the same data for Québec, a rank order correlation of .937 is obtained. Using the same procedure for the income data, the correlation obtained is .916 .

The above statistics indicate that the level of education and income in Ontario and Québec are similar. In addition, at an aggregate level, education and income correlate highly with eachother in each province. However, the rank order correlations show that there is a closer relationship between education and income in Quebec than there is in Ontario.

In other words, there is a closer allignment between the level of education and the level of income in Quebec than there is in Ontario, at least at the aggregate level shown in Table five.

Returning to our original premise of the effect of education and income on socio-economic scores, we can expect that these scores will be similar in the aggregate, that is, the mean score for the grouping "Owners and Managers" in Ontario will be similar to the mean score for the same grouping in Québec. The similarity should exist for all twelve major groupings since no differences of major proportions were found for education and income levels between the provinces, with the exception of the income levels of farmers, loggers, fishermen and miners, as previously noted.

This is not to say however, that specific occupations will not differ in their socio-economic scores. We have only demonstrated that , on the aggregate level, they should be similar, áll other factors being equal.

Table 5 : Percentage of Incumbents in 12 Major Occupational Groupings Reporting an Income of $5000 or more from Employment and Attendance to at least the 4th Year of Highschool, by the Provinces of Ontario and Québec, for 1961.

Occupational Groupings	Ontario		Québec	
	Education	Income	Education	Income
Owners and Managers	55.83	71.74	52.81	68.05
Professional and Technical	80.30	64.73	77.52	59.29
Clerical	41.83	21.66	41.18	17.42
Sales	39.15	36.84	36.16	35.07
Service and Recreation	21.49	12.16	17.94	10.85
Transportation and Communication	22.75	37.19	23.89	30.27
Farmers	11.28	8.01	5.10	1.10
Loggers	11.38	23.00	4.41	4.72
Fishermen	2.53	13.59	1.12	.59
Miners	10.56	34.87	9.06	20.89
Craftsmen and Production Process Related Workers	14.59	23.77	11.67	18.07
Labourers, n.e.s.	8.99	3.97	5.46	3.10
Mean	26.72	29.29	23.86	22.45

TABLE 6: Major occupational groupings ranked by percentage of each group reporting an income of $5000 or more from employment and attendance to at least the 4th year of high school, by Ontario and Quebec, 1961.

OCCUPATIONAL GROUPINGS	ONTARIO		QUEBEC	
	EDUCATION	INCOME	EDUCATION	INCOME
Professional and Technical	1	2	1	2
Owners and Managers	2	1	2	1
Clerical	3	8	3	7
Sales	4	4	4	3
Transportation and Communication	5	3	5	4
Service and Recreation	6	10	6	8
Craftsmen and Production Process Related Workers	7	6	7	6
Loggers	8	7	11	9
Farmers	9	11	10	11
Miners	10	5	8	5
Labourers, n.e.s.	11	12	9	10
Fishermen	12	9	12	12

Socio - Economic Scores for the Provinces

Table seven presents the socio-economic scores for the provinces of Ontario and Québec, in the order that each occupation appears in the census publications for 1961. For tables listing the occupations in terms of their rank order, refer to Appendix A, table , for Ontario and table , for Québec. Readers of this thesis will encounter a number of occupations with a "N.A." where the socio-economic score should appear. This means that scores for these occupations were impossible to compute due to census publication irregularities. These irregularities will be discussed in Chapter Four. A number of abbreviations appear in table seven. Their definitions are as follows; the term "n.e.s." means not elsewhere specified in this table, and the term "n.o.r." means not otherwise reported in this table.

The individual occupations may be compared at will by the reader. It will serve our purpose here to briefly examine the similarities and differences of the major occupational classifications, only.

Table 7 : Socio-economic scores for occupations in Ontario and Quebec in the 1961 census.

Occupation	Ontario Socio-Economic Score	Quebec Socio-Economic Score
Managers and Owners		
Advertising managers	66.93	66.66
Credit managers	60.49	61.13
Sales managers	63.35	63.63
Office managers	60.53	62.86
Postmasters	43.03	40.72
Purchasing agents and buyers	56.24	55.87
Owners and managers in		
Forestry, logging	49.43	43.75
Mines, quarries and oil wells	61.49	62.62
Food and beverage industries	53.44	51.33
Rubber industries	64.51	N.A.
Leather industries	60.02	56.11
Textile industries	61.54	62.61
Knitting industries	58.59	59.73
Clothing industries	54.15	55.33
Wood industries	48.95	44.44
Furniture and fixture industries	53.34	52.29
Paper and allied industries	65.80	53.46
Printing, publishing and allied industries	60.34	60.26
Primary metal industries	65.94	64.37
Metal fabricating industries	59.34	56.58
Machinery industries	64.87	62.16
Transportation equipment industries	63.86	62.19
Electrical products industries	66.67	63.77
Non-metallic mineral products industries	57.35	52.23
Petroleum and coal products industries	N.A.	N.A.
Chemical and chemical products industries	67.43	64.85
Miscellaneous manufacturing industries	59.73	58.30
Construction industry	47.28	48.16

Owners and Managers Continued

Transportation, communication and other utilities	54.04	56.57
Wholesale trade	54.63	55.32
Retail trade	44.73	43.15
Finance, insurance, real estate	65.90	63.52
Education and related services	N.A.	N.A.
Health and welfare services	53.89	59.58
Motion picture and recreational services	45.62	46.88
Services to business management	67.03	66.40
Personal services	38.76	41.13
Miscellaneous services	54.40	54.24
Federal administration	62.45	55.93
Provincial administration	57.09	56.11
Local administration	51.13	53.53
Mean	57.55	56.26
Standard deviation	7.41	7.25

Professional and Technical Occupations

Civil engineers	73.96	72.22
Mechanical engineer	72.62	70.29
Industrial engineer	69.10	70.42
Electrical engineer	74.23	71.32
Mining engineer	74.73	71.32
Chemical engineer	73.29	74.11
Professional engineers, n.e.s.	73.27	71.59
Chemists	70.13	67.09
Geologists	72.73	N.A.
Physicists	73.06	N.A.
Physical scientists, n.e.s.	70.73	N.A.
Biological scientists	74.11	N.A.
Veterinarians	74.00	69.82
Agricultural professionals, n.e.s.	62.44	66.98
Professors and college principals	75.16	70.83
School teachers	70.47	63.93
Teachers and instructors, n.e.s.	49.70	52.04
Physicians and surgeons	74.17	70.58
Dentists	75.09	72.17
Nurses, graduate	44.87	39.29
Nurses-in-training	N.A.	N.A.
Physical and occupational therapists	N.A.	N.A.
Optometrist	72.67	69.82
Osteopaths and chiropractors	66.23	N.A.
Pharmacists	72.73	67.63
Medical and dental technicians	46.68	45.58
Other health professions	N.A.	N.A.
Judges and magistrates	N.A.	N.A.
Lawyers and notaries	74.95	70.68
Clergymen and priests, n.o.r.	55.83	55.84

Professional and Technical Occupations Continued

Religious workers, n.o.r.	45.36	34.57
Artists, commercial	55.11	50.93
Artists, except commercial, art teachers	61.22	51.00
Authors, editors, journalists	64.20	62.51
Musicians and music teachers	51.58	46.70
Architects	72.93	71.91
Draughtsmen	56.83	54.89
Surveyors	51.06	50.14
Actuaries and statisticians	67.72	64.55
Economists	70.92	68.49
Computer programmers	64.82	N.A.
Accountants and auditors	67.69	67.73
Social welfare workers	53.02	51.32
Librarians	N.A.	N.A.
Interior decorators and window dressers	43.64	41.21
Photographers	48.87	44.33
Science and engineering technicians, n.e.s	53.65	51.87
Professional occupations, n.e.s.	61.70	57.93
Mean	64.58	60.91
Standard deviation	10.31	11.37

Clerical Occupations

Bookkeepers and cashiers	47.45	46.98
Office appliance operators	44.59	45.56
Stock clerks and storekeepers	32.01	35.22
Shipping and receiving clerks	29.57	32.72
Baggagemen and expressmen, transport	32.76	35.86
Ticket, station and express agents, transport	46.43	49.45
Stenographers	52.96	49.00
Typists and clerk typists	35.32	40.99
Clerical occupations, n.e.s.	41.39	41.43
Mean	40.28	41.91
Standard deviation	8.17	6.26

Sales Occupations		
Foreman, trade	45.43	43.17
Auctioneers	N.A.	N.A.
Canvassers and other door-to-door salesmen	40.43	38.47
Hawkers and peddlers	30.60	32.03
Commercial travellers	53.15	52.02
Newsvendors	25.81	34.08
Service station attendants	27.47	29.91
Sales clerks	36.11	35.44
Advertising salesmen and agents	56.23	55.40
Insurance salesmen and agents	54.84	54.03
Real estate salesmen and agents	46.72	51.14
Security salesmen and agents	60.29	60.34
Brokers, agents and appraisers, n.e.s.	51.66	54.10
Mean	44.06	54.01
Standard deviation	11.84	10.65
Service and Recreation Occupations		
Civilian protective service occupations	36.35	34.60
Members of the armed forces	42.02	42.14
Lodging and boarding house keepers	N.A.	N.A.
Stewards	33.90	39.60
Cooks	27.52	30.68
Bartenders	27.56	30.88
Waiters	27.72	31.52
Nursing assistants and aides	29.67	30.78
Porters, baggage and pullman	28.15	32.67
Babysitters	N.A.	N.A.
Kitchen helpers and related service workers, n.e.s.	25.59	29.24
Actors, entertainers and showmen	41.80	46.07
Athletes and sports officials	49.64	45.62
Barbers, hairdressers and manicurists	28.87	32.36
Launderers and dry cleaners	27.02	29.95
Elevator tenders, building	26.03	29.23
Janitors and cleaners, building	26.36	29.29
Funeral directors and embalmers	53.50	43.41
Guides	25.69	29.32
Attendants, recreation and amusement	26.88	32.06
Service workers, n.e.s.	29.67	31.33
Mean	32.31	34.25
Standard deviation	8.44	5.89

Transport and Communications Occupations		
Inspectors and foremen, transport	37.55	41.62
Air pilots, navigators and flight engineers	64.16	67.09
Locomotive engineers	47.89	47.37
Locomotive firemen	42.69	40.27
Conductors, railroad	46.09	46.82
Brakemen, railroad	41.88	38.37
Switchmen and signalmen	31.29	33.42
Deck officers, ship	42.42	43.30
Engineering officers, ship	41.70	41.66
Deck ratings, ship, barge crews and boatmen	28.90	31.23
Engine-room ratings, firemen and oilers, ship	27.05	29.65
Bus drivers	31.46	31.75
Taxi drivers and chauffers	28.40	31.42
Driver-salesmen	29.56	30.93
Truck drivers	27.94	29.85
Operators, electric street railway	37.79	N.A.
Teamsters	N.A.	28.51
Transport occupations, n.e.s	26.09	31.43
Inspectors and foremen, communication	59.85	60.69
Radio and television announcers	59.07	58.48
Radio and television equipment operators	47.95	53.29
Telephone operators	48.27	42.82
Telegraph operators	34.94	41.83
Postmen and mail carriers	27.48	31.84
Messengers	27.49	29.89
Mean	39.08	40.15
Standard deviation	11.31	10.91
Farm Workers		
Farm managers and foremen	34.51	N.A.
Farm labourers	25.85	28.17
Gardeners, except farm and groundskeepers	24.98	29.18
Other agricultural occupations	27.06	28.62
Mean	28.10	28.66
Standard deviation	4.36	.51

