Formal Task Differences Between Gender-Dominated Occupations

by

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ABSTRACT

The assignment of different tasks to men and women, referred to as the gendered division of labour, is a fundamental characteristic of work (Reskin & Padavic, 1994:6). Biological determinism and sociobiology interpret the concentration of men and women into different jobs performing different tasks in terms of their biological suitability for these occupations. Human capital theory explains occupational gender segregation in terms of choices men and women make to optimize their economic returns. Gender-role socialization theory interprets the concentration of men and women into different occupations as the result of cultural and social expectations placed upon them to perform tasks appropriate to their gender.

This thesis directly attempts to discover if the formal tasks performed in gender-dominated occupations result because of biological differences or because of social and cultural expectations of appropriate masculine and feminine pursuits. Specifically, it examines gender-dominated and gender-neutral occupations in the British Columbia provincial government and the formal occupational tasks performed within them. By using content analysis of formal job descriptions, physical job requirements are contrasted with gender socialized task performance. The data analysis for this study was separated into two analyses. Analysis 1 was the examination of occupational task focus (data/people/things), occupational complexity, physical aspects of occupations, and line/staff function of task bundles by gender-dominated and gender-neutral occupations. Analysis 2 involved a comparison of occupational task focus (data/people/things), occupational complexity, and physical aspects of occupations contained in the provincial

government job descriptions to the *National Occupational Classification (NOC)* unit group descriptions.

Analysis 2 did not show any significant differences between provincial government job descriptions and *NOC* unit group descriptions. This may be interpreted as support for the ability of the *NOC* to reflect those occupations it describes. The combined findings of Analysis 1 suggest that male and female-dominated occupations are very similar in physical aspects when separately compared to gender-neutral occupations. Also, male and gender-neutral occupations are more likely to work on line tasks compared to female-dominated occupations. Lastly, female and gender-neutral occupations are similar in regards to working with data when compared with male-dominated occupations. The analysis found no support for the assertion that formal tasks performed in gender-dominated occupations result from biological differences between men and women. In fact, only limited support was found for the supposition that socialization and cultural expectations are responsible for the occupational segregation by gender. However, this research does offer further evidence on the debate about why the gendered division of labour has persisted.

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DEDICATION

This thesis is dedicated to my mother and late father, who lovingly advised all their children to pursue higher education by saying "education is a worthwhile quest because it is something *no one* can take away from you."

CHAPTER 1

The History of Segregated Work Between Men and Women

> *"Societies gender work by labeling activities as appropriate for one sex or the other. These labels influence the job assignments of women and men, and they influence employers' and workers' expectations of who ought to perform various tasks. Across societies and over time, however, no hard-and-fast rules dictate which sex should do a particular task. What is crucial for preserving sex inequality is not the tasks performed by each sex but the fact that men and women do different tasks" (Reskin & Padavic, 1994:8).*

Introduction

The assignment of different tasks to men and women, referred to as the gendered division of labour, is a fundamental characteristic of work (Reskin & Padavic, 1994:6). All societies allocate at least some tasks on the basis of workers' gender, although which gender performs which tasks has varied over time and differs across cultures (Wilson, 1991:89). Even though sex and gender are historically altered terms (Armstrong & Armstrong, 1990:24), which are explained more thoroughly in the following chapter, it should be noted at this point that the term *sex* refers to a classification based on biology and physiology (Reskin & Padavic, 1994:2-3); and the term *gender* refers to a classification based upon sociocultural elaborations of biology and physiology (Mackie, 1991:2).

Throughout most of human history in which the family has been the primary institution of production, a gendered division of labour has prevailed, and the vast majority of people have worked in non-wage economies (Phillips & Phillips, 1993:5-10). For example, in Canada women have traditionally concentrated on nurturing and home

tasks, while men have focused on tasks outside the home and those requiring physical strength. Working for wages is a relatively new experience for most Canadian workers (Phillips & Phillips, 1993:9), and the expanding role of a formal labour market has altered societal views of the gendered division of labour.

The increased involvement of women in the paid work force is one of the most significant economic and social changes to occur in the last several decades (Statistics Canada, 1994:7). Women have accounted for most of the increase in labour force participation and employment since the mid-1970s. Currently, women represent almost half of the entire Canadian labour force. On the other hand, male labour force participation has shown a downward trend since the early part of the twentieth century, with a leveling off after 1971. Figure 1 shows the gradual convergence of male and female work force participation rates in Canada.

Women's participation in the labour force has gradually increased since before the turn of the century (Wilson, 1981:64). In 1891, only 11.4 percent of women over the age of fourteen were in the formal labour force. By 1941, this percentage had doubled to 22.9 percent. On the other hand, the male labour force participation rate declined from a high in 1911 of 90.6 percent to 85.6 percent in 1941. The decreasing trend of male labour force participation continued until 1971, finally leveling off at approximately 75 percent. However, female labour force participation continued to rise after World War II and showed its greatest increases after 1961. By 1991, the female labour force participation rate had reached a high of 58.2 percent, while male participation declined to an all-time low of 74.8 percent.

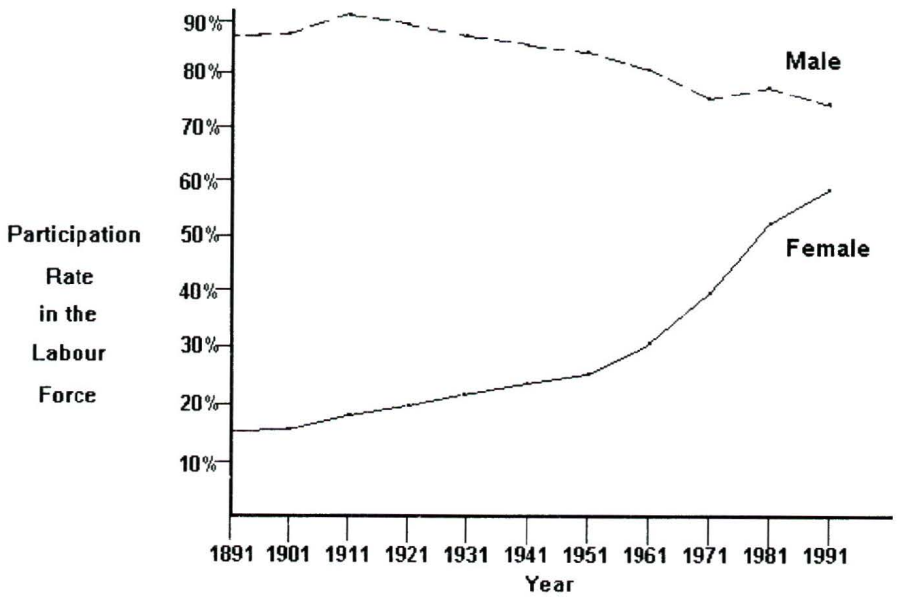

Figure 1 Male and Female Participation Rates in the Canadian Labour Force from 1891 to 1991.

Source: Adapted from Wilson, 1991:64, Krahn & Lowe, 1993:62, Statistics Canada, 1983:93 and Statistics Canada, 1994:8[1].

The trend towards convergence of male and female labour force participation rates has challenged many expectations about which gender should perform certain tasks. But, changes in gender-defined tasks occur slowly because past gender values and norms influence contemporary social expectations (Reskin & Padavic, 1994:7). Ever since labour force data were collected in Canada, they indicate that women have been concentrated and segregated in only a few occupations. For example, in 1901, just four occupations accounted for over two-thirds of all employed women (Krahn & Lowe, 1993:163). Domestic servants made up the greatest portion (36%); 87 percent of all domestic servants were women. Seamstresses (a wholly female occupational enclave) were the next most frequent (14%), while another 13 percent of women were teachers (70 percent of all school teachers were women). Finally, 5 percent of women were office

clerks; however they made up only 21 percent of all clerks in this then male-dominated occupation (Krahn & Lowe, 1993:164). Similarly, in 1993, 71 percent of all employed women were concentrated in five occupational sectors: teaching; medical; clerical; sales; and service (Statistics Canada, 1994:14). Similar to the data at the beginning of the century, women constitute very large proportions of the total work force in each of these "female" occupational categories. Although the enduring occupational segregation by gender is lessening, it still is a major characteristic of the Canadian labour force and constitutes the focus of this thesis.

Why the Gendered Division of Labour has Persisted

The division of labour between men and women has spurred a long-standing debate among anthropologists and sociologists (Sanday, 1981:76). Some researchers (Brown, 1970; Friedl, 1984) suggest that the greater expendability of men makes them suitable for dangerous tasks. Other researchers (White, Burton & Brudner, 1977; Lenski, Lenski & Nolan, 1991) state that the constraints of childbearing and nursing tie women to home-based tasks. Still other authors (Murdock & Provost, 1975; Quinn, 1977) claim that differences in physical strength between men and women have led to the gendered division of contemporary times (Sanday, 1981:76). Finally, some (Oakley, 1972; Ortner, 1974) claim that gender stratification is imposed largely because of cultural influences.

The debate is complicated because depending on the types of activities examined, persuasive arguments can be made for both biological sex and cultural gender stratification (Sanday, 1981:76). For example, some researchers (Murdock and Provost, 1973; Sanday, 1981) point out that hunting and the processing of raw materials have nearly always been performed strictly by males. Although no technological activities

have been undertaken exclusively by women, gathering, processing vegetal foods, cooking and other household tasks constitute "women's work" in most known cultures. Although anthropologists have discovered that in most societies men are the warriors, hunters, and processors of raw materials related to weaponry and tools (Sanday, 1981:77), on occasion, women have acted as full-time warriors and hunters, handling the same weapons as men and exhibiting the same successes. However, such examples are few and often occur under special circumstances. Murdock and Provost (1973:220) explain the occurrence of strictly male-dominated tasks on the basis of men's greater physical strength and their greater capacity for using it in brief bursts of excessive energy. These researchers also suggest that women concentrate on household tasks because of their association with pregnancy and child care.

It is generally agreed that men have greater physical strength than women (Quinn, 1977:186). Not only are men on average physically larger than women (although this difference occurs only within, not across populations), they are equipped for more active and strenuous lives. Men have greater caloric intake, higher basal metabolism, larger hearts and lungs, larger and stronger muscles, less body fat, continued development in strength after puberty, and the male hormone testosterone which promotes tissue growth and repair, particularly in muscles and bones. However, the differences in behaviour that result from these physiological and skeletal differences are not so widely agreed upon (Quinn, 1977:187).

One noticeable consequence of the male advantage in strength and energy is the ability to perform heavier physical tasks. This ability is viewed by Quinn (1977:187) as an evolutionary adaptation similar to women's biological role as bearers and nursers of

children in early hunting and gathering societies. Several authors (Quinn, 1977:187; Lenski, Lenski & Nolan, 1991:105) agree that hunting is incompatible with pregnancy and caring for small children, but they cannot agree on whether it is the actual physical exertion which hunting requires, or the danger that it poses, or the long distance travel it demands that constitutes the most critical component of this incompatibility. Liebowitz (1975) has cautiously suggested (by drawing on an analogy from nonhuman primates) that the discrepancy in physical size between males and females may not be due to male adaptation to roles involving protection and provision. Rather these physical differences may be female adaptations to reproduction because females grow more slowly once they begin to reproduce, thus ensuring efficient energy allocation for reproduction.

If one considers only these facts, it is tempting to conclude that the gendered division of labour is determined solely by biological and reproductive differences between women and men. However, in some cultures women have engaged in activities requiring substantial physical strength that are inconsistent with the demands of maternity (Sanday, 1981:76). Examples of such tasks include carrying heavy loads, long-distance trading, and various laborious agricultural tasks. Gender assignment of these types of tasks is usually interpreted within the social and cultural value framework of a particular society.