Loggers and Related Workers		
Logging foremen	38.42	31.14
Forest rangers and cruisers	30.65	28.98
Lumbermen, including labourers in logging	26.72	27.70
Mean	31.93	29.27
Standard deviation	5.95	1.74
Fishermen, Trappers and Hunters		
Fishermen	26.59	27.79
Trappers and hunters	27.21	27.17
Mean	26.90	27.48
Standard deviation	.44	.44
Miners, Quarrymen and Related Workers		
Foremen, mine, quarry, petroleum and well	48.87	44.95
Prospectors	N.A.	N.A.
Timbermen	33.47	N.A.
Miners, n.e.s.	35.25	32.19
Millmen	31.75	30.15
Well drillers and related workers	30.37	N.A.
Labourers, mine	31.02	30.59
Quarriers and related workers, n.e.s.	32.33	32.34
Mean	34.72	34.04
Standard deviation	6.45	6.17
Craftsmen, Production Process and Related Workers		
Millers of flour and grain	26.92	30.74
Bakers	26.74	30.00
Butchers and meat cutters	29.33	30.85
Meat canners, curers, packers	30.46	29.64
Fish canners, curers, packers	N.A.	27.61
Fruit and vegetable canners and packers	27.55	N.A.
Milk processors	27.72	30.28
Other food processing occupations	28.31	30.52

Craftsmen, Production Process and Related Workers, Continued

Beverage processors	35.89	34.26
Tire and tube builders	31.38	N.A.
Vulcanizers	27.64	29.82
Other rubber workers	29.50	28.89
Leather cutters	26.29	28.60
Shoemakers and repairers, factory, n.e.s.	25.00	28.44
Shoemakers and repairers, not in factory	26.31	29.66
Other leather products makers	24.96	28.61
Carders, combers and other fibre preparers	25.94	28.65
Spinners and twisters	25.69	28.61
Winders and reelers	N.A.	28.52
Weavers	25.30	28.59
Loom fixers and loom preparers	26.03	28.36
Knitters	26.36	30.51
Bleachers and dyers	28.89	31.46
Finishers and calenderers	25.69	29.93
Other textile occupations	26.85	28.81
Tailors	28.21	31.79
Dressmakers and seamstresses	N.A.	N.A.
Furriers	31.70	34.21
Cutters, markers - textiles; garment and glove leather	30.33	32.19
Sewers and sewing machine operators, n.e.s.	25.66	29.98
Upholsterers	28.52	30.73
Apparel and related product makers, n.e.s.	26.25	30.41
Carpenters	29.54	29.71
Cabinet and furniture makers, wood	28.35	30.92
Sawyers	24.11	27.92
Woodworking machine operators, n.e.s.	25.19	28.49
Inspectors, graders, scalers - log and lumber	29.91	31.38
Woodworking occupations, n.e.s.	25.81	28.79
Batch and continuous still operators	47.02	47.14
Roasters, cookers and other heat treaters, chemical	32.52	33.01
Cellulose pulp preparers, n.e.s.	31.89	35.28
Paper makers	40.20	41.03
Paper making occupations, n.e.s.	32.69	34.79
Crushers, millers, calenderers, n.e.s.	30.03	N.A.
Chemical and related process workers, n.e.s.	37.32	34.77
Compositors and typesetters	41.87	42.72
Pressmen, printing	40.35	39.31

Craftsmen, Production Process Related Workers, Continued

Lithographic and photo offset occupations	45.70	44.73
Photoengravers	51.34	46.12
Bookbinders	39.05	37.56
Other occupations in bookbinding	33.50	N.A.
Printing workers, n.e.s.	41.95	38.17
Furnacemen and heaters, metal	35.82	34.95
Heat treaters, annealers, temperers	33.92	N.A.
Rolling mill operators	38.08	40.86
Blacksmiths, hammermen and forgemen	30.70	30.86
Moulders	30.98	32.72
Coremakers	28.33	N.A.
Metal drawers and extruders	33.07	N.A.
Metal treating occupations, n.e.s.	33.10	37.38
Jewellers and watchmakers	35.40	36.96
Engravers, except photoengravers	37.34	37.11
Toolmakers, diemakers	44.75	42.85
Machinists and machine tool setters	36.60	36.20
Filers, grinders, sharpeners	30.38	31.53
Millwrights	40.78	38.00
Fitters and assemblers, n.e.s.	29.22	32.91
Metalworking machine operators, n.e.s.	30.41	32.40
Plumbers and pipefitters	35.88	33.49
Sheetmetal workers	33.38	32.88
Riveters and rivet heaters	28.17	30.91
Boilermakers, platers and structural metal workers	32.46	32.72
Electroplaters, dip platers and related workers	29.63	31.13
Welders and flame cutters	32.27	32.44
Polishers and buffers - metal	27.86	29.81
Metalworking occupations, n.e.s.	28.97	32.20
Mechanics and repairmen, aircraft	37.95	43.48
Mechanics and repairmen, motor vehicle	31.13	31.18
Mechanics and repairmen, office machine	42.13	40.94
Mechanics and repairmen, railroad equipment	29.99	33.71
Mechanics and repairmen, n.e.s.	34.11	34.89
Electricians, wiremen and electrical repairmen	42.95	37.93
Fitters and assemblers, electrical and electronics equipment	32.43	33.47
Power station operators	54.34	42.44

Craftsmen, Production Process and Related Workers, Continued

Mechanics and repairmen, radio and television receivers	37.45	39.03
Projectionists, motion picture	41.53	33.59
Linemenand servicemen, telephone telegraph and power	47.82	41.97
Electrical and electronics workers, n.e.s.	30.19	34.44
Painters, construction and maintenance, paperhangers and glaziers	N.A.	N.A.
Painters, except construction and maintenance	N.A.	N.A.
General foremen, construction	38.75	38.87
Inspectors, construction	43.16	42.08
Bricklayers, stonemasons, tilesetters	28.60	30.74
Cement and concrete finishers	25.19	30.11
Plasterers and lathers	28.18	31.55
Insulation appliers	34.34	33.71
Construction workers, n.e.s.	27.80	29.74
Lens grinders and polishers, opticians	34.55	42.48
Furnacemen and kilnmen, ceramics and glass	27.64	N.A.
Stone cutters and dressers	28.05	28.47
Clay, glass and stone workers, n.e.s.	29.02	29.76
Boiler firemen, except ship	28.10	30.74
Stationary engineermen	38.01	37.31
Motormen, vehicle, except railway	31.27	29.89
Hoistmen, cranemen, derrickmen	35.25	33.25
Riggers and cable splicers, except telephone, telegraph and power	37.01	33.02
Operators of earthmoving and other construction machinery, n.e.s.	28.48	31.04
Materials handling equipment operators	27.61	30.37
Oilers and greasers	29.26	31.92
Longshoremen and stevedores	26.19	28.81
Warehousemen and freight handlers, n.e.s.	27.20	29.21
Sectionmen and trackmen	24.58	28.54
Foremen, food and beverage industries	40.68	38.25
Foremen, textile and clothing industries	41.12	38.86
Foremen, wood and furniture industries	33.69	35.97
Foremen, paper and allied industries	41.67	45.54
Foremen, primary metal industries	51.85	49.63
Foremen, transportation equipment industries	42.12	48.82

Craftsmen, Production Process and Related Workers, Continued

Foremen, other manufacturing industries	46.26	44.28
Foremen, electric, power, gas, water and other utilities	49.62	43.88
Foremen, all other industries	39.84	40.43
Tobacco preparers and product makers	28.54	32.12
Patternmakers, except paper	40.10	38.49
Bottlers, wrappers and labelers	27.73	29.80
Paper products makers	29.80	30.84
Photographic processing occupations	39.86	37.22
Tanners and tannery operatives	25.97	30.64
Inspectors, examiners, gaugers, n.e.s. - metal	36.97	42.14
Inspectors, graders and samplers, n.e.s.	38.54	38.43
Production process and related workers, n.e.s.	29.65	30.54
Mean	33.08	34.18
Standard deviation	6.76	5.30
Labourers, n.e.s.		
Food and beverage industries	26.40	28.86
Textile and clothing industries	24.72	28.42
Wood industries	23.81	27.80
Paper and allied industries	27.61	30.06
Primary metal industries	29.16	32.32
Transportation equipment industries	26.22	38.96
Other manufacturing industries	26.33	29.03
Construction	24.67	28.54
Railway transport	25.87	29.03
Transportation, except railway	26.22	28.66
Communication and storage	26.47	30.54
Electric power, gas and water utilities	28.15	29.21
Trade	28.42	29.26
Local administration	24.36	28.27
Other public administration and defence	26.47	29.16
All other industries	26.86	29.02
Mean	26.36	29.20
Standard deviation	1.49	1.06

Presenting the mean and standard deviation for each major census classification, Table eight makes it very obvious that the census coding system does not produce homogeneous categories. Following Pineo and Porter's system of analysis, we find only six of the possible nine categories (categories with at least five occupations in them) with a standard deviation of less than 10. A second feature of a good coding system is its ability to differentiate between categories. Looking at the mean scores for Table eight, we find at least eight pairs of categories for Ontario and at least 10 for Quebec, with less than two points between them. This seems to indicate a major fault in the census coding of occupations into major categories.

A third point is that the categories do not form a graduated scale, from high status to low status. Certainly, a need for re-arrangement of occupations and creation of new major categories, seems to be indicated. (Statistics Canada seems to have recognized these shortcomings as they have employed a new coding system for the 1971 Census of Canada publications).

Examining the mean socio-economic scores for Table eight, we can see that few differences exist between Ontario and Quebec. The categories with the greatest difference between the two provinces are the "Professional and Technical," "Loggers," "Labourers, n.e.s.," and "Service and Recreation" occupations. A product-moment correlation co-efficient of .990 was obtained between aggregate scores for Ontario and Quebec. In addition,

the rank order correlation obtained was .951 . The "Service and Recreation" and "Labourers, n.e.s." groupings had a better rank in Quebec than their counterparts in Ontario. On the other hand, "Farmers," "Fishermen" and "Miners" had a better rank in Ontario. All other groups were ranked identically in both provinces.

In conclusion, on the aggregate level used in Table eight, there are minor differences between the socio-economic scores of the major groupings, however, none of these differences are large enough to be significant. Therefore, the only conclusion we can draw from Table eight is that socio-economic scores for the twelve major occupational groupings are similar for the two provinces of Ontario and Quebec.

Table 8: Provincial Occupational Socio-economic Scores by Major Census Classification.

	Ontario			Quebec		
	N	mean	std.dev.	N	mean	std.dev.
Owners & managers	39	57.55	7.41	38	56.26	7.25
Professional & technical	43	64.58	10.31	37	60.91	11.37
Clerical	9	40.28	8.17	9	41.91	6.26
Sales	12	44.06	11.84	12	45.01	10.65
Service & recreation	19	32.31	8.44	19	34.25	5.89
Transportation & communication	24	39.08	11.31	24	40.15	10.91
Farmers	4	28.10	4.36	3	28.66	.51
Loggers	3	31.93	5.95	3	29.27	1.74
Fishermen	2	26.90	.44	2	27.48	.44
Miners	7	34.72	6.45	5	34.04	6.17
Craftsmen & production process related workers	125	33.08	6.76	119	34.18	5.30
Labourers, n.e.s.	16	26.36	1.49	16	29.20	1.06
Total	303	41.36	15.04	287	41.31	13.07

Socio-economic Class Intervals

Following Blishen's system of analysis, we arbitrarily divided the socio-economic index into six classes which form a hierarchy. Table nine presents the mean score for each class for the two provinces. A quick inspection of this table indicates a very close association of the scores for the two provinces (r = .998). Standard deviations within each class are low indicating that the scores within each class are relatively homogeneous. Although the mean scores are very similar, the number of occupations and maybe the number of workers which fall within each class differ between the provinces. These differences will be discussed next.

Table 9: Mean and standard deviation of socio-economic scores in Ontario and Québec by the socio-economic class intervals, 1961.

Class Intervals	Ontario		Québec	
	mean	std. dev.	mean	std. dev.
70.00 and up	73.14	1.52	71.45	1.07
60.00 to 69.99	64.10	2.71	64.58	2.83
50.00 to 59.99	54.79	2.61	54.45	2.66
40.00 to 49.99	44.58	3.04	44.00	2.61
30.00 to 39.99	34.18	2.90	33.39	2.80
Below 30.00	27.27	1.53	28.95	.68
Total	41.34	15.00	41.31	13.07

Table ten presents the distribution of occupations by the socio-economic class intervals as well as the percentage distribution of the provincial labour forces by the class intervals. Although there is a relatively low correlation (r = .675) between the number of occupations within each class by the two provinces, the actual percentage distribution of the labour force within each class by province correlates at .885 . The only class interval which approximates a significant difference in labour force distribution between provinces is the "30.00 to 39.99" class. The difference here is significant at the .06 level.

It is interesting to note that in both provinces, more than 60% of the labour force has a socio-economic score of less than 40.00 , Ontario being 60.5% and Québec, 65% . In sum, there appears to be no significant difference in labour force distribution between provinces by the class intervals. Québec has a somewhat higher percentage in the "30.00 to 39.99" class. This may be of marginal importance since we have seen in Table nine that the mean score for this class is lower in Quebec than in Ontario. In other words, there may be a substantial number of workers who are hovering at or near the "30.00" interval level for the province of Québec. This would have the net effect of raising the labour force distribution in the "30.00 to 39.99" class interval for Québec when in fact many of the workers may be so close to "30.00" that this arbitrary class interval gives a false impression to the labour force distribution within it. At the "Below 30.00" class level, the percentage distribution

difference is less, however Ontario does have a slightly higher percentage of workers in this class.

Comparing Tables ten and eleven, we can see that the labour force distribution among the class intervals is about the same, whether we use provincial socio-economic scores or Blishen's national scores. The correlation between the distributions for Ontario, in Tables ten and eleven, is .848 and for Québec .990. One could interpret the higher correlation for Québec as meaning a greater similarity between provincial and national socio-economic scores for that province, with somewhat less similarity for the Ontario and national socio-economic scores. This seems to agree with Blishen's finding that Ontario has a higher scoring labour force relative to the rest of the nation.

Table 10 : Distribution of Occupational Titles and Percent and Cumulative Percent Distribution of the Ontario and Québec Labour Forces by the Socio-economic Class Intervals, 1961.

Socio-economic index intervals	No. of occupations		Ontario		Québec	
	Ont.	Qué.	%	Cum. %	%	Cum. %
70.00 plus	21	12	4.0	4.0	2.4	2.4
60.00 - 69.99	29	27	6.0	10.0	5.0	7.4
50.00 - 59.99	32	33	9.4	19.4	9.4	16.8
40.00 - 49.99	51	51	20.1	39.5	18.2	35.0
30.00 - 39.99	68	105	23.9	63.4	35.7	70.7
Below 30.00	102	59	36.6	100	29.3	100

Table 11: Percent and cumulative percent distribution of the Ontario and Québec labour forces by socio-economic index class intervals, using Blishen's national scores, 1961. 5

Socio-economic class intervals	No. of occupations	Ontario		Québec	
		%	Cum. %	%	Cum. %
70.00 plus	24	4	4	4	4
60.00 - 69.99	26	5	9	4	8
50.00 - 59.99	36	10	19	9	17
40.00 - 49.99	52	20	39	19	36
30.00 - 39.99	103	35	74	33	69
Below 30.00	79	26	100	32	100

Table twelve is a comparison of national socio-economic scores [6] as applied to Ontario and Québec and the provincial scores for Ontario and Québec. In comparison, the mean provincial scores are somewhat higher for both provinces than the mean provincial scores derived from Blishen's data. In addition, there is less difference in the mean scores between the provinces when provincial scores are applied than when national scores are applied, at least at the aggregate level. In summary, the general socio-economic level of the provincial labour forces is higher, and there is less difference in their mean scores, when these scores are constructed from provincial data rather than national data.

Table 12: Comparison of the mean and standard deviation on socio-economic index scores for the labour force, using national index scores and provincial index scores by province, 1961.

Province	National scores		Provincial scores	
	mean	std. dev.	mean	std. dev.
Ontario	39.61	12.35	41.34	15.50
Quebec	38.48	12.15	41.31	13.07

Table thirteen lists the 29 occupations which exhibited a difference of 5.00 or greater, between the provinces, in their socio-economic scores. The distribution of these 29 occupational titles into the major occupational groupings is as follows: "Owners and Managers" - 17.2%, "Professional and Technical" - 13.7%, "Clerical" - 3.5%, "Sales" - 3.5%, "Service and Recreation" - 10.3%, "Transportation and Communication" - 13.8%, "Loggers" - 3.5%, "Craftsmen and Production Process related workers" - 31.0%, and "Labourers" - 3.5% .

We should expect more discrepancy within this distribution in the "Craftsmen ... " grouping since this particular group contains over one-third of all the occupations listed for the labour force. In sum, these 29 occupations seem to be randomly scattered throughout the twelve major occupational groupings. That is to say, no grouping has a disproportionate share of these 29 occupations.

Finally, we calculated a product moment correlation between the socio-economic scores of the key occupational titles for Ontario and Quebec (N=78). The co-efficient of .98 indicates a close association between these two sets of scores. It also implies a high degree of similarity between the regression equations for Ontario and Quebec.

Table 13: Ontario and Québec occupational titles with a difference of 5.00 or greater in their socio-economic scores. *

Occupation	Socio-economic score difference
Owners and managers, forestry & logging	5.68
Owners and managers, paper & allied industries	12.34
Owners and managers, non-metallic mineral products industries	5.12
Owners and managers, health and welfare services	5.69*
Owners and managers, federal administration	6.53
School teachers	6.54
Nurses - graduate	5.58
Religious workers, n.o.r.	10.79
Artists, except commercial art teachers	10.22
Typists and clerk typists	5.67*
Newsvendors	8.27*
Stewards	5.70*
Funeral directors and embalmers	10.09
Attendants, recreation and amusement	5.18*
Transport occupations, n.e.s.	5.34*
Radio and television equipment operators	5.34*
Telephone operators	5.45
Telegraph operators	6.89*
Logging foremen	7.28
Photo - engravers	5.22
Mechanics and repairmen, aircraft	5.53*
Power station operators	11.90
Projectionists, motion picture	7.94
Linemen and servicemen, telephone, telegraph and power	5.85
Lens grinders and polishers, opticians	7.93*
Foremen, transportation equipment industries	6.70*
Foremen, electric, power, gas, water & other utilities	5.74*
Inspectors, examiners, gaugers, n.e.s. - metal	5.17*
Labourers, transportation equipment industries	12.74*

* For occupations with an asterisk, the Québec score was greater.

Conclusions

In summary, Chapter three has demonstrated that the relationship between income and education approximates a linear configuration thus enabling us to make use of these data in combination with regression equations for the purpose of constructing socio-economic indices for occupations in Ontario and Quebec. Comparing these indices, we discovered no statistically significant differences between them. In addition, we found that the distribution of the labour force within the six socio-economic classes was about the same for both provinces. This indicates that the Ontario and Quebec labour forces are similar with reference to their socio-economic status.

We conclude therefore, that the socio-economic status of occupational incumbents in Quebec is quite similar to their Ontario counterparts. Several references were made within the chapter to census publication irregularities. More specifically, we were concerned with the omission of data for certain occupations in Ontario and Quebec. Discovery of these omissions raises the following question; were the omissions an application of the confidentiality rule as stated in each census publication, or were the omissions an error. Chapter four will examine this question, and in addition, will attempt to evaluate the effects of these omissions on the analysis of income and education data as well as the consequences for the construction of the socio-economic indices.

NOTES

1. B.R. Blishen, "Social Class and Opportunity in Canada," Canadian Review of Sociology and Anthropology, 7 (May, 1970), pp. 111 - 112.

2. B.R. Blishen, "A Socio-economic Index For Occupations In Canada," Canadian Review of Sociology and Anthropology, 4 (February,1967), p. 44.

3. Ibid., p. 50.

4. See H. Walker and J. Lev, Statistical Inference, (U.S.A., Holt, Rinehart and Winston, 1953), p. 278 and W. Hays, Statistics For The Social Sciences, (U.S.A., Holt,Rinehart and Winston, 1973), pp. 683 - 684.

5. B.R. Blishen, 1967, op.cit., p. 52.

6. Ibid., p. 53. Data under "National Scores" in Table 12 was taken from Table 4 of cited article.

CHAPTER FOUR

Confidentiality In Census Data

And The Distortion Of Analysis

Introduction

"Certain basic problems arise in comparative analysis whether the method of research is the sample survey, participant observations, historical analysis, or some other approach. These are (1) conceptual equivalence; (2) equivalence of measurement; (3) linguistic equivalence; and (4) sampling." [1] In a general sense, all of the above problems are methodological problems. However, since the research at hand dealt with the secondary analysis of data, the above four problems were non-controllable variables. The research does however concern itself with how this data, census data, can be utilized as data in an intra-national comparative setting. As a result of the research carried out, the construction of socio-economic scores for occupations in the provinces of Ontario and Québec, one major problem was encountered. This was the problem of missing data in census publications.

Missing Data

Referring back to the methodology carried out for the construction of the socio-economic index, the reader will recall that it was initially required that the researcher calculate education and income levels on 88 selected "key" occupations. As a result

of publication irregularities in the census, it was only possible to calculate this information on 83 occupations for Ontario and 78 for Québec.

The census occupational titles which were missing [2] for the province of Ontario were as follows; dressmakers and seamstresses - not in factory, judges and magistrates, librarians, physical and occupational therapists, and baby sitters. For the province of Québec, the missing titles were as follows; dressmakers and seamstresses - not in factory, judges and magistrates, librarians, painters, (construction and maintenance) paper hangers and glazers, physicists, fruit and vegetable packers, and canners, osteopaths and chiropractors, physical and occupational therapists, computer programmers, and baby sitters.[3]

All of the above titles were missing from the census publication dealing with incomes of individuals. The census publication offers little in terms of an explanation for the omission of the above occupations. They do say that, "Where the estimated total within an occupation or the self employed portion of an occupation is less than 250, the occupation is not shown but is included in the sub-totals and totals." For most of the occupations listed above, this might be far from a suitable explanation. One might assume that the 20% sample of private non-farm households used by the census officials to gather the data pertinent to this study, did not include persons in the above occupations. This too,

is an explanation which seems to lack reality, however, the census publication provides no other information which might account for their exclusion. Moreover, there is no attached listing of occupations missing from a certain province. So, one only discovers the absentees by carefully comparing over time and area. If all of the titles were always included in all of the tables, even though no data were reported for them, the user could at least recognize the missing data at a glance.

The missing data has possible consequences, not only for those who want to know specific information, like the comparative incomes for geologists in the provinces of Ontario and Québec, but also for reliability of general statistical manipulation on the total set of occupations. This is relevant to our use of multiple regression.

One of the advantages of multiple regression is that it can be used as an instrument for the prediction of a dependent variable. That is to say, the basic idea of multiple regression is to produce a linear combination of independent variables which will correlate as highly as possible with the dependent variable.[4] This linear combination can then be used to predict values of the dependent variable, in this case, the socio-economic scores for occupations in Ontario and Quebec. As with any statistic, the number of cases used in the construction of this regression equation is crucial to its reliability as a predictive instrument.

Duncan was able to use 45 of the original 88 NORC occupational prestige ratings[5], approximately 51%. In 1967, Blishen was able to use 88 of the 204 Pineo-Porter prestige ratings[6], approximately 43%. For the province of Ontario, the author was able to use 83 of the 204 Pineo-Porter ratings and for Quebec, 78 of the 204 prestige ratings, approximately 41% and 38% respectively. The point is, the reduction from the original 88 occupational titles used by Blishen to 83 titles and 78 titles for Ontario and Quebec respectively, was precipitated by the publication irregularities in the census data already cited above.

The possible effect of this loss in the number of cases is as follows. If we are trying to predict the socio-economic scores for 320 occupations in the 1961 census, using income, education and prestige data for some of those occupations, the larger the number of occupations that we can incorporate into our original regression equation, the more accurate our predictor equation should be, especially if the original regression equation contains occupations representative of the major census divisions for occupations. Since census publication irregularities prevented us from using the total 88 occupations used by Blishen, we find it necessary to treat our equation for predicting socio-economic scores with more suspicion, than might otherwise be the case.