Aside from the few tasks assigned exclusively either to men or to women, there is considerable empirical diversity in the cultural patterning of male and female work roles (Sanday, 1981:79). The gendered division of labour can range from nearly complete segregation of tasks, where almost all work activities are defined as either male or female (as is the case in Egyptian peasant classes), or it can be highly gender integrated with

men and women sharing most work tasks (as is the case in many primitive societies such as the Lepcha, an agricultural society in southern Asia) (Sanday, 1981:80-83). In those societies with relatively high proportions of gender integrated tasks, there is also a lower degree of distinctions by gender in social life. Furthermore, these more egalitarian societies emphasize cooperation instead of competition. However, because competition is the hallmark of capitalism, and most contemporary industrialized societies are capitalistic, today's capitalistic societies manifest a distinct gendered division of labour. In fact, Game and Pringle (1987:15) claim that a gendered division of labour is a basic dynamic of capitalist societies.

White, Burton and Brudner (1977:22) suggest another explanation for strictly male tasks. Although these authors do not contest the existence of human dimorphism, they point out that there is a considerable diversity from culture to culture in the degree to which men are stronger than women. Also, they note that many strictly male tasks require relatively little physical strength. Instead, danger, long distance travel and "economies of effort" explain more of the variation in the exclusivity of male tasks than do physical strength and the constraints of child care (White, Burton & Brudner, 1977:23). Brown (1970:1076) agrees that given the importance attached to the bearing of children, it would be counterproductive for a society to expose nursing mothers and childbearing women to danger. Also, Friedl (1984:135) states that men are the most reasonable choice for dangerous activities, as they are expendable because they are not the bearers of the next generation of work and warrior forces.

White et al. (1977) further discuss the gendered division of labour by introducing the concept of efficiency in the application of learned skills. According to White and his

colleagues (1977:23), "there are economies of effort in having the same persons perform adjacent tasks in the production sequences, since adjacent tasks often require similar technological skills, and are often performed in similar contexts." Therefore, women's performance of tasks that are compatible with nursing and child care (in most but not all instances) and men's performance of tasks that are consistent with travel and danger are a result of efficiency considerations, not the intrinsic characteristics of these tasks.

Men's greater size, strength and energy appear to provide suitable characteristics for heavy labour, and consequently help explain women's near exclusion from such tasks as hunting, warfare, tree felling and plowing (Murdock & Provost, 1973:222; Quinn, 1977:187). The fact that the average woman is not as physically strong as the average man has led to norms that exclude women from performing tasks that empirically only a minority cannot actually perform (Lenski, Lenski & Nolan, 1991:331).

With respect to the gendered division of labour, modern industrial societies resemble preindustrial societies in several ways. In industrial societies, as has been the case in previous societies, there are certain jobs that are performed primarily by men and others that are filled primarily by women (Lenski, Lenski & Nolan, 1991:332). Even in modern industrial societies which emphasize and value change, fundamental differences between male and female work roles persist (Oakley, 1972:152).

Two parallel historical trends have contributed to the continued gender segregation of the labour force. First, those jobs which command the highest prestige and earnings have been those occupations most coveted and occupied by men (Goldberg, 1986:5). Second, women, particularly married women, have been perceived as a "reserve army" of workers whose wages are considered supplementary to the family income

(Wilson, 1991:39). Despite considerable change in the sex composition of occupations, people nevertheless maintain traditional ways of thinking and acting (Oakley, 1972:152).

A central theme in the examination of the gendered division of labour is that women's work has been devalued and poorly rewarded throughout history (Krahn & Lowe, 1993:149). This devaluation of women's work has existed so long that its origin is conjectural (Reskin & Padavic, 1994:9). However, the rise of industrialization and large-scale factory production facilitated the growing separation between men's and women's work. Industrial jobs increased men's contribution to their families in that men became both the producers of the products and services their families required and the earners who could pay for these products and services (Reskin & Padavic, 1994:25).

Wilson (1990:17) argues that women's economic dependence peaked during the early decades of the twentieth century. Before this period, women made tangible economic contributions to their families' welfare: they cared for infant children, nursed the sick and elderly, and toiled to feed and clothe their families. Their labour was physically exhausting and time-consuming work, and it had a direct bearing on their families' standard of living. However, as wage earning became the norm, the economic responsibilities of husbands and wives changed, especially in urban middle-class families. Middle-class women's responsibilities became increasingly focused towards childrearing and home management, as wage labour took men away from the home during the day. Although working-class families generally accepted the presumption that women's place was in the home, they were not in the financial position to organize their lives accordingly (Wilson, 1990:18).

The decline of economic domestic production left women with the invisible, socially devalued and non-remunerative tasks of child rearing and house work (Reskin & Padavic, 1994:25). As industrialization and urbanization became more widespread, the home started to be considered as a refuge from the world of work (Wilson, 1990:18). Motherhood and family responsibilities assumed increased personal and social significance. Women were encouraged to take their responsibilities as mothers seriously because they were considered the educators of the next generation. Industrialization required an educated work force and mothers were important intermediaries in ensuring educational success. It was believed that women were temperamentally different from men and naturally adapted to their roles as wives and mothers, propositions supported by religion and contemporary science. Femininity was symbolized by domesticity and masculinity by success in the labour market. This ideology of family life coupled methodically to the requirements of capitalism in rejuvenating current employees and preparing the next generation.

Women's employment continues to be considered temporary and secondary to family responsibilities (Wilson, 1991:1). In the 1990s, this is exemplified by the double day or second shift in which many women spend their days in paying jobs and assume most of the responsibilities of child care and domestic chores when they arrive home (Krahn & Lowe, 1993:151). Because of their dual responsibilities, women are much more likely than men to be in jobs that are part-time and temporary (31 percent of employed women contrasted with 16 percent of employed men in 1989) (Reskin & Padavic, 1994:76). The increased expansion of the service sector, in particular lower-tier service industries and occupations, has continued to entice women with children because of the

part-time hours and flexibility of these occupations (Wilson, 1991:92). However, lower-tier services jobs are commonly low paying and offer little job security. Women take these jobs because of their extensive domestic responsibilities, limited alternatives to child care, and restricted alternatives available to them.

Gender is a prominent organizing principle in most societies and gender stereotypes proliferate in contemporary culture (Reskin & Padavic, 1994:33). Cultural beliefs about men, women, and work affect all members of a society; gender stereotypes affect workers, customers, employers, and supervisors. Unless someone directly challenges contemporary assumptions about gender and work, people seldom consider gender stereotyping. For example, when a news reporter recounts the story of a child care worker who saved a child's life, people usually think it is a *woman* saving the child. Similarly, when the story of a construction worker injured at a work site is reported, most people think of a *man* injured on the job. The invisibility of these stereotypes makes them especially powerful in shaping people's behaviours. Gender stereotypes, like the ones above, and job stereotypes about the qualities of the incumbents necessary to be successful at certain jobs, combine to segregate contemporary labour forces by gender (Reskin & Padavic, 1994:34).

Both men and women enter a labour force in Canada today that is segregated and distributes rewards in an unequal fashion (Wilson, 1991:39). Women occupy female-dominated jobs in which they receive low pay relative to equally qualified and skilled men. Even in the 1990s, as female labour force participation has reached a historical high, other aspects of women's work experience have been slower to change (Statistics Canada, 1994:7). For example, women's wages remain well below those of their male

counterparts. Also, even when they are employed, women are still largely responsible for family care and housework (Statistics Canada, 1994:45). In fact, employed married women with children spend two hours a day more on child care and household activities than their husbands, regardless of their employment status or the age of their children (Statistics Canada, 1994:48). Finally, and directly relevant to this study, even though many women are now entering occupations in which relatively few were employed in the past, most are still concentrated in traditionally "female" occupations (Statistics Canada, 1994:7). Previous researchers (Krahn & Lowe, 1993:161; Phillips & Phillips, 1993:45) have noted that the majority of occupations that women do are simply an extension of what they have typically done in the home for centuries, i.e., "being a help mate to man" (Hedley, 1992:174).

> "Secretarial and clerical work, cooking, waiting tables, hosting, teaching and caring for small children, nursing, cleaning, and sewing are all chores that women have done since time immemorial. The only difference between what most women are doing now and what they traditionally did is that they are being directly paid for their labor" (Hedley, 1992:174).

Although women have made noticeable inroads into some traditionally male-dominated areas, specifically the professional and managerial fields, the Canadian labour force still remains highly gender segregated (Wilson, 1991:90). Table 1 shows that of the nine major occupational categories, six are gender-dominated (i.e., at least 75 percent male or female occupied). Although Clerical is the only female-dominated major occupational category (80.1% female incumbency), it employs over one-quarter of all women working for wages. On the other hand, Construction, Transport equipment operating, Process, machining and fabricating, Primary, and Material handling and other

crafts all have over 78 percent male incumbency rates. These five major occupational categories employ close to half of all men working for wages. Generally speaking, one out of three employed women and one out of two employed men worked in gender-dominated occupational categories in 1995. Furthermore, Table 1 only reports major occupational categories and not actual jobs. On the job level, the gender segregation is even greater (see Hedley, 1992:171-175).

Table 1.0 Canadian Female and Male Employment by Major Occupational Categories in 1995.

Major Occupational Category	Women as percent of occupation	Percentage of all female workers	Men as percent of occupation	Percentage of all male workers
Managerial & other professional	50.8	37.0	49.2	29.6
Clerical	80.1	25.8	19.9	5.3
Sales	46.2	10.1	53.9	9.8
Service	56.8	17.2	43.2	10.8
Primary	21.1	2.1	78.9	6.5
Processing, machining & fabricating	19.0	5.0	81.0	17.7
Construction	2.8	0.3	97.2	9.1
Transport equipment operating	9.8	0.8	90.4	6.3
Material handling & other crafts	21.5	1.7	78.5	5.0
Total		100.0		100.1

Source: Statistics Canada, (1996:B-39).

The persistent occupational segregation by gender in the Canadian labour force and the continuation of two distinct work forces, one for women and one for men, is the

basis of this thesis. In particular, this thesis applies content analysis of formal job descriptions to determine the commonalties and differences between the tasks of male and female-dominated occupations in the public sector to determine if any significant patterns exist. Gender-neutral occupations are also examined as a comparative reference point. It is the intent of this study to analyze the formal tasks of gender-dominated occupations to discern if there is any functional basis for gender segregation. In conducting this research, I hope to be able to provide evidence that speaks to the various historical explanations of gender segregation that have been offered.

End Notes

1. It was not until 1891 that labour force information was collected for Canada as a whole. It is important to note that annual data were not systematically collected until 1945; therefore, the percentages reported before this period may be confounded by methodological inconsistencies. This fact should not present a problem for this overview because the purpose of the data is to illustrate the general trends in labour force participation by gender.

CHAPTER 2

Explanations for the Segregation of Work Between Men and Women

> *"Theory is much more than a game academics play. We all carry around in our heads some ideas about how people act and why they act the way they do. These explanations, which are often partial, contradictory, and illogical, filter our interpretations of the behaviour and institutions we encounter and influence our interactions with others"* (Armstrong & Armstrong, 1990:11).