In order to answer the above questions and determine the validity of the argument that the missing data may have distorted our analysis, we requested special tabulations from Statistics Canada for the 10 missing Quebec occupations and the 5 Ontario occupations. (see Appendix B for our request and their reply). This request was granted with surprising rapidity. The special tabulations are presented in tables fourteen and fifteen. By quick inspection of the "total" column, we can determine that all occupations missing for Ontario were a result of the application of the confidentiality rule. The same applies to the province of Quebec, except for the title "Painters" which at 12,522 incumbents is well over the 250 confidentiality limit. In sum, the missing data for the 88 key titles used to form the regression equation is an application of the confidentiality rule, with the apparent exception of "Painters" in Quebec which would appear to be a genuine error of one sort or another.

Table 14: Special Tabulation of 1961 Employment Income by Selected Occupations for the Male Labour Force, Age 15 and Over, In the Province of Ontario. *

Ontario-Males	1961 Employment Income										
	Total	No Income	Under $1000	1000-1999	2000-2999	3000-3999	4000-4999	5000-5999	6000-9999	10000 plus	
Librarians	226	-	14	16	15	15	56	45	50	15	*
Judges & Magistrates	233	-	5	4	-	15	5	16	54	134	*
Physicists	369	-	9	30	15	20	5	36	175	79	
Osteopaths & Chiropractors	316	5	21	19	21	48	28	19	90	70	
Physical & Occupational Therapists	220	-	8	25	26	65	34	35	12	15	*
Computer Programmers	428	-	20	16	20	25	87	98	158	4	
Babysitters	133	10	113	10	-	10	-	-	-	-	*
Fruit & Vegetable Canners & Packers	856	-	133	96	129	270	159	34	30	5	
Dressmakers & Seamstresses (not in factory)	245	-	19	30	54	122	20	-	-	-	*
Painters	14854	189	1555	2217	3112	3855	2607	1063	322	123	
Totals	17880	204	1897	2463	3392	4445	3001	1346	891	445	
Totals*	1057	10	159	85	95	227	115	96	116	164	

* Occupational titles marked with an asterisk represent those missing from Bulletin SX-5, 1961 Census of Canada, which were part of the list of 88 "key" titles used in the construction of the regression equation for the socio-economic index.

Table 15 : Special Tabulation of 1961 Employment Income by Selected Occupations for the Male Labour Force, Age 15 and Over, In the Province of Québec. *

Québec-Males	1961 Employment Income									
	Total	No Income	Under $1000	1000-2999	2000-3999	3000-4999	4000-5999	5000-5999	6000-9999	10000 plus
Librarians	155	-	5	20	10	26	49	20	25	-
Judges & Magistrates	199	-	5	4	-	-	5	10	15	160
Physicists	172	-	15	-	5	5	11	34	56	46
Osteopaths & Chiropractors	205	-	14	8	23	32	16	10	48	54
Physical & Occupational Therapists	147	5	5	9	30	35	39	5	9	15
Computer Programmers	143	-	-	-	4	10	20	44	60	5
Babysitters	39	-	34	5	-	-	-	-	-	-
Fruit & Vegetable Canners & Packers	179	4	39	19	75	36	10	-	-	-
Dressmakers & Seamstresses (not in factory)	183	5	19	51	59	30	20	-	4	-
Painters	12522	78	1507	2203	3295	3076	1726	420	240	55
Totals	13944	92	1643	2319	3501	3250	1896	543	457	335

* Occupational titles represent those missing from Bulletin SX-5, 1961 Census of Canada, which were part of the list of 88 "key" titles used in the construction of the regression equation for the socio-economic index, for the province of Québec.

The question which now presents itself is the following; how seriously does the suppression of data distort analysis, in our case, the formation of regression equations for the construction of socio-economic indices. To answer this question, we computed new correlation co-efficients for the three variables income, education and prestige, for the two provinces. In addition, new mean percentage levels were computed for income and education as well as a new mean prestige score. These data are presented in tables sixteen and seventeen.

Comparing table sixteen with table two, we can see that the effect of the introduction of these missing data has created only a slight change in the correlation of the above mentioned variables, and only at the second and third decimal places at that. We conclude that there is no significant difference between the correlations of table sixteen and table two.

Examining tables seventeen and one, we note that the mean percentage level for income in Ontario is lowered slightly by introducing the missing data (5 occupations) into the calculations. In addition, the mean percentage level for education is raised slightly. For Québec, introduction of the missing data (10 occupations) has raised the mean percentage level of both income and education, but again, by only a very minimal amount. The mean prestige score for both Ontario and Québec was raised slightly.

Table 16: Correlation Coefficients of the Percentage of People Reporting a Total Income of $5000 or More From Employment, and Attendance to At Least the Fourth Year of Highschool, 1961, and the Pineo-Porter Occupational Prestige Scores For 88 Ontario and Québec Occupations.

	Ontario			Québec		
	Income	Education	Prestige	Income	Education	Prestige
Income	1.000	.813	.829	1.000	.865	.814
Education	.813	1.000	.870	.865	1.000	.849
Prestige	.829	.870	1.000	.814	.849	1.000

Table 17: Mean and Standard Deviation of the Percentage of People Reporting a Total Income of $5000 or More from Employment, Attendance to at Least the Fourth Year of Highschool 1961, and the Pineo-Porter Occupational Prestige Scores For 88 Ontario and Québec Occupations.

	Ontario		Québec	
	Mean	Std. Deviation	Mean	Std. Deviation
Income	34.92	29.14	30.31	28.99
Education	38.28	33.99	37.03	34.53
Prestige	43.68	19.37	43.95	18.01

This had the net effect of creating a somewhat greater difference in prestige levels for Ontario and Québec, but again, the difference is not significant.

In sum, suppression of the data in question has no significant effect on correlations between income, education and prestige. In addition, the mean percentage levels for income and education, as well as the mean prestige score, are not altered significantly by suppression of this data.

In order to further examine the degree of distortion of analysis caused by suppression of data, new regression equations were formed, employing all 88 key occupations used by Blishen. These are presented, together with the original equations employed in Chapter Three, below.

Ontario: $Y = 22.57 + .255x_1 + .309x_2$ (based on 83 occupations)

$Y = 22.75 + .239x_1 + .329x_2$ (based on 88 occupations)

Quebec: $Y = 27.05 + .222x_1 + .267x_2$ (based on 78 occupations)

$Y = 26.88 + .195x_1 + .301x_2$ (based on 88 occupations)

Examining the new intercepts and unstandardized regression weights for each province, we can see that a minimal amount of change is affected by the introduction of the suppressed data. For Ontario, the intercept increased by .18, the income regression weight decreased by .016 and the education regression weight increased by .020. For Québec, the intercept decreased by .17,

the income regression weight decreased by .027 and the education regression weight increased by .034. Although these changes are small, any change in the intercept values or regression weight values will cause a subsequent change in the socio-economic scores. To determine the magnitude of this change, eight occupations were selected at random and socio-economic scores were calculated using the new regression equations. But before we examine these new scores, we would first like to present the multiple correlation co-efficients calculated from the data for 88 occupations.

New multiple correlation co-efficients were calculated for income and education by prestige scores. For Ontario, a co-efficient of .886 was obtained, based on the 88 key occupations. This compares with .883 based on the 83 key titles used in Chapter Three. In other words, addition of the suppressed data for the five missing titles increased the explained variance in prestige scores by 0.53 %. For Québec, the new co-efficient is .900 compared with .897 for the 78 key occupations. The new data in this case increased the explained variance in prestige scores by 0.54 %. Although the additional explanation of variance in the prestige scores is an asset, the minimal increase may not justify the expense of obtaining the missing or suppressed data. We therefore conclude, that for our purposes, there is no significant difference in multiple correlation co-efficients for Ontario or Québec.

We have seen that minor changes in our regression equations occurred when the suppressed data for Ontario and Québec was introduced to the analysis. We would now like to examine the changes which occur in the socio-economic scores as a result of these new regression equations. As previously mentioned, eight occupations were selected at random. Socio-economic scores were then calculated for these occupations and are reported in table eighteen. As a control, we selected everyother key occupational title from the list of the original 88, contructed regression equations with them and then applied these equations to the eight randomly selected occupations in order to obtain their socio-economic scores. These scores are reported in table eighteen along with the two sets of scores calculated from 83 and 88 key occupational titles.

Examining table eighteen, we see very little difference in the scores in the first two columns for each province. This was expected since there was very little difference between the two sets of regression equations. The scores of the third column however, depart somewhat from the scores in the first two columns, although not drastically. The regression equations obtained from the 44 key titles (for Ontario, $Y = 24.03 + .303x_1 + .230x_2$; for Quebec, $Y = 28.28 + .142x_1 + .310x_2$) produce approximately the same socio-economic scores as the equations based on 83 and 88 occupational titles, respectively. The following

Table 18 : Socio-economic Scores for Eight Selected Occupations in Ontario and Québec, Calculated by varying the Number of Key Occupational Titles used in the Construction of the Regression Equations.

Occupation	Ontario			Quebec		
	83	88	44	83	88	44
Welders and flame cutters	32.27	32.05	34.11	32.44	32.10	32.73
Sectionmen and Trackmen	28.26	28.68	28.71	28.54	28.37	29.62
Stock Clerks and Store Keepers	32.01	32.44	32.31	35.22	35.54	36.62
Stenographers	52.96	53.74	51.44	49.00	50.27	50.94
Advertising Managers	66.93	67.22	66.66	66.66	66.89	64.55
Architects	72.93	73.72	70.70	71.91	72.73	70.49
Professors and College Principals	75.16	75.93	72.91	70.83	71.88	70.00
Lawyers and Notaries	74.95	75.75	72.67	70.68	71.76	69.93

differences however, should be noted. The intercepts for both equations are higher in value than the two sets of equations previously used. In addition, for Ontario, the income regression weight is higher in value and the education weight is lower in value than those in the two equations previously used. For Quebec, the income regression weight is lower in value but the education regression weight is slightly higher in value than those in the two equations previously used. We suspect that, in general, the differences in regression weights and intercept values tend to cancel eachother rendering a socio-economic score which is similar, regardless of which of the three equations we use to calculate that score.

Conclusions

In sum, some alteration in the rank order of occupations may result when socio-economic scores are calculated with the three different equations. However, use of any one of the three equations for the calculation of scores appears to be an operational equivalent, since numerical differences in the obtained scores are minimal, in most cases. Furthermore, use of any one of the three equations for calculating scores is not likely to shift a great number of occupations from one socio-economic class to another. Thus, there will be a minimum amount of change in the occupational composition of each of the six socio-economic classes.

It would seem apparent then, that suppression of data by Statistics Canada, as an application of the confidentiality rule, has a minimal and limited effect on the distortion of analysis, at least as far as the construction of socio-economic scores is concerned. We have demonstrated that distortion is almost conspicuous by its absence in the case of the five missing occupations in Ontario and the ten in the province of Québec. Furthermore, we have demonstrated that as many as one-half of the titles could have been suppressed with the result that the socio-economic scores would be virtually the same as scores calculated from equations where no suppression of data had taken place.

The only permanent effect that suppressing data has, in this case, is that occupations which are missing from a census publication will not be eligible for inclusion in the final socio-economic index. This will, of course, reduce the usefulness of the index as a research tool.

NOTES

1. Warwick, D.P. and S. Osherson, "Comparative Analysis in the Social Sciences," Comparative Research Methods, (U.S.A., Prentice-Hall, 1973), p. 11.

2. Titles listed as missing were from Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin SX - 5, Ottawa, The Queen's Printer, 1965.

3. Ibid.

4. N.H. Nie, et.al., Statistical Package for the Social Sciences, (U.S.A., McGraw Hill, Inc., 1970), p. 175.

5. See "A Socio-economic Index For All Occupations," by O.D. Duncan in Occupations and Social Status, A.J. Reiss, Jr. (ed.), (U.S.A., The Free Press, 1961).

6. B.R. Blishen, "A Socio-economic Index for Occupations In Canada," Canadian Review of Sociology and Anthropology, 4 (February, 1967), 42.

CHAPTER FIVE

Conclusions

Conclusions and Final Comments

Conclusury notes are, most often, difficult to compose. The task of tedious summaries of the findings and cursury critiques of methodology and study design are rendered difficult by one's impatience to go on with some new idea or piece of research. However, concluding notes are not for the benefit of the reporter. Acting as a confession post, they can and should be useful to the report reader. The following, then, are the conclusions that can be drawn from this thesis.

Beginning with the naive goal of discovering a multiplicity of errors in Canadian census data, a research project was proposed which would employ census data as the major source of information. The project, the replication of Blishen's socio-economic index, applied to the provinces of Ontario and Québec, involved the construction of regression equations from Canadian census data on income and education as well as provincial prestige scores which were calculated from Pineo-Porter's raw national data. Tests for curvilinear relationships between the three variables were performed with the resulting conclusion that the relationships approximated a linear configuration which was close enough for our purposes. The appropriate regression equations constructed, socio-economic scores were then calculated for all occupations listed in the census publications for the provinces of Ontario and Québec. These scores were then analized on a variety of levels,

(mean scores for Ontario and Québec by major census classifications, mean scores for Ontario and Québec by six socio-economic class intervals, etc.) with the conclusion that there were no significant differences between the socio-economic scores for Ontario and Québec. In addition, we found that the distribution of the labour force within the six socio-economic classes was about the same for both provinces, thus indicating the the Ontario and Québec labour forces are similar with reference to their socio-economic status. The initial purpose of doing the project was to discover errors in census data. Initially, we thought we had been successful in this pursuit as several occupations were found to be absent from the census publications for Ontario and Québec. However, a check with Statistics Canada revealed that all but one of these missing occupations were an application of the confidentiality rule. The one remaining occupation did in fact appear to be a genuine error of omission. We were then faced with the following question; how seriously did the suppression of data distort analysis, in our case, the formation of regression equations for the construction of socio-economic indices.

To answer this question, new regression equations were constructed which included all previously missing or suppressed data. These were then examined and were found to be only

slightly different from the original equations used. Socio-economic scores were calculated for eight randomly selected occupations and were examined. In comparison with the original scores for these occupations, no significant differences were found. It was concluded that the suppressed data has not distorted our analysis to any significant degree. Following this examination, we constructed still another set of regression equations. To do this we selected everyother title from the original list of 88 key occupations used by Blishen. This was done as a control on data suppression and resulting distortion of analysis. After computing the new set of regression equations, socio-economic scores were calculated for the same eight occupations mentions above, and the scores were examined and compared. It was concluded that although the scores were somewhat different from the original two sets, the differences were minimal. It was subsequently concluded that with the technique employed for the construction of socio-economic scores, one could suppress at least one-half of the data without bringing about a high degree of distortion in socio-economic scores. In sum, only one genuine error was discovered in the census data used and the data that was suppressed or missing had no crucial effect in terms of the construction of our regression equations.

In terms of the socio-economic scores between Ontario and Québec, no significant differences were found. This may not have been the case if French Canadians in Quebec were compared with English Canadians in Québec. At the present time however, this is purely a matter of speculation but none-the-less

it poses an interesting problem for future research. Perhaps most curiosity will be aroused by suggesting a comparison with scores based on 1961 and 1971 census data, which will only be possible when the appropriate 1971 data becomes available. In any event, for 1961, there appears to be little difference in socio-economic status between the Ontario and Québec labour forces.

APPENDIX A

Miscellaneous Tables

Table 19 : Socio-economic index for 303 Ontario occupations in 1961 census of Canada

Occupation	Socio-economic index	Occupation	Socio-economic index
Professors and college principals	75.16	Owners and managers, finance, insurance and real estate	65.90
Dentists	75.09	Owners and managers paper and allied industries	65.80
Lawyers and notaries	74.95	Owners and managers, machinery industries	64.87
Mining engineers	74.73	Computer programmers	64.82
Electrical engineers	74.23	Owners and managers, rubber industries	64.51
Physicians and surgeons	74.17	Authors, editors and journalists	64.20
Biological scientists	74.11	Air pilots, navigators and flight engineers	64.16
Veterinarians	74.00	Owners and managers, transportation equipment industries	63.86
Civil engineers	73.96	Sales managers	63.35
Chemical engineers	73.29	Owners and managers, federal administration	62.45
Professional engineers, n.e.s.	73.27	Agricultural professionals, n.e.s.	62.44
Physicists	73.06	Professional occupations n.e.s.	61.70
Architects	72.93	Owners and managers, textile industries	61.54
Geologists	72.73	Owners and managers, mines, quarries and oil wells	61.49
Pharmacists	72.73	Artists (except commercial) art teachers	61.22
Optometrists	72.67	Office managers	60.53
Mechanical engineers	72.62	Credit managers	60.49
Economists	70.92	Owners and managers, printing, publishing and allied industries	60.34
Physical scientists, n.e.s.	70.73	Security salesmen and brokers	60.29
School teachers	70.47	Owners and managers, leather industries	60.02
Chemists	70.13	Inspectors and foremen, communications	59.85
Industrial engineers	69.10		
Actuaries and statisticians	67.72		
Accountants and auditors	67.69		
Owners and managers, chemical and chemical products industries	67.43		
Owners and managers, services to business management	67.03		
Advertising managers	66.93		
Owners and managers, electrical products industries	66.67		
Osteopaths and chiropractors	66.23		
Owners and managers, primary metal industries	65.94		

Occupation	economic index
Owners and managers, miscellaneous manufacturing industries	59.73
Owners and managers, metal fabricating industries	59.34
Radio and television announcers	59.07
Owners and managers, knitting mills	58.59
Owners and managers, non-metalic mineral product industries	57.35
Owners and managers, provincial administration	57.09
Draughtsmen	56.83
Purchasing agents and buyers	56.24
Advertising salesmen and agents	56.23
Clergymen and priests, n.o.r.	55.83
Artists, commercial	55.11
Insurance salesmen and agents	54.84
Owners and managers, wholesale trade	54.63
Owners and managers, miscellaneous services	54.40
Power station operators	54.34
Owners and managers, clothing industries	54.15
Owners and managers, transportation, communication and other utilities	54.04
Owners and managers, health and welfare services	53.89
Science and engineering technicians, n.e.s.	53.65
Funeral directors and embalmers	53.50
Owners and managers, food and beverage industries	53.44
Owners and managers, furniture and fixture industries	53.34
Commercial travellers	53.15
Social welfare workers	53.02
Stenographers	52.96
Foremen, primary metal industries	51.85
Brokers, agents and appraisers, n.e.s.	51.66
Muscicians and music teachers	51.58
Photoengravers	51.34
Owners and managers, local administration	51.13
Surveyors	51.06
Teachers and instructors, n.e.s.	49.70
Athletes and sports officials	49.64
Foremen, electric power, gas and water utilities	49.62
Owners and managers, forestry and logging industries	49.43
Owners and managers, wood industries	48.95
Foremen, mine, quarry, petroleum well	48.87
Photographers	48.87
Telephone operators	48.27
Radio and television equipment operators	47.95
Locomotive engineers	47.89
Linemen and servicemen, telephone, telegraph and power	47.82
Bookkeepers and cashiers	47.45
Owners and managers, construction industries	47.28
Batch and continuous still operators	47.02
Real estate salesmen and agents	46.72
Medical and dental technicians	46.68
Ticket, station and express agents, transport	46.43
Foremen, other manufacturing industries	46.26
Conductors, railroad	46.09
Lithographic and photo-offset occupations	45.70

Occupation	Socio-economic index
Owners and managers, motion picture and recreational services	45.62
Foremen, trade	45.43
Religious workers, n.o.r.	45.36
Nurses, graduate	44.87
Toolmakers, diemakers	44.75
Owners and managers, retail trade	44.73
Office appliance operators	44.59
Interior decorators and window dressers	43.64
Inspectors, construction	43.16
Postmasters	43.03
Electricians, wiremen and electrical repairmen	42.95
Locomotive firemen	42.69
Deck officers, ship	42.42
Mechanics and repairmen, office machine	42.13
Foremen, transportation equipment industries	42.12
Members of armed forces	42.02
Printing workers, n.e.s.	41.95
Brakemen, railroad	41.88
Compositors and typesetters	41.87
Actors, entertainers and showmen	41.80
Engineering officer, ship	41.70
Foremen, paper and allied industries	41.67
Projectionists, motion picture	41.53
Clerical occupation, n.e.s.	41.39
Foremen, textile and clothing industries	41.12
Millwrights	40.78
Foremen, food and beverage industries	40.68
Canvassers and other door-to-door salesmen	40.43
Pressmen, printing	40.35
Paper makers	40.20
Foremen, tobacco preparers and product makers	40.10
Foremen, photographic processing occupations	39.86
Foremen, all other industries	39.84
Bookbinders	39.05
Owners and managers, personal services	38.76
General foremen, construction	38.75
Inspectors, graders and samplers, n.e.s.	38.54
Logging foremen	38.42
Rolling mill operators	38.08
Stationary enginemen	38.01
Mechanics and repairmen, aircraft	37.95
Operators, electric street railway	37.79
Inspectors and foremen, transport	37.55
Mechanics and repairmen, radio and tele vision receivers	37.45
Engravers, except photoengravers	37.34
Chemical and related process workers, n.e.s.	37.32
Riggers and cable splicers, except telephone, telegraph and power	37.01
Inspectors, examiners, gaugers, n.e.s., metal	36.97
Machinists and machine tool setters	36.60

Occupation	Socio-economic index
Civilian protective service occupations	36.35
Sales clerks	36.11
Beverage processors	35.89
Plumbers and pipe-fitters	35.88
Furnacemen and heaters, metal	35.82
Jewelers and watch-makers	35.40
Typists and clerk typists	35.32
Hoistmen, cranemen, derrickmen	35.25
Miners, n.e.s.	35.25
Telegraph operators	34.94
Lens grinders and polishers, opticians	34.55
Farm managers and foremen	34.51
Insulation appliers	34.34
Mechanics and repair-men, n.e.s.	34.11
Heat treaters, annealers, temperers	33.92
Stewards	33.90
Foremen, wood and furniture industries	33.69
Other occupations in bookbinding	33.50
Timbermen	33.47
Sheet metal workers	33.38
Metal treating occu-pations, n.e.s.	33.10
Metal drawers and extruders	33.07
Baggagemen and express-men, transport	32.76
Paper making occupa-tions, n.e.s.	32.69
Roasters, cookers and other heat treaters, chemical	32.52
Boilermakers, platers and structural metal workers	32.46
Fitters and assemblers, electrical and elect-ronics equipment	32.43
Quarriers and related workers, n.e.s.	32.33
Welders and flame cutters	32.27
Stock clerks and storekeepers	32.01
Cellulose pulp pre-parers, n.e.s.	31.89
Millmen	31.75
Furriers	31.70
Bus drivers	31.46
Tire and tube builders	31.38
Switchmen and signal-men	31.29
Moteremn (vehicle), except railway	31.27
Mechanics and repair-men, motor vehicle	31.13
Labourers, mine	31.02
Moulders	30.98
Blacksmiths, hammermen, forgemen	30.70
Forest rangers and cruisers	30.65
Hawkers and peddlers	30.60
Meat canners, curers packers	30.46
Metalworking machine operators, n.e.s.	30.41
Filers, grinders, sharpeners	30.38
Well drillers and related workers	30.37
Cutters, markers - textiles: garment and glove leather	30.33
Electrical and elect-ronics workers, n.e.s.	30.12
Crushers, millers, calenderers, n.e.s.	30.03
Mechanics and repair-men, railroad equip-ment	29.99
Inspectors, graders, scalers - log and lumber	29.91
Foremen, paper prod-ucts makers	29.80
Service workers, n.e.s.	29.67