Theories are attempts to synthesize explanations in a methodical manner and to advance related and logical understandings about how people and social arrangements operate (Armstrong & Armstrong, 1990:11). Although theory molds empirical research, it is also shaped by empirical research. Therefore, theory formation is a dynamic and continuous process that cannot be readily isolated from research and other behaviours (Armstrong & Armstrong, 1990:12). Theoretical premises are neither true or false, instead they are evaluated as more or less beneficial in understanding the situations and relations of day-to-day life. Explanations guide what we all do, both explicitly and implicitly. Theories must be perceptible so their usefulness can be evaluated. Perceptible, clear, systematic theories are imperative if we want to know how things work so as to change or maintain them, or to advance alternative interpretations. Theory development is a continual and cumulative process (Armstrong & Armstrong, 1990:20). The very synthesis of theory building means that no theoretical debate can ever be definitive or exhaustive.

Armstrong and Armstrong (1983:7) argue that the differences between men and women and the division of labour are central to all levels of social theory and analysis. The simple dichotomy about whether sex or gender is the primary explanation for

segregated labour is a useful way to begin to analyze work, especially women's work, as it simplifies the confusing complexities of daily life to make more informed reasoning possible (Armstrong & Armstrong, 1990:18). The debate between sex or gender being the principal explanation for the segregation of men and women into different occupations is the central focus of this thesis. Therefore, this chapter will attempt to contrast theories which claim that biology is the primary explanation for segregation of men and women into different jobs with those theories which claim gender socialization accounts for the segregation of work between men and women. However, the differences between sex and gender are not as clear cut as the distinction between biology and socialization. Therefore, the two terms of sex and gender must first be examined.

The Sex/Gender Difference

The term *gender* has been increasingly used to identify socially constructed differences between men and women and to direct attention to the nonbiological origins of women's positions (Armstrong & Armstrong, 1990:23). The distinction between sex and gender has flourished as efforts to oppose presumptions about biologically determined labour and characteristics of men and women persist. Mackie (1983:1) states that "Sex is the biological dichotomy between females and males. It is determined at conception and is, for the most part, unalterable. Gender, on the other hand, is what is socially recognized as femininity and masculinity." Although Mackie's definitions are commonly accepted and inherently commonsensical, the boundaries between and within sex and gender are not as straightforward.

The term *sex*, which is commonly used to denote biological and physiological differences between men and women, obscures the fact that there is cross-cultural

variability in the categories of "male" and "female" (Moore, 1993:195). Furthermore, the term *sex* implies that male and female categories are exclusive and homogenous, as well as biological opposites. Few authors emphasize the biological similarities between men and women; although, several researchers (Collier & Yanagisako, 1987:29; Stolcke, 1988:16; Moore, 1993:196) have pointed out that the "natural" differences between men and women are "socio-political conceptualizations" ingrained in Western culture. This discussion shifts the focus from gender constructs and roles as cultural manifestations of biological sex differences, toward ways in which cultures devise differences between men and women, and why these differences are constructed (Moore, 1993:196). The idea of sex as a cultural construct is not a recent idea, nor is it confined to Western culture.

In Foucault's (1984) book, *The History of Sexuality Vol. I*, he argues that *sex* is a consequence instead of an origin; it is a classification which is a product of particular discursive undertakings (Moore, 1993:197).

> "The notion of 'sex' made it possible to group together, in an artificial unity, anatomical elements, biological functions, conducts, sensations, and pleasures, and it enabled one to make use of this fictitious unity as a causal principle, an omnipresent meaning; sex was thus able to function as a unique signifier and as a universal signified" (Foucault, 1984:154).

Foucault's central point is that the concept of *sex* does not exist in advance of its understanding within a discourse in which its parameters are defined (Moore, 1993:197). It follows from this argument that outside discourse, bodies have no sex aside from which they are specified as sexed. If sex is an outcome of discourse, then sex cannot be viewed as biologically determined, unalterable, or natural. This is particularly problematic for Mackie's (1983:1) passage above because within Foucault's (1984) definition, sex is

culturally determined. Moreover, the assumption that biological sex is the universal starting point of male and female categories is also challenged because if gender constructs are culturally fluid, then culturally determined categories of sexual difference are also alterable. Biological sex may be more correctly understood "to mean a continuum whereon the reproductive structures, hormones, and physical features range somewhere between two extreme poles" (Doyle, 1985:8).

The categories of male and female are most often based on physical attributes, most notably genitalia, and the differential roles of men and women in reproduction (Moore, 1993:198). However, Moore (1993:198) suggests that recognition of physical differences and capabilities do not completely explain the production of discrete, fixed, dichotomous categorization of sex. Instead, Western discourse dictates that sex/gender is at the heart of personhood, to such a degree that if someone you are acquainted with as woman, divulges that she is a man, she literally becomes a different person. Further, people with recognizable biological characteristics may not have a singular gender identity, as can be with case with transvestites or bisexuals (Moore, 1993:201-202).

To complicate the sex/gender distinction is the recognition that it is very difficult to identify the socially allocated from the biologically determined (Armstrong & Armstrong, 1990:23). Even if characteristics based on biological sex could be separated from socially assigned characteristics, they would only have significance within particular contexts of class, race and history (Armstrong & Armstrong, 1990:24). Further, the importance of biological sex characteristics is also interpreted within the economic milieu and influenced by the availability of technology. Armstrong and Armstrong (1990:24) advance the example of men's greater muscle mass, claiming that such sex-

specific characteristics lose their value in those societies or classes where intellectual skill is the primary focus and where machines provide the physical power. They point out that the value attached to childbearing capabilities are also influenced by class, race and historical contexts, as is the case between paupers and queens, and between white women and Native women.

Mackie's (1983:1) claim that sex is "for the most part, unalterable" inaccurately implies that biology is beyond society and history (Armstrong & Armstrong, 1990:24). This is clearly not the case as the physical and social consequences of pregnancy have changed considerably over the last century. Even within contemporary times, pregnancy outcomes differ between women of advanced-industrial nations and women of developing nations, as well as between rich and poor women of the same country. Moreover, many young women today start menstruating at a younger age than young women several generations ago (Armstrong & Armstrong, 1990:24). Sex-specific biological characteristics and their implications change with privilege and the passage of time, but an over-emphasis on gender implies that a theory of biology is unwarranted and possibly futile.

The term *gender* is becoming increasingly used to refer to all differences between men and women; thus, it is losing its utility as a way to differentiate between socially assigned behaviour and biologically determined differences (Armstrong & Armstrong, 1990:24). Surveys and job applications commonly ask the respondents' gender when all they want to know is whether the respondents are males or females. This discrepancy between sex and gender may very well stem from Sanday and Goodenough's (1990)

claim that there is no distinct way of classifying the male and the female, and no distinct gender ideology or model within any one society.

This brief review of the sex/gender distinction is not meant to solve the controversy surrounding this debate; rather it is intended to bring conceptualization problems to the forefront. The discussion is somewhat circular as both terms, *sex* and *gender*, are culturally determined and depend on the contexts of class, race and history. Thus, a problem arises as to which concept, sex or gender, is the actual determinant of the other. It may be that these concepts are independent of each other, or it may be that they are so intricately related to each other that the same variables influence them equally.

The inherent difficulties of conceptualizing sex and gender continue and for the purposes of this thesis, a moderated form of Mackie's (1983:1) definitions of sex and gender are used. More specifically, sex is interpreted to be the biological dichotomy between males and females. Although alterable, sex is simplified to refer to the physiological and biological differences between males and females. Gender, on the other hand, is what is socially recognized and constructed as masculinity and femininity. These simplified definitions are not intended to direct attention away from the rich diversity of research undertaken to define sex and gender. Rather, these definitions contrast the biological and physiological differences between males and females within the socio-cultural expectations placed on men and women.

Theories of Sex/Gender Differences

The remainder of this chapter outlines four theories commonly invoked to explain occupational segregation by gender. The first two, biological determinism and sociobiology, interpret the concentration of men and women into different jobs

performing different tasks in terms of their biological suitability for these occupations. The third approach, human capital theory, explains occupational gender segregation in terms of choices men and women make to optimize their economic returns. The last perspective, gender-role socialization theory, interprets the concentration of men and women into different occupations as cultural and social expectations placed upon them to perform tasks appropriate to their gender.

Biological Determinism

The idea that social arrangements are manifestations of the intrinsic nature of human beings and are unchangeable has come to be referred to as biological determinism (Lewontin, 1977:8). Biological determinism strives to explain most of the present human condition as a natural development of biological phenomena (Boucher et al., 1977:1). Human nature is defined entirely in terms of Darwinian evolution, gene expression, hormonal influences, or other biological processes. Biological deterministic theories range in their rigidity from the claim that biological factors essentially determine all of the "nature" of each individual to the more indirect notion that human biology constitutes only "tendencies" toward which human beings will be drawn to in the normal course of events (Lewontin, 1977:8).

Biological deterministic theories have two complementary assumptions, both of which are crucial (Lewontin, 1977:8). The first are assertions that the differences in apparent abilities and power between individuals, classes, sexes, races, and nations result mostly from differences in intrinsic biological properties of individuals. These claims, even if they were accurate, would not necessarily result in a society of unequal power. Therefore, biological determinism requires a second condition to complete its argument.

This second aspect is a belief in human nature. More specifically, biological determinism contends that there are biological "tendencies" common to all human beings and their societies, and that these tendencies manifest in hierarchically arranged societies in which individuals compete for limited resources allocated to their positions in society (Wilson, 1975:554).

The premise that domination of men over women has a biological basis and is therefore inevitable provides a link between theories that claim differences between groups are genetic, and theories that claim human societies are the products of innate human nature (Lewontin, 1977:14). Many social theories support the notion that human nature influences social organization, and this notion is often invoked to legitimize political ends. For example, Durkheim asserted that structures of differentiation and power, and the sexual and familial divisions of labour are unavoidable and desirable products of evolution (Lehmann, 1994:48). As structures, they are desirable because they perform necessary and beneficial functions. According to Durkheim, the differences in activities between men and women exist because of differences in nature, and consequently differences in abilities between men and women. This correspondence between sex-specific abilities and sex-specific occupations is important to Durkheim as it creates sexual and familial solidarity. "It intimately and intricately binds together specialized male and female beings who are incomplete and mutually dependent" (Lehmann, 1994:49). Boucher et al. (1977:57) claim that it is a common assumption in Western societies that men and women have different roles because they are biologically distinct. In the nineteenth century, scientists and religious leaders cited menstruation, pregnancy, nursing, smaller body size, and hormonal differences as some of the factors

which set women apart and fitted them naturally into their roles as mothers and housewives.

Biological deterministic theories often differ in detail, but all have a similar framework (Boucher et al., 1977:133). They start by describing a specific model of society that corresponds to the author's socioeconomic predispositions. The characteristics of that society are then claimed to be necessary consequences of the biological nature of the human species. Consequently, present social arrangements are either unchangeable, or when altered will require constant conscious social control because the changed conditions will be "unnatural." According to Boucher et al. (1977:135), biological determinists build selective pictures of human history, ethnography, and social relations in order to make their cases. They misuse the central premises of genetics, evolutionary theory, and ethology to declare assertions to be true that are actually unknown. They then contrive *ad hoc* hypotheses to explain contradictions in their claims and rely on "scientific reasoning" to lead to conclusions that are untestable.

It is interesting to note that biology is invoked much more often to explain women's behaviours than it is to explain men's behaviours, and women's actions are usually described in a negative manner (Bart, 1977:81). Also, resurgences in biological explanations of human behaviour coincide with eras of conservatism and have been traditionally used to legitimize the status quo. Criticisms of biological determinism arise from its use of various broad assumptions (Lambert, 1978:97). For instance, assumptions about biological differences between men and women such as their universality,

inevitability, desirability, and their justification of social inequalities have all fallen under criticisms for their wide sweeping generalities.