Occupation	Socio-economic index
Nursing assistants and aides	29.67
Driver salesmen	29.65
Production process and related workers, n.e.s.	29.65
Electroplaters, dip platers and related workers	29.63
Shipping and receiving clerks	29.57
Cabinet and furniture makers - wood	29.54
Other rubber workers	29.50
Butchers and meat cutters	29.33
Oilers and greasers - machinery and vehicles, (except ships)	29.26
Fitters and assemblers, n.e.s. - metal	29.22
Labourers, primary metal industries	29.16
Clay, glass and stone workers, n.e.s.	29.02
Metalworking occupations, n.e.s.	28.97
Deck ratings (ship), barge crews and boatmen	28.90
Bleachers and dyers-textile	28.89
Barbers, hairdressers, manicurists	28.87
Bricklayers, stonemasons, tilesetters	28.60
Tobacco preparers and products makers	28.54
Upholsterers	28.52
Operators of earth-moving and other construction machinery, n.e.s.	28.48
Labourers, trade	28.42
Taxi drivers and chauffeurs	28.40
Cabinet and furniture makers - wood	28.35
Coremakers	28.33
Other food processing occupations	28.31
Tailors	28.21
Plasterers and lathers	28.18
Riveters and rivet heaters	28.17
Labourers, electric, power gas and water utilities	28.15
Porters, baggagemen and pullmen	28.15
Boiler firemen (except ship)	28.10
Stone cutters and dressers	28.05
Truck drivers	27.94
Polishers and buffers - metal	27.86
Construction workers, n.e.s.	27.80
Foremen, bottlers wrappers and labelers	27.73
Milk processors	27.72
Waiters	27.72
Furnacemen and kilnmen, ceramics and glass	27.64
Vulcanizers	27.64
Labourers, paper and allied industries	27.61
Materials handling equipment operators	27.61
Bartenders	27.56
Fruit and vegetable canners and packers	27.55
Cooks	27.52
Messengers	27.49
Postmen and mail carriers	27.48
Service station attendents	27.47
Trappers and hunters	27.21
Warehousemen and freight handlers, n.e.s.	27.20
Other agricultural occupations	27.06

Occupation	Socio-economic index
Engineroom ratings, firemen and oilers, ship	27.05
Launderers and dry cleaners	27.02
Millers of flour and grain	26.92
Attendants, recreation and amusement	26.88
Labourers, all other industries	26.86
Other textile occupations	26.85
Bakers	26.74
Lumbermen, including labourers in logging	26.72
Fishermen	26.59
Labourers, other public administration and defence	26.47
Labourers, communication and storage	26.47
Labourers, manufacturing	26.40
Knitters	26.36
Janitors and cleaners, building	26.36
Labourers, other manufacturing industries	26.33
Shoemakers and repairers - not in factory	26.31
Leather cutters	26.29
Apparel and related products makers, n.e.s.	26.25
Labourers, transportation - except railway	26.22
Labourers, transportation equipment industries	26.22
Longshoremen and stevedores	26.19
Transport occupations n.e.s.	26.09
Loom fixers and loom preparers	26.03
Elevator tenders, building	26.03
Foremen, tanners and tannery operatives	25.97
Carders, combers and other fibre preparers	25.94
Labourers, railway transport	25.87
Farm labourers	25.85
Woodworking occupations, n.e.s.	25.81
Newsvendors	25.81
Finishers and calenderers	25.69
Spinners and twisters	25.69
Guides	25.69
Sewers and sewing machine operators, n.e.s.	25.66
Kitchen helpers and related service workers, n.e.s.	25.59
Weavers	25.30
Cement and concrete finishers	25.19
Woodworking machine operators, n.e.s.	25.19
Shoemakers and repairers - factory, n.e.s.	25.00
Gardeners (except farm) and groundskeepers	24.98
Other leather products makers	24.96
Labourers, textile and clothing industries	24.72
Labourers, construction	24.67
Sectionmen and trackmen	24.58
Labourers, local administration	24.36
Sawyers	24.11
Labourers, wood industries	23.81

Table 20 : Socio-economic index for 287 Quebec occupations in 1961 census of Canada.

Occupation	Socio-economic index	Occupation	Socio-economic index
Chemical engineers	74.11	Owners and managers finance, insurance and real estate	63.52
Civil engineers	72.22	Office managers	62.86
Dentists	72.17	Owners and managers, mines, quarries and oil wells	62.62
Architects	71.91	Owners and managers, textile industry	62.61
Professional engineers, n.e.s.	71.59	Authors, editors and journalists	62.51
Mining engineers	71.32	Owners and managers, transportation equipment industries	62.19
Electrical engineers	71.32	Owners and managers, machinery industries	62.16
Professors and college principals	70.83	Credit managers	61.13
Lawyers and notaries	70.68	Inspectors and foremen, communication	60.69
Physicians and surgeons	70.58	Security salesmen and brokers	60.34
Industrial engineers	70.42	Printing, publishing and allied industries	60.26
Mechanical engineers	70.29	Owners and managers, knitting mills	59.73
Optometrists	69.82	Owners and managers, health and welfare services	59.58
Veterinarians	69.82	Radio and television announcers	58.48
Economists	68.49	Owners and managers, miscellaneous manufacturing industries	58.30
Accountants and auditors	67.73	Professional occupations, n.e.s.	57.93
Pharmacists	67.63	Owners and managers, metal fabricating industries	56.58
Air pilots, navigators and flight engineers	67.09	Owners and managers, transportation, communication and other utilities	56.57
Chemists	67.09	Owners and managers, provincial administration	56.11
Agricultural professionals, n.e.s.	66.98		
Advertising managers	66.66		
Owners and managers, services to business management	66.40		
Owners and managers, chemical and chemical products industries	64.85		
Actuaries and statisticians	64.55		
Owners and managers, primary metal industries	64.37		
School teachers	63.93		
Owners and managers, electrical products industries	63.77		
Sales managers	63.63		

Occupation	Socio-economic index
Owners and managers, leather industries	56.11
Owners and managers, federal administration	55.93
Purchsing agents and buyers	55.87
Clergymen and priests, n.o.r.	55.84
Advertising salesmen and agents	55.40
Owners and managers, clothing industries	55.33
Owners and managers, wholesale trade	55.32
Draughtsmen	54.89
Owners and managers, miscellaneous services	54.24
Brokers, agents and appraisers, n.e.s.	54.10
Insurance salesmen and agents	54.03
Owners and managers, local administration	53.53
Owners and managers, paper and allied industries	53.46
Radio and television equipment operators	53.29
Owners and managers, furniture and fixture industries	52.29
Owners and managers, non-metallic mineral products industries	52.23
Teachers and instructors, n.e.s.	52.04
Commercial travellers	52.02
Science and engineering tech nicians, n.e.s.	51.87
Owners and managers, food and beverage industries	51.33
Social welfare workers	51.32
Real estate salesmen and agents	51.14
Artists, (except commercial), art teachers	51.00
Artists, commercial	50.93
Surveyors	50.14
Foremen, primary metal industries	49.63
Ticket, station and express agents, transport	49,45
Stenographers	49.00
Foremen, transportation equipment industries	48.82
Owners and managers, construction industries	48.16
Locomotive engineers	47.37
Batch and continuous still operators	47.14
Bookkeepers and cashiers	46.98
Owners and managers, motion picture and recreational services	46.88
Conductors, railroad	46.82
Musicians and music teachers	46.70
Photoengravers	46.12
Actors, entertainers and showmen	46.07
Athletes and sports officials	45.62
Medical and dental technicians	45.58
Office appliance operators	45.56
Foremen, paper and allied industries	45.54
Foremen, mine, quarry, petroleum well	44.95
Lithographic and photo-offset occupations	44.73
Owners and managers, wood industries	44.44

Occupation	Socio-economic index
Photographers	44.33
Foremen, other manufacturing industries	44.28
Foremen, electric, power, gas and water utilities	43.88
Owners and managers, forestry, logging	43.75
Mechanics and repairmen, aircraft	43.48
Funeral directors and embalmers	43.41
Deck officers, ship	43.30
Foremen	43.17
Owners and managers, retail trade	43.15
Toolmakers, diemakers	42.85
Telephone operators	42.82
Compositors and typesetters	42.72
Lens grinders and polishers, opticians	42.48
Power station operators	42.44
Inspectors, examiners, gaugers, n.e.s. - metal	42.14
Members of armed forces	42.14
Inspectors, construction	42.08
Linemen and servicemen, telephone telegraph and power	41.97
Telegraph operators	41.83
Engineering officers, ship	41.66
Inspectors and foremen, transport	41.62
Clerical occupations, n.e.s.	41.43
Interior decorators and window dressers	41.21
Personal services	41.13
Paper makers	41.03
Typists and clerk typists	40.99
Mechanics and repairmen, office machine	40.94
Rolling mill operators	40.86
Postmasters	40.72
Foremen, all other industries	40.43
Locomotive firemen	40.27
Owners and managers, food and beverage industries	39.60
Pressmen, printing	39.31
Nurses, graduate	39.29
Mechanics and repairmen, radio and television receivers	39.03
General foremen, construction	38.87
Foremen, textile and clothing industries	38.86
Patternmakers, (except paper)	38.49
Canvassers and other door-to-door salesmen	38.47
Inspectors, graders and samplers, n.e.s.	38.43
Brakemen, railroad	38.37
Foremen, food and beverage industries	38.25
Printing workers, n.e.s.	38.17
Millwrights	38.00
Electricians, wiremen and electrical repairmen	37.93
Bookbinders	37.56
Metal treating occupations, n.e.s.	37.38
Stationary enginemen	37.31
Photographic processing occupations	37.22
Engravers, except photoengravers	37.11
Jewellers and watchmakers	36.96
Machinists and machine tool setters	36.20
Foremen, wood and furniture industries	35.97

Occupation	Socio-economic index
Baggagemen and expressmen, transport	35.86
Sales clerks	35.44
Cellulose pulp preparers, n.e.s.	35.38
Stock clerks and storekeepers	35.22
Furnacemen and heaters, metal	34.95
Mechanics and repairmen, n.e.s.	34.89
Paper making occupations, n.e.s.	34.79
Chemical and related process workers, n.e.s.	34.77
Civilian protective service occupations	34.60
Religious workers, n.o.r.	34.57
Electrical and electronics workers, n.e.s.	34.44
Beverage processors	34.26
Furriers	34.21
Newsvendors	34.08
Insulation appliers	33.71
Mechanics and repairmen, railroad equipment	33.71
Projectionists, motion picture	33.59
Plumbers and pipefitters	33.49
Fitters and assemblers, electrical and electronics equipment	33.47
Switchmen and signalmen	33.42
Hoistmen, cranemen and derrickmen	33.25
Riggers and cable splicers, except telephone, telegraph and power	33.02
Roasters, cookers and other heat treaters, chemical	33.01
Fitters and assemblers, n.e.s., metal	32.91
Sheet metal workers	32.88
Boilermakers, platers and structural metal workers	32.72
Moulders	32.72
Shipping and receiving clerks	32.72
Porters, bagagemen and pullmen	32.67
Welders and flame cutters	32.44
Metalworking machine operators, n.e.s.	32.40
Barbers, hairdressers and manicurists	32.36
Quarriers, and related workers, n.e.s.	32.34
Primary metal industries	32.32
Metalworking occupations, n.e.s.	32.21
Cutters, markers - textiles; garment and glove leather	32.19
Miners, n.e.s.	32.19
Tobacco preparers and products makers	32.12
Attendants, recreation and amusement	32.06
Hawkers and pedlers	32.03
Oilers and greasers, machinery and vehicles (except ships)	31.92
Postmen and mail carriers	31.84
Tailors	31.79
Bus drivers	31.75
Plasterers and lathers	31.55
Filers, grinders, sharpeners	31.53
Waiters	31.52
Bleachers and dyers, textile	31.46