Although biological deterministic arguments often acknowledge the influence of "environmental" factors in the development of human behavioural sex differences, they seldom point out that such factors may have biological effects (Lambert, 1978:105). Influences from outside the individual affect "biological events" within the living being, events which often affect the development of the organism (Lambert, 1978:104). It is important to note that the influences of external stimuli can alter the normal course of development as in the case of reproductive variations and abnormalities.

Sociobiology

One of the more recent reemergences of biological determinism has been in the form of sociobiology which claims that cultural manifestations such as religion, ethics, warfare, cooperation, and competition are tendencies that have been entrenched by natural selection and are encoded in the human genome (Lewontin, 1977:15). Edward Wilson's (1975) book, *Sociobiology: The New Synthesis*, is a manifesto of a more elaborate form of biological determinism (Boucher et al., 1977:134). The purpose of Wilson's (1975:4) book is to "codify sociobiology into a branch of evolutionary biology," and to show "that sociology and the other social sciences, as well as the humanities, are the last branches of biology waiting to be included in the Modern Synthesis" (neo-Darwinist evolutionary theory).

The role of women in society, the aggressiveness of humans, and numerous other human qualities are interpreted by sociobiologists as the results of the laws of natural selection (Boucher et al., 1977:131). Sociobiology starts by attempting to determine the

existence of interrelated social and individual behaviours that are representative or universal in the human species (Boucher et al., 1977:134). But it is often ambiguous as to what degree a certain trait is proclaimed to be universal (Boucher et al., 1977:135). What is clear is that the underlying essential nature described by sociobiologists bears a striking similarity to the society occupied by the theorists themselves. Also, sociobiologists overlook the rich diversity of differences between societies (Lowe, 1978:122).

Once sociobiologists have established the premise that human nature coincides with their immediate world, they attempt to convince us that it has evolved in the course of human evolution (Boucher et al., 1977:135). Consequently, they propose a four-step theoretical explanation. First, sociobiologists attempt to establish that human nature and social organization are only particular examples of more widespread classifications of behaviour and social organization in the animal kingdom. This enables them to trace an evolutionary history for the social phenomena under investigation. Sociobiologists try to show this biological continuity through either direct genetic continuity between humans and other primates, or as the result of common dynamics of natural selection that drive different genetic bases in more distantly connected organisms and lead to evolutionary convergence (Boucher et al., 1977:135-136). A large portion of sociobiological data have been extrapolated from the behaviour of animals (Mackie, 1991:58). Of special interest to sociobiologists are the implications of sexual dimorphism among nonhuman primates. Once "universal" anatomical or behavioural traits are identified, sociobiologists then try to find similar traits in nonhuman primates to strengthen their arguments that human traits have evolved through natural selection (Lowe, 1978:121).

The second step undertaken by sociobiologists is to establish that different facets of human social behaviour are "genetically programmed," although in varying degrees, depending on the behaviours examined (Boucher et al., 1977:136). This step is central because modern evolutionary theory demands that for natural selection to influence a trait, it must have a genetic base. There is no evolution, in a biological sense, without genetic variation. However, sociobiologists offer only arbitrary conjectures of gene evolution, and the obvious fact that people are genetically different from apes, thus presenting no evidence for a genetic basis of human social behaviour. One such example is the "inevitability" of male-female differences (Mackie, 1991:58). According to the tenets of sociobiology, physical and behavioural dimorphism of men and women have evolved because of advantages in attracting mates, producing and caring for young, and utilizing resources (Lambert, 1978:98).

The third platform of sociobiological theory is that each component of human nature is adaptive and leads to higher "reproductive fitness" (Boucher et al., 1977:136). Any genetically influenced behaviour "is assumed to be adaptive and functional" (Mackie, 1991:58). Sociobiology claims that behavioural traits endure if they strengthen the chances of people passing along their genes (Tavris & Wade, 1984:127). Also, for each characteristic of human nature, like love, spite, conformity, territoriality, and many others, sociobiologists devise a plausible narrative to explain why those with the trait in question may leave more or fewer offspring in the future (Boucher et al., 1977:136). Moreover, in this theory it is not necessary to account for the possibility that individuals will leave more descendants in the immediate future, providing that one can sufficiently demonstrate that individuals' relatives have benefited from the trait under investigation.

In short, behaviour is presumed to be influenced by genetic self-interest (Sayers, 1982:51). However, such broad ranges of scope enable any interpretation to be in line with this theory and make most claims nonfalsifiable.

Finally, sociobiology must explain the fact that human societies differ considerably in their cultural forms and content, which in some cases can change rapidly (Boucher et al., 1977:136). Sociobiologists (see Wilson, 1975:11-13) parallel any observed amount of cultural differentiation with an assumed degree of genetic variation. Sociobiologists consider any behaviour that is observable in all societies to be a product of human genetic composition, the societal division of labour by sex being one such universal (Mackie, 1991:58).

Sociobiology emphasizes the "basic asymmetry" between men and women (Dawkins, 1976:151). By using evolutionary reasoning, it argues that women are genetically programmed to perform more child and home care than men (Mackie, 1991:58). As mentioned above, sociobiologists believe that living beings' inclusive or reproductive fitness relies on producing the largest possible number of offspring who will reproduce and pass on their genetic codes to following generations. Consequently, men and women adopt different strategies to maximize their possibilities of passing on their genes (Hubbard, 1983:5-6). Richard Dawkins (1976:142), in his book *The Selfish Gene*, claims that females contribute more than men into each offspring from the moment of conception. Even though both eggs and sperm contribute equal amounts of genetic material, eggs contribute the necessary food reserves (Mackie, 1991:58). Also, because females cannot pass their genes to as many offspring as can males, each child represents a greater investment to women (Mackie, 1991:59). Because women continue to invest

more in their children throughout their development (supposedly because of women's greater original investment), sociobiologists conclude that the traditional division of labour between men and women has evolved (Mackie, 1991:58).

Sociobiological theory also claims that the sexual division of labour is related to "aggressive dominance systems" (Lowe, 1978:122). For example, Wilson (1975:551) states that aggressive dominance systems are universal, "...with males generally dominant over females..." This leads Wilson to conclude that males are more aggressive than females and that the hierarchical structures in societies are innate in human nature. Consequently, the sexual division of labour is related to maternal care and aggressive dominance systems.

Lowe (1978:122) suggests that sociobiology has co-opted the sexual division of labour into its argument because it persists in nearly all cultures. However, sociobiology neglects the fact that the tasks men and women perform differ noticeably from society to society. Also, sociobiologists appear to ignore the fact that when they claim that the sexual division of labour is universal, they are comparing genetically different groups living in different environments.

None of the biological deterministic theories, including sociobiology, have been able to determine the extent to which a particular behaviour is the result of biology or environment in a manner that satisfies the minimum requirements of the scientific method (Lowe, 1978:119). Wilson (1975:159) does admit that determining the genetic components of behaviour is difficult because of environmental factors and the influences of culture and learning. For instance, in a discussion of the differing arm strength of men and women, "several researchers have concluded that much of this difference is the result

of society's encouraging the average man to be more active than the average women. They feel that the social influences are so great that inherent physiological differences in strength cannot yet be estimated" (Douglas & Miller, 1977:173). Also, to attempt to separate genetic and environmental elements and consider them separately is pointless (Lowe, 1978:120), as an organism's basic biology must interact with the environment (Hamilton, 1985:28). Sex differences, as well as other biologically influenced traits, differ with environmental conditions.

Human Capital Theory

Human capital theory proposes that the allocation of jobs generally results in a match between the demands of the job and the skills and abilities of the job's incumbent (Krahn & Lowe, 1993:109). Thus, the human capital approach uses the characteristics and behaviours of workers to explain the gender differences in occupational concentration (Roos, 1985:3). The actual family responsibilities of women (or anticipated family responsibilities of single women) are presupposed to affect the types of jobs women choose or are able to enter, by affecting the amount of time they invest in educational and on-the-job training, the number of hours they can work, the continuity of their labour force participation, and their ability to follow through on opportunities for advancement. At the societal level, the result is a hypothesized more efficient and productive labour market (Krahn & Lowe, 1993:109). The occupations which require the most effort, training and skills commonly receive the greatest rewards. Human capital theory presumes that an occupation's rewards are essentially determined by how much that occupation contributes to the economy.

Human capital theory also assumes that there is an equal competition for the more rewarding jobs and that participants in the labour market are all competing for jobs in a single, open labour market (Krahn & Lowe, 1993:117). Also, it assumes that available job postings are widely circulated, potential workers who possess the necessary qualifications all have equal access to job openings, and when it comes to whom to hire, employers make rational decisions that are based solely on assessments of applicants' skills, training, and initiatives. Human capital theory emphasizes the "supply" side of labour market operations, and commonly overlooks the behaviour and characteristics of employers and work organizations. The differences in the characteristics of the employees are the primary determinants of differences in pay, benefits, occupational status and other work rewards. According to human capital theory, gender differences in labour force participation are derived from three central factors: gender differences in socialization, differential accumulation of human capital between men and women and consequently job productivity, and child care and household responsibilities of men and women (Roos, 1985:3).

Gender differences in socialization is the most elusive of the concepts used in human capital theory and the most arduous to test empirically (Roos, 1985:3). People learn as children about the expectations of others as to what constitutes appropriate behaviour for adults. According to human capital theory, women's primary roles are those of wives and mothers; career ambitions are secondary. On the other hand, men are expected to be responsible for the primary support of their families. Thus, socialization determines the educational, occupational choices and options of both men and women. Women's participation in the labour force is viewed as dependent on their family life

cycle, and consequently, likely to be discontinuous. Because of these reasons, human capital theory proposes that women will not invest in lengthy education, nor will employers invest in on-the-job training for women. Human capital theory uses these reasons to explain women's poorer earning prospects relative to men (Reskin & Hartmann, 1986:71).

Since human capital theory assumes that the labour market operates in a nondiscriminatory fashion which rewards workers for their productivity, women are disadvantaged because they are seen as less productive workers due to their lack of education, training and work experience (Reskin & Padavic, 1994:39-40). Thus, women's orientation to their families hinders their investments in education, training and experience which makes them less productive than men (Becker, 1975:179; Roos, 1985:4).

Although the amount of education people have is important in determining their participation in the labour force, their authority, and their wages (Reskin & Padavic, 1994:40), it is losing its importance in explaining the gender segregation in the labour force today. For example, in the United States, men and women both average slightly more than 12 years of education, but men are less likely than women to complete high school, although more are likely to continue past the master's degree (Reskin & Padavic, 1994:40). What is important is that male and female post-secondary students tend to major in different subjects, although this difference too has been shrinking (Jacobs, 1989:132).

Men and women often receive different types of training, sometimes due to cultural values and sometimes because of employers' actions (Reskin & Padavic,

1994:40). Historically, most of the job training provided by public schools was gender segregated and gender stereotyped which resulted in the channeling of males and females into different courses and programs. On-the-job training also varies greatly by gender as "female" occupations are less likely than "male" occupations to provide training once employees are hired (Carey & Eck, 1984:12). For example, employers usually expect workers in traditionally female occupations, such as nursing, to acquire and pay for their own training before they begin working (Reskin & Padavic, 1994:40), as opposed to male occupations, such as construction jobs, which commonly provide on-the-job, employer paid apprenticeships.

Experience, another variable commonly cited in human capital theory, is a more contentious issue between men and women (Reskin & Padavic, 1994:40). On average, women have less work experience than men, although this difference is lessening. Also, women are less likely to work continuously than men (Reskin & Padavic, 1994:41). However, differences in the length of work experience between men and women are expected to decrease as the necessity of two incomes increases.

Human capital theory assumes that women's top priority is raising their families, which results in women limiting their time in the labour force (Reskin & Padavic, 1994:75). Since women do not plan to be continuously employed, they expect less return from job-related investments in education and training, and consequently choose female-dominated occupations (Reskin & Hartmann, 1986:70). Working from this premise, human capital theory concludes that women favour occupations that are easier to re-enter and require general skills that do not deteriorate while they are out of the labour force raising their children (Reskin & Hartmann, 1986:70; Reskin & Padavic, 1994:75).

Therefore, women "invest" in less education, training and experience than men because they are less attached to the labour force. This supposedly leads to women being less qualified for traditional male occupations. Also, human capital theory suggests that women who anticipate short periods of employment try to maximize their starting salaries by seeking female-dominated occupations, which presumably start at higher wage levels but yield lower long term returns than male-dominated occupations, which hypothetically start at a lower wage because of on-the-job training (Reskin & Hartmann, 1986:70). Also, the human capital perspective claims that women prefer jobs that do not require much effort so they can save their energy for their families (Reskin & Padavic, 1994:75).

In sum, the human capital theory response to gender segregation states that women have chosen to be secretaries, teachers, nurses, cashiers, and waitresses because it is a rational decision based on the demands of their families (Roos, 1985:4; Reskin & Padavic, 1994:75). Women's family responsibilities are proposed to affect their productivity and advancement in employment in three ways (Roos, 1985:4). First, family responsibilities are considered to limit the number of hours women can contribute to the job (Roos, 1985:4), and can make it difficult for many women to pursue full-time occupations (Reskin & Padavic, 1994:76). Some women have countered by seeking part-time jobs; also, employers are more likely to arrange part-time jobs in traditionally female occupations, thus contributing to men and women being concentrated into different occupations. Second, family responsibilities can reduce women's abilities to travel or geographically relocate as a means of furthering their careers. Third, family responsibilities may influence women's decisions to accept jobs that have flexible

working hours or convenient job locations over jobs that pay more or have greater prestige.

The human capital approach to gender segregation in the labour force which arises out of women's primary orientation to their families rather than their careers appears more plausible 30 years ago when it was first proposed. For example, in the 1960s, most women left the labour force to raise their families; however, today women without children and women delaying childbirth are more common. Furthermore, women return to their jobs sooner after giving birth than in the past. Also, in today's economy, two incomes are needed to purchase the goods and services that one income purchased just a generation ago (Reskin & Padavic, 1994:41). Also, Reskin and Hartmann (1986:71-72) have reported that single women are just as likely as married women to work in traditionally female occupations. As for education and training, male and female-dominated occupations require similar levels (England, Chassie & McCormack, 1982:163), and there are both male and female-dominated occupations that require little skill or training (Blau & Jusenius, 1976:196). Today, most workers acquire needed skills on the job (Reskin & Padavic, 1994:76). Human capital theory also neglects the fact that, on average, women are as committed to their jobs as men (Bielby & Bielby, 1988:1055), and women have the same preferences for work values (i.e., high income, no danger of being fired, short working hours, chances for advancement, and feelings of accomplishment) as men (Rowe & Snizek, 1995:226). Lastly, the characteristics of female-dominated occupations are not particularly compatible with women's family roles, nor are they, on average, any more flexible, easy or clean than heavily male-dominated occupations (Glass, 1990:791; Jacobs & Steinberg, 1990:449). However, it is

difficult if not unfeasible to disprove this approach completely with empirical evidence (Jacobs, 1989:170).

The human capital approach to occupational segregation has generated considerable research, but the findings are contradictory (Reskin & Hartmann, 1986:71). Witkowski and Leicht (1995:67) found results that suggest marriage and parenthood are important factors that affect the process in which labour force activity and occupational segregation are translated into economic work rewards. Mincer and Polachek (1978) observed the relationship between women's work experience, home responsibilities, and wages and linked these variables to the depreciation of their skills while out of the labour force. Upon further investigation, Polachek (1981:68) discovered that the link between women's marital status and occupation is an indirect relationship as life-cycle labour force employment patterns explain more of the variation in occupational choices. Beller (1982) found that being single increased the chances of women working in male-dominated occupations; however, single women only had a 1 percent greater probability of being employed in nontraditional occupations than married women. Roos (1983) claims that differences in marital status in relation to occupations are minimal and inconsistent with the human capital explanation.

Contrary to the human capital perspective, women's employment continuity does not appear to be related to working in female-dominated occupations (Reskin & Hartmann, 1986:72). England (1982) examined the employment patterns of women aged 30 to 44 years of age and found that the length of time they were employed since completing school did not differ with the gender composition of their first or most recent occupation. Furthermore, the rates at which the wages of women in female-dominated

occupations appreciated with experience did not vary from those women in less gender segregated occupations. Thus, it appears that female-dominated occupations do not penalize discontinuous employment any less than male-dominated jobs (Reskin & Hartmann, 1986:72). Also, there is little support for the contention that women who spend more time at home or plan to spend more time at home are more likely to choose traditionally female occupations (England, 1984:746). England (1984) discovered that women in male-dominated occupations have higher life-time earnings than women in female-dominated occupations, which suggests that it is not rational for women to choose female-dominated occupations to maximize life-time earnings (Reskin & Hartmann, 1986:73).

It should be noted that more educated or experienced workers are not necessarily more productive (Reskin & Padavic, 1994:41). Instead, productivity is greatly affected by the resources that employers make accessible to workers and by the commitment workers bring to their jobs. Employers are more likely to give men preference in the allocation of tools and resources necessary to increase their productivity. The human capital perspective also concludes that because of women's socialization, they are less committed to the labour market that men (Jacobs, 1989:173). However, Bielby and Bielby (1988:1055-1056) found that men and women have nearly equivalent levels of job commitment; rather it is the types of jobs workers perform which more strongly affect their commitment (Marsden, Kalleberg & Cook, 1993:384).

According to Reskin and Hartmann (1986:73), for the human capital theory to explain occupational segregation by gender, its premises ultimately rest on ascertaining what women believe is true and how they decide on labour market choices. It is possible

that theories that assume economic optimization, such as human capital theory, may not completely explain situations where behaviours are strongly influenced by cultural norms and expectations, as is the case in both men's and women's work. Also, human capital theory does not attempt to clarify its assumption about why women are primarily focused on their families instead of on their careers (Reskin & Padavic, 1994:41). Instead, numerous factors are related to the employment behaviours of men and women before they enter the labour force, as well as after they have entered the labour force (Wolf, 1984:234). There is too much overlap in the distribution of job-relevant skills and aptitudes between men and women for supply-side factors to account for the persistence of occupational segregation between them (Marini & Brinton, 1984:194; Bielby & Baron, 1994:607). Other factors are operating such as sociological influences and others.

Gender-Role Socialization Theory

Gender-role socialization is the manner in which families, friends, educational systems, and the media make known society's expectations of suitable attire, speech, disposition, diversions and ambitions for each gender (Weitzman, 1979; Reskin & Padavic, 1994:41). Thus, gender-role socialization is considered to contribute to women's greater orientation to their families and men's greater orientation to their jobs (Reskin & Padavic, 1994:41-42). Traditionally, girls have been socialized to want and take care of babies, while boys have been socialized to compete for recognition and wealth in the larger society (Reskin & Padavic, 1994:42). The divergent socialization of males and females influences them to seek occupations that society has designated acceptable for their gender. Socialization has also been theorized to contribute to the tendency for men and women to adhere to different values regarding their work careers, -- values such as

having authority on the job, being promoted, and making lots of money. Lastly, the gender-role socialization of men influences them to expect a gendered division of labour at work which entitles them to particular jobs, promotions, authority, and high pay for their labour, in addition to a gendered division of labour at home which enables them to avoid most of the daily domestic work. Men are often in positions to enforce these expectations because they have traditionally been the work place decision-makers.

Because women's socialization orients them more toward their families than men, it is argued that women choose occupations that are more compatible with their duties to their families (Reskin & Padavic, 1994:42). Also, women are disadvantaged in their competition for jobs and promotions because of the demands of their families. Men's advantages are derived from their avoidance of child rearing and domestic work and women's socialization to take up the slack. However, as with human capital theory, these premises have generally been discounted because women have been shown to work as hard as men and to be equally committed to their jobs (Bielby & Bielby, 1988:1055).

It is generally assumed that childhood socialization constantly influences adult viewpoints (Reskin & Padavic, 1994:42). Childhood gender-role socialization, however, is in fact not very accurate in explaining differential rates of promotion between men and women, the disparity in wages of men and women, and occupational gender concentration. Although gender-role socialization does lead some young people to strive for jobs that are labeled appropriate for their gender by society, such ambitions are highly unreliable, as most young people's occupational goals are basically unrelated to the occupations they eventually perform as adults (Jacobs, 1989; Levine & Zimmerman, 1995). Furthermore, adults are likely to move between male and female-dominated

occupations several times in their working careers, which is especially the case for women. Reskin and Padavic (1994:77) claim that available opportunities, rewards and sanctions encountered as adults are greater determinants of occupational gender segregation than childhood socialization.

Reskin and Padavic (1994:77) contend that occupational segregation based on gender is best explained by the choices men and women make regarding the jobs that are available to them; employers and society offer more options to men than women. When employers do allow women to apply for traditionally male jobs, they usually apply for them in large numbers (Reskin & Padavic, 1994:78). For example, during World War II the demand for labour rose and presented the opportunity for women to enter jobs that were historically unavailable to them. Women were actively recruited for jobs in heavy industry, in farm labour, and in munitions (Wilson, 1991:81). Women worked in war plants that manufactured guns, ammunition and tanks (Pierson, 1983:10); they worked in shipbuilding and aircraft production; and they also drove trucks and flew airplanes. Welders, riveters, electricians, painters, and boilermakers were just a few of the occupations women performed (Pierson, 1983:10). In today's society, however, most people do not apply for jobs unless they have reasonable expectations that they will be hired (Reskin & Padavic, 1994:78).

Reasonable expectations of being hired stems from the appropriateness of the tasks of the jobs as viewed by employers and applicants. In all formal organizations, particularly work organizations, there is "a job to be done," frequently in a culturally prescribed manner (Mills, 1989:36). The various tasks of jobs and the manner in which they are performed incorporate assumptions about the nature of men and women. For

example, physical strength has historically been associated with masculinity, "men's work," and has contributed to physically intensive occupations being male-dominated. Physical strength assumptions surround many job tasks, but can vary according to technical needs (Mills, 1989:37). Skill requirements may replace physical strength requirements in some instances, but such occurrences favour men as women are rarely recruited for jobs involving traditional skills training, and skills are less attached to the work of women (Mills, 1989:37-38). Moreover, once jobs acquire gender labels, it is very difficult for individuals of the "wrong" sex to move into them (Bielby & Baron, 1984:53).

According to Yount (1986:63), the gendered division of labour directly influences stereotypical beliefs about the attributes of men and women, and these beliefs also sustain the division of labour by gender. Stereotypes are adopted to make sense of complex social environments, which operate to organize information when too much is present, and to supplement information when too little is present (McLean & Kalin, 1994:146). Gender is an important aspect of occupational stereotypes. A large part of occupational stereotypes consists of personality traits commonly found in gender stereotypes. Gender segregation in the labour force is at least partially responsible for the fact that certain traits are generalized to all men and to all women (Yount, 1986:63). For example, physical tasks and traits associated with physical work (i.e., aggressiveness, dominance, forcefulness, competitiveness and independence) are considered consistent with the masculine stereotype (Yount, 1986:79). On the other hand, nurturing and tending tasks reflect characteristics of the feminine stereotype (i.e., nurturant, benevolent, sensitive, devoted to others, yielding and dependent).