Occupation	Socio-economic index
Transport occupations n.e.s.	31.43
Taxi drivers and chauffeurs	31.42
Inspectors, graders, scalers - log and lumber	31.38
Service workers, n.e.s.	31.33
Deck ratings - ship, barge crews and boatmen	31.23
Mechanics and repairmen, motor vehicle	31.18
Logging foremen	31.14
Electroplaters, dip platers and related workers	31.13
Operators of earth-moving and other construction machinery, n.e.s.	31.04
Driver-salesmen	30.93
Cabinet and furniture makers, wood	30.92
Riveters and rivet heaters	30.91
Bartenders	30.88
Blacksmiths, hammermen and forgemen	30.86
Butchers and meat cutters	30.85
Foremen, paper products makers	30.84
Nursing assistants and aides	30.78
Boiler firemen, (except ship)	30.74
Bricklayers, stonemasons, tilesetters	30.74
Millers of flour and grain	30.74
Upholsters	30.73
Cooks	30.68
Tanners and tannery operatives	30.64
Labourers, mine	30.59
Labourers, communication and storage	30.54
Foremen, production process and related workers, n.e.s.	30.54
Other food processing occupations	30.52
Knitters	30.51
Apparel and related products makers, n.e.s.	30.41
Materials-handling equipment operators	30.37
Milk processors	30.28
Millmen	30.15
Cement and concrete finishers	30.11
Labourers, paper and allied industries	30.06
Bakers	30.00
Launderers and dry cleaners	29.95
Finishers and calenderers	29.93
Service station attenants	29.91
Motormen(vehicle) except railway	29.89
Messengers	29.89
Truck drivers	29.85
Vulcanizers	29.82
Polishers and buffers - metal	29.81
Foremen, bottlers, wrappers, labelers	29.80
Sewers and sewing machine operators, n.e.s.	29.78
Clay,glass and stone workers,n.e.s.	29.76
Construction workers, n.e.s.	29.74
Carpenters	29.71
Shoemakers and repairers, not in factory	29.66
Engine-room ratings, firemen and oilers-ship	29.65

Occupation	Socio-economic index
Meat canners, curers, packers	29.64
Guides	29.32
Janitors and cleaners, building	29.29
Labourers, trade	29.26
Kitchen helpers and related service workers, n.e.s.	29.24
Elevator tenders, building	29.23
Labourers, electric, power, gas and water utilities	29.21
Warehousemen and freight handlers, n.e.s.	29.21
Gardeners (except farm) and grounds-keepers	29.18
Labourers, other public administration and defence	29.16
Labourers, railway transport	29.03
Labourers, other manufacturing industries	29.03
Labourers, all other industries	29.02
Forest rangers and cruisers	28.98
Labourers, transportation equipment industries	28.96
Other rubber workers	28.89
Labourers, food and beverage industries	28.86
Longshoremen and stevedores	28.81
Other textile occupations	28.81
Woodworking occupations, n.e.s.	28.79
Labourers, transportation except railway	28.66
Carders, combers and other fibre preparers	28.65
Other agricultural occupations	28.62
Spinners and twisters	28.61
Other leather products makers	28.61
Leathet cutters	28.60
Weavers	28.59
Labourers, construction	28.54
Sectionmen and trackmen	28.54
Winders, reelers	28.52
Teamsters	28.51
Woodworking machine operators, n.e.s.	28.49
Stone cutters and dressers	28.47
Shoemakers and repairers, factory, n.e.s.	28.44

Occupation	Socio-economic index	Occupation	Socio-economic index
Labourers, textile and clothing industries	28.42	Fishermen	27.79
Loom fixers and loom preparers	28.36	Lumbermen, including labourers in logging	27.70
Labourers, local administration	28.27	Fish canners, curers and packers	27.61
Farm labourers	28.17	Trappers and hunters	27.17
Sawyers	27.92		
Labourers, wood industries	27.80		

APPENDIX B

Correspondence

Department of Sociology,
McMaster University,
Hamilton, Ontario.

Mr. B. Blishen,
Department of Sociology,
Trent University,
Peterborough, Ontario.

January 30, 1972

Dear Sir;

In a recent conversation with Peter Pineo, he recommended that I write and send to you the enclosed list of stimulus occupational titles in order to confirm which of the 204 titles you used for the construction of your socio-economic index. I would be pleased, if you would indicate on the enclosed list, in some fashion, which 88 occupations formed your dependent variable. I look forward to hearing from you at your earliest convenience and remain,

Yours truly,

C.L. McEachern,
Teaching Assistant.

TRENT UNIVERSITY PETERBOROUGH ONTARIO CANADA

from the Office of the Dean of Graduate Studies

2 February, 1972.

Mr. C. L. McEachern,
Teaching Assistant,
Department of Sociology,
McMaster University,
HAMILTON, Ontario.

Dear Mr. McEachern,

With respect to your letter of January 30, Dean Blishen has asked me to forward the attached table for your information.

Yours sincerely,

Joanne Heath

(Miss) Joanne Heath,
Department Secretary.

Encl.

Head Statistician,
Labour Force Statistics,
Census Division,
Statistics Canada,
Ottawa, Ontario, Canada.

August 26, 1973

Dear Sir/Madame;

I am presently involved in the construction of Blishen occupational scales for the provinces of Ontario and Quebec. The research involves the use of statistics published in Bulletin SX - 5, (Catalogue 98 - 519, Vol. IV), for the 1961 Census of Canada. In this bulletin, the following occupational titles were found to be missing for the province of Ontario: dressmakers and seamstresses - not in factory; judges and magistrates; librarians; physical and occupational therapists; and babysitters. For the province of Québec, the following titles were found to be missing: dressmakers and seamstresses - not in factory; judges and magistrates; librarians; painters, (construction and maintenance) paper hangers and glazers; physicists; fruit and vegetable canners and packers; osteopaths and chiropractors; physical and occupational therapists; computer programmers; and babysitters.

To be brief and to the point, there are three considerations I would like you to grant. The first, and most obvious is a reason for the omission of the above listed occupational titles. The other two considerations would involve releasing to me sufficient data to enable me to successfully complete this research project. This data would be 1) the number of workers or incumbents in each

of the missing occupational titles listed above and secondly

2) the percentage of incumbents who earned $5000 or more.

I might stress that this information is needed and needed urgently. I trust that you will give my request carefull consideration and I await your early reply.

Very sincerely,

C. McEachern,
Co-ordinator,
Research Techniques,
Sheridan College,
1430 Trafalgar Road,
Oakville, Ontario, Canada.

Statistics Canada | Statistique Canada
Census Division | Division du recensement

September 13, 1973

Mr. C. McEachern
Co-ordinator
Research Techniques
Sheridan College
1430 Trafalgar Road
Oakville, Ontario

Dear Mr. McEachern:

In reply to your letter of August 26, 1973, I am enclosing a table prepared by the Economic Characteristics section, Census Field, Statistics Canada. Data are given for males only as the Blishen scale is based on male prestige ratings. The reason that the requested occupations were not included in the bulletin 98-519, was that any occupation with an estimate of less than 250 persons was not to be published. This data is taken from a 20% non-farm, private household sample.

The prepared table shows the number of workers in each of the requested occupational titles. Also, the income groups are shown, from which your percentages can be calculated. Please do not hesitate to contact this office if you have any questions concerning this or other data.

Yours truly,

Sean Curry

Sean Curry
Data Dissemination Section
Census Field

APPENDIX C

Computer Programs

Computer program one, as listed below, was created in order to facilitate the conversion of raw data on income and education into socio-economic scores. In the program, X(1) and X(2) represent the income data while X(3) and X(4) represent the data on education. The program prints this raw data as well as the socio-economic score for each occupational title.

Computer Program One

```
      PROGRAM TST (INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      DIMENSION X(4)
      LCOUNT=1.
      DO 600 JP = 1,287
      READ(5,101)(X(I), I=1,4)
101   FORMAT(4F6.0)
      XI = X(1) / X(2) * 100
      XE = X(3) / X(4) * 100
       BINDEX = 27.05 + ((XI * .222) + ( XE * .267))
      WRITE(6,201) JP, X(2), X(4), XI, XE, BINDEX
201   FORMAT(1H0,10X,I3,5X,F6.0,5X,F6.0,//20X,F6.2,5X,F6.2,10X,F10.2)
      IF(LCOUNT .GE. 42) WRITE(6,301)
301   FORMAT(1H1)
      LCOUNT = LCOUNT + 1.
      IF( LCOUNT .GE. 42 ) LCOUNT = 1.
600   CONTINUE
      STOP
      END
```

Computer program two is simply a small program to sum the incumbents of all occupations used in the socio-economic index.

Computer Program Two

```
      PROGRAM TST (INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      DIMENSION X(1)
      SUM=0
      DO 100 JP = 1,287
      READ(5,101) X
  101 FORMAT(7X,F6.0)
      SUM = SUM + X
  100 CONTINUE
      WRITE(6,201) SUM
  201 FORMAT(1H1,10X,F10.0)
      STOP
      END
```

Computer Program Three


```
      PROGRAM TST (INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      THIS IS A PROGRAM TO CALCULATE THE PERCENTAGE OF WORKERS IN EACH OF THE
      CLASS INTERVALS OF THE SEI.  SIX RUNS ARE MADE, ONE FOR EACH CLASS
      INTERVAL.  DATA COMES FROM THE SERIAL ORDERED DECK OF EACH RESPECTIVE
      PROVINCE.
      DIMENSION X(3)
      SUM = 0
      LCOUNT = 1.
      READ(5,101) NCASES
      FORMAT(I3)
      WRITE(6,401)
      DO 100 JP = 1,NCASES
      READ(5,201)(X(I), I = 1,3)
      FORMAT(F3.0,F4.2,F6.0)
      WRITE(6,301) X(1), X(3)
      FORMAT(1H0,10X,F3.0,5X,F6.0)
      LCOUNT = LCOUNT + 1.
      IF ( LCOUNT .GE. 30 ) WRITE(6,401)
      FORMAT(1H1)
      IF ( LCOUNT .GE. 30 ) LCOUNT = 1.
      SUM = SUM + X(3)
      CONTINUE
      CENT = SUM / 1537945  * 100
      WRITE(6,501) CENT, NCASES
      FORMAT(1H1,10X,37HPERCENTAGE OF WORKERS IN THIS RUN IS ,4X,F7.4,
     110X,6HNCASES,4X,I3)
      STOP
      END
```

APPENDIX D

A Precaution to Census Data Users

Introduction

"The essential features of an official national census are (a) the sponsorship by the national government, sometimes with the co-operation of provincial and local governments; (b) the coverage, relating to a precisely defined territory; (c) the universality of the enumeration to include every member of the community within the scope of the census without omission or duplication and with reference to one well defined point of time; (d) the recording of separate data for each individual by direct enumeration and not by registration, although the mechanics of collection may make it possible to record information common to all members of a household or family for the group as a whole; (e) the compilation and publication of data by geographic areas and by basic demographic variables as an integrated part of the census." [1] Implicit in the above features of a national census is the fact that the census should be a useful source of data for secondary analysis.

Who else but a national government, would have the resources to interview each member of the national population? Basically, our national government collects, compiles and makes available to the general public, selected tabulations of census data. If social scientists weren't concerned about sampling procedures, and other aspects of the research process, they might well consider census data of the kind available in Canada, as a "gift from the gods".

However, some social scientists dismiss this census data as theoretically irrelevant and of no import to their basic sociological issues. Others, at least those who have made use of it, must consider it of some relevance. Perhaps there is a third category of use who relies on census data because it is the only data available to them at present.

An example of a major sociological work employing census data would be The Vertical Mosaic, by J. Porter.[2] In this work, there are over one hundred references, many of them in the form of tables, to the Dominion Bureau of Statistics, now Statistics Canada, and the Canadian census.

Another example would be the book by S. Lieberson, Language and Ethnic Relations in Canada.[3] Both of these works rely heavily on census data as a rich source of available information.

Regardless of the substantive or theoretical concerns of the user, there are certain difficulties in census data that are relevant to all users. Some of these problems are more obvious than others; some we discovered only through the process of using the census; obviously, there are still more problems that will only be discovered by conscientious users of census data, in the future. In this chapter, we will elaborate the difficulties that are known to us in Canadian census data.

This cautionary appendix will deal with general criticisms of census data. The appendix will in fact be a recount of methodological problems encountered while carrying out the

hypothetical comparative research problem of construction provincial socio-economic scales of occupations. The format used here will be similar to an annotated diary. That is, a methodological problem will be stated and will be followed by an explanation related to the research undertaken in this thesis.