Workplace research has been criticized because it assumes that differences between men and women are a result of biological or psychological differences (Morash & Greene, 1986:233). The rival hypotheses that socialization and varying social experiences may account for workplace differences between men and women are rarely examined (Kanter, 1977; Snyder, 1979; Morash & Greene, 1986).

Purpose Statement

This thesis directly attempts to discover if the formal tasks performed in gender-dominated occupations result because of biological differences or because of social and cultural expectations of appropriate masculine and feminine pursuits. Specifically, it examines gender-dominated occupations in the British Columbia provincial government and the formal occupational tasks performed within them. Biological determinism is contrasted with human capital theory and gender-role socialization theory to determine if occupational gender-domination exists because of formal physical task requirements of occupations or because of socio-cultural expectations of appropriate task performance of men and women. By using content analysis of formal job descriptions, physical job requirements are contrasted with gender socialized task performance. Physical job requirements are defined as those requirements that demand physical exertion and endurance. Gender socialized task requirements are defined as those requirements that are traditionally believed to be tasks performed by men or women.

CHAPTER 3

Methodology

In order to determine if there is a biological or sociocultural basis for occupational segregation, the constituent task elements of occupations were examined. For the purposes of this thesis, a *job* is the group of positions in an establishment in which workers perform basically the same activities and *occupations* are defined as collections of jobs comprising similar activities across establishments (Reiss, 1966:10-11; Miller, Treiman, Cain & Roos, 1980:216; Bielby & Baron, 1994:609). The objectives of this study were accomplished by analyzing job descriptions to determine whether there are physical (biological) or social explanations for the occupational segregation between men and women.

The first step was to select an accessible data source. The provincial government of British Columbia was chosen to participate in this study because of the probability of gaining access to the necessary data and job descriptions. Although the B. C. government has a limited range of occupations relative to the private sector, it does have a wide variety of occupations. Also, the B. C. provincial government employs over 42,000 people, records data concerning the concentration of men and women by occupations, and has established Human Resource Branches with refined and standardized job descriptions. Also, job descriptions often report clusters of similar tasks under job description statements; consequently, the unit of analysis for this research was the job description statements or task bundles. Since men and women can perform essentially similar tasks within an organization but have different job titles (Bielby & Baron, 1994:609), the level of analysis was aggregated to the occupational level so those

workers performing the same tasks across the provincial government are sampled together by gender composition.

Research Design

Once the participating organization was determined and the unit and level of analysis were resolved, occupations were then defined as either gender dominant or gender-neutral. Although the numerical superiority of women in certain occupations has been evident for decades, the definition of what constitutes a female-dominated occupation varies greatly. Unfortunately, there is little agreement regarding the operational guidelines for defining male and female-dominated occupations (McLean & Kalin, 1994:142). However, among the descriptive measures of occupational sex concentration, the most common criterion for determining gender dominance is at least 70 percent incumbency of men or women. Therefore, *female-dominated occupations* consist of 70% to 100% female occupational incumbents, and the definition of *male-dominated occupations* is 0% to 30% female occupational incumbents. Among definitions of gender-dominated occupations, these are the most common and the most useful for the purposes of this study, thus allowing future comparisons among the largest number of studies. *Gender-neutral occupations* were defined as those occupations with female incumbency rates of 35% to 65%. These definitions were suitable for this study because they permitted the analysis of occupations performed predominantly by either men or women, as well as occupations in which there is little gender segregation.

Once occupations had been identified according to gender composition, the next steps were to examine each occupation by central task focus, complexity of the tasks performed, physical task requirements, and whether the occupation was a line or staff

position. In addition, occupations were also classified and compared to the *National Occupational Classification (NOC)* manual to assess the *NOC's* usefulness in examining occupations. Finally, this study investigated the similarities and differences that exist between male and female-dominated occupations, and between gender-dominated and gender-neutral occupations. By specifying the differences and commonalties between the work tasks of men and women and between gender-dominant and gender-neutral occupations, I anticipated that any patterns existing in formal tasks illustrating the underlying bases of the biological or sociocultural division of labour would emerge.

Sample

Gender-dominated and gender-neutral occupations were located using the British Columbia Government January 1995 *Work Force Profile* (British Columbia Statistics, 1995). The *Work Force Profile* reports the raw numbers and percentages of all government employees by classification title and gender. Classification titles are occupations as defined earlier, in that they are also collections of similar jobs across all provincial government ministries. The *Work Force Profile* lists 238 classification titles. Of these, 53 were reported as having at least 70% female incumbency (female-dominated); 133 were 30% or lower female incumbency (male-dominated); and 37 titles fall in the 35% to 65% female incumbency range (gender-neutral). Due to the size of the B. C. government workforce and the limited resources of this study, only those job descriptions that were readily accessible from the Classification Advisors were sampled. Because of the fluid nature of the British Columbia government, several ministries underwent re-organizations between the time this sample was determined and the data collection stage began.

At the time the January 1995 *Workforce Profile* was collected, the provincial government had 28 Ministries and Departments with a total combined workforce of 42,241 employees. The first Ministries targeted were the Ministry of Social Services with the highest percentage of female employees (78.5%)[1], and the Ministry of Transportation and Highways which had the lowest percentage of female employees (33.4%). These two ministries were chosen as the starting points for data collection because of the likelihood of finding the necessary job descriptions of gender-dominant occupations. Because the *Work Force Profile* reports all B. C. government classification titles by gender, but does not report which ministries contain these occupations, a quota sample was initiated to obtain sufficient job descriptions for both gender-dominated and gender-neutral occupational categories so that a reasonable representation of the B. C. government workforce could be obtained.

Although there are limitations to this study, I am confident that this sample is representative of gender-dominated and gender-neutral public sector occupations in British Columbia. Due to the contrasting goals and mandates of the Ministries which participated, the likelihood of locating a representative sample of gender-dominated and gender-neutral occupations is very good because of the variation of job descriptions sampled. Unfortunately, the public sector has a restricted range of occupations relative to the entire labour force; therefore, this sample is not representative of all gender-dominated and gender-neutral occupations, although it does lend some insight into those occupations that are typically found in both public and private sectors.

Data Collection

The *Workforce Profile* was obtained from the Ministry of Finance and Corporate Relations, Public Service Employee Relations Commission. It reports government-wide concentrations of men and women by occupational level (Upper Level Managers; Middle or Other Managers; Professionals; Semi-Professionals & Technicians; Supervisors; Foreman/woman; Clerical Workers; Sales Workers; Services Workers; Skilled Crafts & Trades Workers; Semi-Skilled Manual workers; and, Other Manual Workers) in raw numbers and percentages.

The *Workforce Profile* also provides breakdowns of men and women by occupation. However, for reasons of pay equity and employment benefits, the B. C. provincial government defines occupations by classification titles. Although gradations of classification titles were contained within the same occupation, some classification titles were given separate occupational designations. For example, a Machine Operator 1 is aggregated with a Machine Operator 2 through 7. This does not confound the research and actually aids in the standardization of tasks bundles. Those occupations given separate classification titles and occupational designations involve different tasks bundles and therefore should facilitate the analysis of the job descriptions (as is the case with Licenced Science Officer [Agricultural] and Licenced Science Officer [Engineering]).

Once I identified the sample of gender-dominated and gender-neutral occupations from the *Workforce Profile*, I began the process of gaining access to job descriptions that were representative of the classification titles. This involved approaching the Classification Advisors of the Human Resources Branches of the ministries with the highest concentrations of male and female employees. Thus, the first ministries I

approached were the Ministry of Social Services with the highest percentage of female employees (78.5%)[1], and the Ministry of Transportation and Highways with the lowest percentage of female employees (33.4%). However, the Ministry of Social Services was divided into two ministries between the time I started this study and the data collection phase of the research. Consequently, both ministries (the Ministry of Children and Families and the Ministry of Human Resources) were asked to participate. Due to the re-organization of these new ministries, the Ministry of Human Resources declined my request to participate, and the Ministry of Children and Families only contributed 7 job descriptions. On the other hand, the Ministry of Transportation and Highways was very receptive and helpful towards this research, they contributed a large number of job descriptions (50), especially male-dominated ones. Thus, the issue arose of gathering enough job descriptions to represent female-dominated and gender-neutral occupations. Consequently, ministries with high proportions of female employees were asked next to participate: the Ministries of Health (78.2% female incumbency), Housing, Recreation and Consumer Service (72.1%), Education (69.1%), Skills, Training and Labour (65.2%), Aboriginal Affairs (62.7%), Small Business and Tourism (61.7%), Finance (59.1%), Attorney General (53.6%), Agriculture (45.7%), Environment, Lands and Parks (38.9%), Municipal Affairs (38.8%) and Forests (35.7%). Because of the difficulty gathering sufficient numbers of job descriptions to provide representative samples of gender-dominant and gender-neutral occupations, all of the British Columbia government ministries were approached to participate in this study.

Although all of the ministries in the B. C. provincial government were asked to participate, the responses were disappointing. Some ministries, such as the Ministry of

Labour and the Ministry of Women's Equality, immediately refused to participate in this research, while the Ministry of Finance and Corporate Relations originally agreed to participate but failed to return my follow-up telephone calls or sent unusable materials (i.e., selection criteria). The remaining ministries contributed varying numbers of job descriptions, usually only after repeated requests. In particular, the Ministry of the Attorney General contributed 24 job descriptions, the Ministry of Health and the Ministry Responsible for Seniors supplied 18 job descriptions, the Ministry of Small Business Tourism and Culture (10), the Ministry of Education, Skills and Training (5), the Ministry of Forests (4), the Ministry of Agriculture Fisheries and Food (3), the Ministry of Aboriginal Affairs (2), the Ministry of Environment, Lands and Parks (2), the Ministry of Municipal Affairs and Housing (2), the Ministry of Employment and Investment (1), and 13 job descriptions were obtained by contacting offices holding competitions for occupations required in this sample. Although 141 job descriptions were collected, only 63 were useable for this analysis as the others were duplicates or job descriptions not requested[2].

The Use of Job Descriptions in Social Research

The present study analyzes only those tasks formally required of occupations. Through detailed job descriptions, the work of male and female-dominated occupations, as well as gender-neutral occupations, were compared and contrasted. However, by only looking at job descriptions, many informal features of jobs were neglected. This shortcoming is particularly relevant to the understanding of traditionally female-dominated occupations, as many of the intellectual and emotional aspects of female-dominated occupations are "invisible" to the organizations for whom they work (see

Wichroski, 1991). For example, secretaries are expected to be empathetic, supportive and competent at logical problem solving, skills that are rarely contained within their formal job descriptions (Wichroski, 1991:34). Unfortunately, the informal aspects of occupations were omitted because they were not amenable to content analysis through the use of job descriptions.

The use of job descriptions in social scientific research is susceptible to several methodological misinterpretations. Although there is a scarcity of research examining the cognitive processes involved in the analysis of job descriptions (Smith, Benson & Hornsby, 1990:301), those studies that have been conducted have uncovered some potential biases. For example, the dominant gender of job incumbents has mixed influences on job content evaluations. While some researchers (Nieva & Gutek, 1980; Schwab & Grams, 1985) found no effect of gender-domination on job content evaluations, others (Mahoney & Blake, 1979) found significant differences in job content evaluations by gender-dominant incumbency rates. More specifically, Mahoney and Blake (1979) found that gender incumbency and the perceived masculinity or femininity of jobs significantly affected the amount of salary variance after the effects of job requirements were controlled.

Smith, Hornsby, Benson and Wesolowski (1989) found another form of bias in the evaluation of job descriptions. They presented job descriptions for an executive secretary, secretary and clerk typist to experimental subjects. Although the job titles were different, the job descriptions were exactly the same. Analysis of subjects' evaluations of job descriptions showed significant differences between the three job titles. Thus, the

manipulation of classification titles alone affected the evaluation process to a significant degree.

In order to eliminate both these biases in the present study, the classification titles were covered prior to research examination by an independent research assistant with no knowledge of the research objectives. In place of the job titles, numerical codes were assigned and recorded on a separate sheet of paper. As principal researcher, I had no knowledge of which job descriptions received which numerical codes; however, the ministry from which the job descriptions were obtained was still known.

Job description evaluations are also susceptible to *primacy* and *recency* effects (Smith, Benson & Hornsby, 1990:302-303). A *primacy* effect occurs when information at the beginning of a job description is given more weight in the evaluation process than information reported later in the job description. Smith, Benson and Hornsby (1990:305) found the *primacy* effect significantly affected subjects' evaluations of job descriptions. On the other hand, a *recency* effect occurs when information at or near the end of the job description registers a more lasting impression than other information contained within the job description. Although Smith, Benson and Hornsby (1990) found no support for the *recency* effect in their study, it is worth noting as a potential source of bias in job description evaluation. Therefore, as the job descriptions were analyzed, conscious effort was taken to weigh all of the information equally.

Classification of Gender-Dominated and Gender-Neutral Occupations

Although the numerical superiority of women in certain occupations has been evident for decades, the definition of what constitutes a female-dominated occupation varies greatly. Unfortunately, there is little agreement regarding the operational

guidelines for defining male and female-dominated occupations (McLean & Kalin, 1994:142). While the study of gendered occupational distributions has continued for quite some time, relatively little effort has been devoted to considering an appropriate measurement procedure (Siltanen, Jarman & Blackburn, 1995:14). Measurement of gendered occupational distributions range from ratio measurements to percentage distributions.

The Index of Dissimilarity (ID), Sex Ratio (SR), Women in Employment (WE), and Marginal Matching (MM) are four measures which identify occupations as either "male" or "female" (Siltanen, Jarman & Blackburn, 1995:15). Each of these measures requires the researcher to select a cut off point for determining male or female concentration. The SR, WE and ID define "female" occupations as those in which the *proportion* of females is greater than the *proportion* of all female workers in the labour force, and "male" occupations as those in which the *proportion* of males exceeds the *proportion* of all males in the labour force. MM defines "female" occupations as those with the greatest concentrations of female workers which together combine to form the same absolute number of workers, men and women, as there are employed women. MM specifies "male" occupations in a similar fashion. All of these ratio measurements, although often used, are difficult to interpret and hard to understand for those without specialized training. Consequently, they were rejected for this research in favour of more comprehensible measurements.

Simple descriptive procedures, such as percentages of men and women, are intuitively easy to understand (Siltanen, Jarman & Blackburn, 1995:17). However, the actual percentage of women or men necessary to achieve gender-dominance varies

tremendously throughout the literature. Although gender domination has been defined from as little as 50.1% (Solberg & Laughlin, 1995) to at the most 90% gender-incumbency (Nordic Council, 1992), the most popular and customary definition is 70% or greater gender incumbency (Greenfeld, Greiner & Wood, 1980; Levine & Zimmerman, 1995). In light of the disparity of definitions to describe gender-dominance, this study applied the definition of 70% and greater incumbency of women to define female-dominated occupations, and male-dominated occupations were defined as 30% and fewer female occupational incumbents. Because these definitions are the most customarily accepted, they will build on prior literature in the field of gender-dominated occupations, and permit the greatest comparison among past research and facilitate future comparisons.

The definitions of gender-neutral occupations also vary greatly as they are commonly defined as those occupations **not** gender-dominated. Therefore, gender-neutral occupations, or more commonly termed "mixed occupations," range from 20% to 80% male or female incumbency (Bielby & Baron, 1994). Cooper, Doverspike and Barrett (1985) suggest using 40% to 60% female incumbency to define mixed occupations after finding similar results for most occupations when comparing statistical data on labour market rates and subjective measures. For the purposes of this study, gender-neutral occupations were defined as those occupations which have 35% to 65% female incumbents as the number of occupations in the B. C. provincial government in the 40% to 60% range is considerably restricted. The 35% to 65% range still allows for a restricted examination of those tasks performed in occupations which have nearly equal percentages of men and women employed. This enables those tasks that are empirically

gender-neutral to be reported and controlled for in the investigation of gender-dominated occupational tasks.

Classification of Occupations by Data, People, and Things

The job descriptions were categorized according to the primary focus of work (data, people, and things), and according to the level of complexity of task bundle focus as defined by the *Dictionary of Occupational Titles* (*DOT*) (United States Department of Labor, 1965). This step is necessary because the *Work Force Profile* (British Columbia Statistics, 1995) only reports gender composition by general occupational classification. This becomes problematic because occupational task bundles can vary by organizational department. Thus, although the same classification titles may perform the same task bundles, the focus of these task bundles can be different depending on the department or ministry in which an incumbent works. For example, in the Ministry of Transportation and Highways, a Clerk 3 in the Engineering Branch may spend the majority of his or her time compiling data for engineers and management, whereas a Clerk 3 in the Motor Vehicle Branch of the same ministry may spend the majority of his or her time assisting the public in meeting drivers' licence requirements. Therefore, by adopting the *Dictionary of Occupational Titles*' classification system (United States Department of Labor, 1965) of people, data or things as the occupation's primary focus, more complete profiles of the occupations under investigation were possible.

It is important to note that occupational classification by people, as the incumbent's primary focus, includes both employees of the public sector as well as encounters with the public. Classification by data as the primary focus of an occupation includes all forms of data such as electronic, physical and abstract. Occupations which

are classified by things infer that the occupations' primary work is with inanimate objects that are not data (i.e., assembly, repairing and operation of machines or other inanimate objects).

To determine the task focus of each occupation, the task bundles which together consumed over 50% of an incumbent's time were individually classified according to people, data, and things as the primary focus of the tasks. Once all of the tasks were individually classified, each category of people, data, and things were added and the category which contained the largest number of task bundles became the designation for the occupation. Since the *DOT* allows for assessment of the complexity of task focus, occupations were also assessed according to their level of task complexity. This was accomplished by using the most common level of task complexity for the designated task focus for each occupation. This method of assigning task complexity differs from the *DOT's* method of designating task complexity, as the *DOT* uses the highest level of task complexity. The most common level of task designation was adopted to avoid a polarization of task complexity scores at the highest or most complex range of the scale. This categorization and the task focus complexity also gives more complete descriptions of the occupations under examination. A detailed description of the *Dictionary of Occupational Titles*' classification system (United States Department of Labor, 1965), operational procedures and coding is excerpted from *Measures of Occupational Attitudes and Occupational Characteristics* (Robinson, Athanasiou & Head, 1969) and constitutes Appendix A.

Classification of Physical Aspects of Occupations

Job descriptions were also examined to determine their physical requirements. Although many occupations require some physical effort, the degree of effort needed to accomplish the tasks of an occupation can vary dramatically. Therefore, the majority of task bundles of each occupation were coded according to: seven categories (non-physical, sedentary, light, moderate, heavy, very heavy, and ultra heavy) according to the degree of effort necessary to accomplish the task bundles. Industrial work assignments are often determined by the physical demands necessary to accomplish the tasks (Wardle, Gloss & Gloss, 1987:113). Several researchers (Passmore & Durnin, 1955; Brown & Crowden, 1963; and Durnin & Passmore, 1967) have graded work according to the physical energy expended performing required tasks. However, the classification system developed by Wardle, Gloss & Gloss (1987:113) suits the nature of job description information best. Physical tasks are coded by six categories (sedentary, light, moderate, heavy, very heavy and ultra heavy), which defines the type of effort necessary to accomplish the work. To determine the category of physical effort necessary to perform an occupation, the task bundles which together consumed over 50% of an incumbent's time were individually classified according to the level of physical work necessary to complete them (non-physical, sedentary, light, moderate, heavy, very heavy and ultra heavy). The category of physical work which contained the largest number of task bundles became the physical work designation for that occupation. A detailed description of Wardle, Gloss & Gloss' (1987) six categories of work intensity are reported in Appendix B. It should be noted that the category of non-physical was added for this research. The non-physical category was necessary to capture those task bundles that were entirely intellectual.

Classification of Functional Aspects of Occupations (Line versus Staff)

The distinction between *line staff* has long been the focus of debate among organizational theorists. Drucker (1954:241) claims that the terms are unproductive as there are no *staff* functions in business. On the other hand, Urwick (1954) claims the dichotomy is too simple and requires additional categories and functions. Still other theorists (Tead, 1951:105; Dalton, 1961:71-72) state that the *line staff* distinction is essential to understanding organizational hierarchies and theories. In any case, it is commonly accepted that the *line staff* distinction exists, and that *staff* occupations at the same organizational level are actually subordinate to *line* occupations.

Blau and Scott (1964:172) affirm that the *line staff* demarcation has influenced the study of formal organizations for some time. The distinction is commonly drawn between a *line* organization on the one hand, which emphasizes differences in hierarchical position, and in which *line* officers have authority over the production process, and a *staff* organization on the other hand, which concentrates on specialization and in which *staff* officers serve in research or advisory capacities. Hodson and Sullivan (1995:194) sum up the *line staff* distinction by stating that *line* occupations are in the linear chain of command, and *staff* occupations are ancillary support positions occupied by specialized workers with training in specific areas. In effect, *staff* workers are supplementary experts demanded by specific levels of the organization, but are not in the formal chain of authority that controls production. More simply, *line* occupations possess formal authority for organizational goals, while *staff* occupations support appropriate *line* positions in the organizational hierarchy by supplying specialized and technical advice (Blau & Scott, 1964:172).

In the present study, occupations were classified according to whether they were *line* or *staff* jobs. While *line* occupations further the goals and objectives of the organization (i.e., they are in the formal chain of authority controlling production), *staff* positions provide support functions to those jobs in the linear chain of command. This distinction is made to discover if women are working in the capacity of "being a helpmate to man" (Hedley, 1992:174). More specifically, are women working predominantly in "support" positions, as has been the case historically? The *line staff* distinction was determined by individually analyzing the task bundles which consumed over 50% of an incumbent's time according to whether the task bundles serve a *line* or *staff* function. Once each task bundle was designated as a *line* or *staff* function, they were then added according to being *line* or *staff*. The category (*line* or *staff*) which contained the largest number of task bundles determined the *line staff* function of the occupation. Since this study employs samples of job descriptions from public sector organizations, the organizations' production is defined as the ministries' mission statements, mandates or goals for which the respective job description was obtained. For the purposes of this thesis, those occupations which directly contribute to or have authority regarding their prospective ministry's mission statement, mandate or goals, were defined as *line* occupations, and those occupations which support or provide expert knowledge to *line* occupations were defined as *staff* occupations. The mission statements, mandates or goals of the participating ministries are contained in Appendix C.