GENERAL CRITICISMS:

In terms of general problems with census data, one of the major categories where difficulties are encountered is in the area of data collection, that is to say, enumeration. Enumeration is a term used to describe the process of listing information, in this case, information about the population of a nation. The people who do this enumeration are called enumerators. In 1961, the Dominion Bureau of Statistics conducted the dicennial census using enumerators, people who had undergone a training program designed specifically to teach them how to fill in the census taking forms.

One of the problems with enumerators is as follows. Since enumerators are usually residents of the area in which they are enumerating, with some exceptions, for example the Royal Canadian Mounted Police take the census in the North West Territories, there may be a tendency among respondents to distort or exaggerate their responses because of their unwillingness to give confidential information to an enumerator who might be their next door neighbour. For example, this may be the point of entry of distorted or exaggerated information about age, income or occupation. Many people might be tempted

to add one or two thousand dollars to their income or conversely subtract that amount. The same might be true about information on other social variables.

In addition to the above problem, there may be a language barrier between enumerators and the people they are enumerating. This would be especially true in large urban areas where there is generally a multiplicity of different language groups. In addition, many immigrants may be suspicious of federal officials asking such questions as, "How many people live in this house?" or "What is your marital status?"

Other problem areas have been suggested to me by a number of enumerators. For example, it is common for a wife to respond to questions about her husband. Since many husbands will be at their place of employment when the enumerator calls, a legitimate question would be; how many wives know enough about their husband's occupation and annual income to give the enumerator accurate information about such variables? A further problem in the data collection process occurs with people who have more than one occupation. Many times these people will only admit to having one job. This occurs for various reasons, such as for the purpose of concealing undeclared income.

In fact, despite the intention to enumerate the total population, this is obviously not the case. This point can best be described by relating a story told to the author by a person familiar with census data collection procedures on

Indian reservations.

"I expected a certain number of people, who were Indians in that county, given the 1961 census. This would be based on that other and not stated ethnic category in the census, but I knew it would include no-one else, except Indian population. The number I expected, given the 1961 census didn't match at all the household census we did in the only two reservations, in that county - in fact we had a larger population count. So, how come? Later I'm talking to a priest, then I'm talking to an agent from the area, and other people, and so on, eventually someone tells me who does the enumeration for that county. Eventually, I meet that person who does the enumeration for the area and I ask her when she did it because I' still puzzled about the discrepancy. She tells me how much she was getting paid per head, for enumerating the census and how she was scared of going on the one reserve in particular. She didn't mind going to the other one but one reserve in particular was known for the couple of people who had been murdered there and the drinking. One of the Indian people from that reserve worked in her friends motel as a cleaning lady, and she had been in that area for a long while. Between this lady and the Indian girl who worked in the motel, they knew everybody on the reserve. So she sat down in her own house and made out the enumeration for the reserve. When I was there in 1964, the whole thing, the male-female ratio, the young-old ratio, it wasn't just total numbers. Total numbers can change. The total numbers weren't even close at all. If she did it when they were off blueberry picking, or when they were off potato picking in Maine, then she wouldn't find two-thirds of the population. They're gone. Or if she hit it at Saint Anne's festival when they were off the island, then ninety percent of the population is gone. When you are talking about age categories and if you are guessing and you know somebody has six kids or maybe eight or maybe it four, and your guess their birthdays and you are guessing their sex, then you are more or less right per household. You are more or less right eighty percent of the time with sex and you are more or less right, well you may not be right in any of the age categories. If the category only includes five years, you could be out a couple of years and you are done for, if you are guessing the age categories. The census figures didn't make any sense at all, on age and sex distribution as well as total population. And that is because she was guessing. If you are guessing for four hundred people, that doesn't mean anything. But if enough people are guessing for four hundred people, it adds up." 4

When asked if the people on the reserve were afraid to talk with government officials, the reply was as follows.

"No. They have no idea what the hell a census taker is. Government officials come and go and they don't know one from the other".

As a final note of intrigue, I enclose the following newspaper story from The Hamilton Spectator, April 25, 1972.

LOST - 30,000 PEOPLE

> PORTAGE LA PRAIRIE, MAN. (CP SPECIAL) - Premier Ed Schreyer has a problem - in fact, 30,000 problems. He told the annual convention of the Manitoba Chambers of Commerce that Statistics Canada census figures showed the population of Manitoba was 988,247. However statistics issued by the Manitoba Health Services Commission gave a population of 1,018,000. "I wonder who's paying those extra 30,000?" said the premier. 5

In other words, the data collection process for the census is no more free of problems than any other data collection procedures used in the social sciences. In fact, because it depends on local persons with little training in, or commitment to, the data collection procedures, it is quite possible that the census data has a higher rate of error occurrence than many other secondary sources of data.

The next step toward the publication of the census results would be the transfer of data from the enumeration forms to magnetic computer tape. This was done with the aid of an IBM Document Reader which reads sense marks on a document and transfers the data to magnetic tape. The device was used for the first time by Statistics Canada in 1961 resulting in great time saving at this stage of the operation. The device is highly

accurate and it is therefore unlikely that errors occur at this stage of processing.

One final area where problems arise is of course in the publication of the tabulations of census data. The problems in this area occur in a variety of forms. One example that was brought to my attention concerns the population distribution for the census tracts in the city of Hamilton. More specifically, distribution figures for certain tracts, as published in Bulletin CT - 8[6], from the 1961 census, do not match the 1961 figures published in Bulletin C - 10[7], from the 1966 census. Of the 65 census tracts, published for the Hamilton metropolitan area, 8 of these tracts, or 12.3%, list population figures which do not match from one bulletin to the next. The discrepancy in the figures range from 8 to 695. The census tracts involved, for anyone wishing to investigate further, are as follows; 1, 2, 3, 4, 7, 44, 45, and 61. There are no apparent explanations for these discrepancies other than the suspicion that they are some form of clerical error.

Other problems manifest themselves in the forms by which the data are presented. One kind of problem may appear whenever the user attempts certain kinds of comparisons. If a researcher desired to compare the income levels of men and women for various occupations, that person would soon encounter the problem of creating comparable income intervals for males and females. Table 10, illustrates this point more clearly. One can see at a glance that the income levels for males and females are reported in 13 and 10 categories respectively. However, the interval size for males differs quite substantially from the inteval size for

females. In order to compare men and women with respect to income, it is necessary to collapse five categories for men.

This is not such a great problem if one is interested in the income distribution for the total male and total female labour force respectfully. If however, you wish to compare the income levels for each of the 320 occupational titles, as listed in the census, for males and femails, the process then becomes both time consuming and highly conducive to the occurrence of computational errors.

Table 21: Income Categories for Males and Females, as Published in the 1961 Census, Bulletin 4, 1-2, of Volume IV.*

Employment Income Group	
Males	Females
Under $500	Under $500
$500 - 999	$500 - 999
$1000 - 1499	$1000 - 1499
$1500 - 1999	$1500 - 1999
$2000 - 2499	$2000 - 2499
$2500 - 2999	$2500 - 2999
$3000 - 3499	$3000 - 3499
$3500 - 3999	$3500 - 3999
$4000 - 4499	$4000 - 4999
$4500 - 4999	$5000 and over
$5000 - 5999	
$6000 - 9999	
$10000 and over	

Source: Tables B4 and B5.[8]

After collapsing these categories, one is left with ten categories for men, instead of the original thirteen. In addition, the last category created for men, from $5000 and over, will in all likelihood, contain a major proportion of one's cases for men. In other words, a good deal of information is lost to the researcher because of the necessity to reconstruct categories. Interval size for this kind of data varies from one census publication to another making it even more difficult to carry out meaningful comparisons for selected variables.

Obviously, no researcher is going to investigate all of the data collection and compilation procedures, before using census material. Therefore, any errors in the above mentioned sources are typically undetected and undetectable. However, we have given enough examples to at least convince users that they are working with imperfect data.

If the user is willing to live with the possibilities of the presence of errors in the data, then there are other general considerations, about the nature of this data that are contingent upon the basic fact of time. The user should be aware of these considerations as well.

In 1961, Canada carried out a dicennial census. The provincial education data required for the construction of the socio-economic index, were published in 1963, as Volume 3, Part 1, Bulletin 3.1 - 11.[9] The provincial income data were published in 1965 as Volume 4, Bulletin SX - 5.[10] There are

obvious problems encountered by Statistics Canada in the collection, analysis and publication of such vast amounts of data as are involved in a national census. However, one can not overlook the criticisms that occur in the use of data that are five years out of date. This is particularly true of the period, 1960 to 1970; when so much emphasis was placed on education; when minimum wage laws were introduced; when labour unions made vast strides in the area of wage increases for their members.

Census data in Canada was collected in 1961, during the month of June. It is evident from the definition of "employment income" and "labour force participation" given in the census that reported statistics will include data for students who are holding temporary summer jobs. The census defines employment income as follows, "Income from employment is the total income from wages, salaries, commissions and tips (before deduction), and net income (gross income less operating expenses) received from own business or professional practice (excluding net income earned from the operation of a farm).

All individuals 15 years of age and over residing in sample households were asked to report total income received from each of the above sources for the twelve month period ended May 31, 1961, or if this figure could not be provided, for the calendar year 1960." [11]

From the above definition, it is very likely that students with summer employment were included in the reported statistics published by Statistics Canada. The census definition of labour force participation includes the following paragraph.

> " The tables in this report contain statistics for persons aged 15 years and over who were reported in the current labour force, i.e., persons who reported a job or looking for a job (exclusive of those looking for their first job) in the week prior to enumeration in June 1961." [12]

It is evident from this definition that there exists a strong possibility that students holding summer employment were included in the enumeration. The significance of this for the reported data is as follows. For any given occupation where a large number of students are employed during the summer, the following bias might appear in the reported data. A large number of students would have the effect of lowering the average income for that occupation, since students tend to be paid less than a regular worker in that occupation. At the same time these students would have the effect of raising the average education for that particular occupation, since students generally find summer employment in occupations which require little training, while at the same time, they themselves may be completing a university degree. In other words, they may have quite a substantially higher level of education than regular incumbents of that occupation, while at the same time, they may have a lower level of income than regular incumbents of the same occupation.

One final general criticism of census data is its availability. If the researcher is content to use library facilities, which generally means examining census data in the library, very little problem exists in obtaining census data. However, if it is necessary for the researcher to obtain a census publication for personal use, there is generally a problem in purchasing such publications. Dominion Bureau of Statistics (since remamed Statistics Canada) publications are sold in Information Canada Bookstores, which are listed in the telephone books. However, if the publication you desire is anything but the most general demographic descriptions, you will, in all likelihood, have to order your publication from Ottawa. During the course of this research, the author discovered an alternative to this usually time consuming procedure. It is possible to obtain any census publication from a little known, little publicized department of Statistics Canada. The name and address of this department is included in the notes for this chapter for information purposes only. Publications can generally be secured from this office within two or three days.

Notes

1. Parenti, G., " The Census," in Handbook for Social Research in Urban Areas, P. Hauser (ed.), Paris, Unesco, 1965, p. 42.

2. Porter,J., The Vertical Mosaic, Toronto, University of Toronto Press, 1969.

3. Lieberson, S., Language and Ethnic Relations in Canada, New York, J. Wiley and Sons, Inc., 1970.

4. The story reprinted in the text of the thesis is from a confidential communication.

5. The Hamilton Spectator, " Lost - 30,000 People," April 25, 1972.

6. Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin CT - 8, Ottawa, Queen's Printer, 1963.

7. Dominion Bureau of Statistics, 1966 Census of Canada, Bulletin C - 10, Ottawa, Queen's Printer, 1968.

8. Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin 4.1 - 2, Ottawa, Queen's Printer, 1965.

9. Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin 3.1 - 11, Ottawa, Queen's Printer, 1963.

10. Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin SX - 5, Ottawa, Queen's Printer, 1965.

11. Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin SX - 5, Ottawa, Queen's Printer, 1965, inside front cover.

12. Ibid.

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