Classification of Occupations Using the *National Occupational Classification*

The *National Occupational Classification* (*NOC*) manual is a systematic taxonomy of occupations in the Canadian labour force (Human Resources Development

Canada, 1995:i). It is based on research, analysis and consultation on occupations across the country. The *NOC* replaces the earlier occupational classification systems in Canada, the *Canadian Classification and Dictionary of Occupations* (*CCDO*) (Manpower and Immigration, 1971) and the closely connected *Standard Occupational Classification* (*SOC*) used by Statistics Canada (1981). The *NOC* is a three-tiered hierarchical categorization of occupational groups containing 26 major groups, 139 minor groups and 522 unit groups, altogether comprising approximately 25,000 occupational titles. The *NOC* manual (Human Resources Development Canada, 1995) standardizes occupational classification systems to facilitate the recording of new occupations and to ensure historical continuity with earlier classification systems. Although the *NOC*'s focus is on the type of work performed in each occupation, it further clarifies the nature of occupations on the following factors: education or training required, occupational mobility possible, and services rendered.

The two major characteristics of jobs which were adopted as classification criteria in developing the *NOC* are *skill level* and *skill type* (Human Resources Development Canada, 1995:ii). *Skill level* is defined as the amount and type of education and training needed to enter and perform the requisite tasks of an occupation. Also considered in determining *skill level* is the experience required for entry, responsibilities, and complexity of an occupation. The *NOC* identifies four skill levels which it assigns to each minor and unit group. A detailed description of the skill level criteria used in the *NOC* can be found in Appendix D. *Skill type* is defined as the kind of work performed, although the *NOC* takes into account other factors related to skill type (Human Resources Development Canada, 1993:iii). One such factor is the similarity in regard to the

educational field of study required to enter an occupation. Another factor is the industry of employment where experience within the industry or an internal job ladder is a prerequisite for entry. Ten broad occupational categories based on skill type are identified by the *NOC* and are presented in Appendix E.

Job descriptions were classified according to the *NOC* to facilitate replication and improve comparisons with other research. This step also provides an opportunity to assess the usefulness of the *NOC* in the classification of job descriptions. This is accomplished by matching the descriptive work titles used in this study with the occupational titles in the *NOC's Index of Titles* and comparing the primary focus, level of complexity, and physical demands reported in formal job descriptions with the primary focus, level of complexity, and physical demands reported in the *NOC* for the corresponding occupational titles.

An Example of the Thesis Classification Schemes Applied to a Job Description

To illustrate the application of the above mentioned classification schemes, the job description with the descriptive work title, Secretary to the Director, classified by the B. C. provincial government as a Clerk 4 (Stenographer), was chosen as its provides some challenges. It was previously determined by the *Work Force Profile* to be female-dominated (98.6% female incumbency). The first step was to classify it according to the *NOC*. The *NOC* lists 17 job titles under the headings of secretary or secretarial. Since there was no verbatim listing, the title of "secretary" was used for comparison as it was nearest to the descriptive work title. Next, the job description and the corresponding *NOC* unit group description (1241 Secretaries [Except Legal and Medical]) were edited by a

research assistant to remove any references to descriptive work titles, classification titles or unit group titles.

The next step was to code the job description and the corresponding *NOC* unit group description according to the predefined classification schemes. First, blocks of task bundles were targeted by the percentage of time the incumbent spends on the task bundles contained within the block. Those task bundle blocks (or that block) which consume over half the incumbent's time were targeted for analysis. If the largest block did not consume over 50% of the incumbent's time, then the next largest block was also analyzed, and so on until over 50% of the incumbent's time was accounted for. For the present example of Clerk 4 (Stenographer), Secretary to the Director, the largest block of task statements consumed 40% of the incumbent's time. Consequently, the next largest block of task statements (which consumed 30% of the incumbent's time) was also included in the analysis. Next, the job description was analyzed by task bundles or task statements.

Each of the task statements targeted for analysis for the Clerk 4 (Stenographer), Secretary to the Director were individually analyzed for data/people/things, task complexity, physical components and whether the task statements served line or staff functions. The subjects of the task statements were used to determine whether the incumbent worked with data, people or things and if the task bundles referred to line or staff tasks. The verbs in the statements determined the complexity of the tasks and usually the physical components. It is important to note that each task bundle statement satisfied only one category on each dependent variable (measure). For example, each task bundle statement could only be coded either as works with data or with people or with

things, on only one level of complexity, on one level of physical exertion, and as either line or staff. For the example job description, there were 86 task statements contained in the two blocks of task statements which combined to consume 70% of the incumbent's time. Of the 86 task statements, 45 were working with data, 34 were working with people, 7 were working with things, 23 were non-physical, 63 were sedentary and all 86 task statements were staff functions. To determine the task complexity, the category of data/people/things which had the largest number of tasks was examined to determine which level of complexity of tasks was most common. In the case of Clerk 4 (Stenographer), Secretary to the Director, working with data was the most common category and of these tasks, compiling was the most frequent level of complexity. For this job description and classification title, the incumbent works primarily with data, performs mainly compiling tasks, works mainly at a physical level of sedentary and performs all staff tasks.

It is important to note that many facets of job descriptions did not fit the tight confines of the previously defined classification schemes. Therefore, several exceptions were made to accommodate the format of job descriptions. For example, many of the verbs used in job descriptions did not fit verbatim with the guidelines for data/people/things set out by the *Dictionary of Occupations Titles* (United States Department of Labor, 1965). Consequently, lists of verbs that were synonyms for the *DOT* classification system were collected and classified during the coding phase of this research and are reported in Appendix F. These lists were developed to facilitate uniformity and replicatability of coding. Also, when the task bundle statements in each category were summed to determine the designation, some of the categories were tied.

Although these cases were few in number, they were scored as missing data on the particular designation for which they were tied. Due to the importance of coding uniformity, the first 35 job descriptions (25% of the sample) were recoded at the conclusion of the coding phase of the research to ensure they were uniform with the rest of the sample. The most notable differences between the first and second coding of the 35 job descriptions were that working with data decreased while working with people and things increased proportionally, and performing sedentary tasks decreased while performing non-physical (intellectual) tasks increased. *NOC* unit group descriptions were coded in a similar manner as described above. However, one exception was that the line/staff analysis was excluded because *NOC* unit group descriptions did not provide enough detail. Another exception was that *NOC* unit group descriptions were coded on "Main Duties" only and statements that began with "May" perform certain tasks were excluded from analysis. Once all job descriptions and *NOC* unit group descriptions were coded in terms of the above classification schemes, I was in a position to begin the statistical analysis.

Data Analysis

The data analysis for this study was separated into two analyses. Analysis 1 was the examination of occupational task focus (data/people/things), occupational complexity, physical aspects of occupations, and line/staff function of task bundles by gender-dominated and gender-neutral occupations. Analysis 2 involved a comparison of occupational task focus (data/people/things), occupational complexity, and physical aspects of occupations contained in the provincial government job descriptions to the *National Occupational Classification* unit group descriptions. Due to the small sample

size, the dependent variables of data/people/things, occupational complexity, physical components and the line/staff function were dichotomized to form data/non-data, people/non-people, things/non-things, physical/non-physical, and line/non-line (staff is the non-line parameter). Although data/people/things and line/staff were straightforward re-categorizations, occupational complexity and physical requirements required more elaborate re-categorizations. Occupational complexity was dichotomized into complex/non-complex by dividing each complexity scale in half. For working with data, comparing, copying, computing and compiling were considered non-complex tasks, while analyzing, coordinating and synthesizing were categorized as complex tasks. Working with people was re-categorized by serving, speaking-signaling, persuading and diverting being non-complex tasks and supervising, instructing, negotiating and mentoring were considered complex tasks. For working with things, handling, feeding-offbearing, tending and manipulating were defined as non-complex tasks and driving-operating, operating-controlling, precision working and setting-up were categorized as complex tasks. The physical requirements of occupations were re-categorized into non-physical (intellectual) tasks and physical tasks comprising all of the physical categories (sedentary, light, moderate, heavy, very heavy and ultra heavy). These re-categorizations also limited the overlap of variables and made the dependent variables mutually exclusive.

Analysis 1

Analysis 1 involved the examination of major task focus of occupations (data/people/things), task complexity, physical components, and line versus staff by gender domination and gender-neutrality of the occupations. It is important to note that

during the course of collecting job descriptions, many classification titles were duplicated. The decision of which job description to use out of several for a particular classification title was done with the use of a random numbers list. This precaution was taken to give equal representation of each classification title in the sample. Male-dominated, female-dominated and gender-neutral occupations were examined by frequencies and percentages, crosstabulations and chi-square tests, cross-product ratios, and logistic regression. These methods of analysis were implemented to describe the sample and gradually refine the analysis to uncover statistically significant relationships.

Analysis 2

Analysis 2 compared the major task focus of occupations (data/people/things), task complexity, and physical components of occupations specified by provincial government job descriptions with the same variables specified by matched *NOC* unit group descriptions. Analysis 2 was particularly important as it examined the usefulness of the *NOC* to describe the occupations it contains. Furthermore, Analysis 2 was important in this thesis as it enables generalizations from Analysis 1 to be made regarding other occupations in the unit groups investigated.

All of the provincial government job descriptions were matched with *NOC* unit group descriptions. Because *NOC* unit group descriptions are collections of occupations, some of the *NOC* unit group descriptions were used more than once in the Analysis 2 sample. The decision to include a *NOC* unit description more than once in the sample was made to compensate for classification titles that were duplicates with different descriptive work titles. Similarly to Analysis 1, and for the same reasons, the comparison between provincial government job descriptions and *NOC* unit group descriptions involved

frequencies and percentages, crosstabulations and chi-square tests, cross-product ratios, and logistic regression.

End Notes

1. According to the 1995 *Work Force Profile*, the Ministry of Women's Equality had the highest percentage of female employees. However, because of this ministry's narrow mandate and limited range of occupations, it was rejected as a starting point for the data collection phase. Because of the difficulty collecting an adequate number of job descriptions, the Ministry of Women's Equality was included in the latter stages of the data collection phase.
2. It is important to note that obtaining information and job descriptions from the British Columbia Provincial Government was extremely difficult and time-consuming. My requests were nearly always politely accepted; however, receiving data and job descriptions usually took repeated requests. Most Ministries only contributed a few job descriptions, so their cooperation and participation could be noted. In retrospect, I should have attempted to access the necessary information and job descriptions from the highest position in the organizational hierarchy that I could contact. This approach would have given more importance to my requests and encompass the lower positions in the organizational hierarchy.

CHAPTER 4

Results

As mentioned, the results of this study were produced through two separate analyses. Analysis 1 was the examination of occupational task focus (data/non-data, people/non-people, things/non-things), occupational complexity (complex/non-complex), physical aspects of occupations (physical/non-physical), and line/staff function (line/non-line) of task bundles by gender-dominated and gender-neutral occupations. A complete list of the provincial government job descriptions used in Analysis 1 is shown in Appendix G. Analysis 2 was conducted in a similar format as Analysis 1. The exception was that instead of using gender-dominance and gender-neutrality of occupations, Analysis 2 substituted provincial government job descriptions and *NOC* unit group descriptions, and excluded the line/non-line variable. Appendices H and I contain complete lists of provincial job descriptions and *NOC* unit group descriptions used in Analysis 2.

Analysis 1

Frequencies and Percentages

The sample for Analysis 1 consists of 63 job descriptions representing the same number of occupations. Of these 63 job descriptions, 32 (50.8%) were male-dominated occupations, 15 (23.8%) female-dominated occupations, and 16 (25.4%) gender-neutral occupations. Sample sizes varied according to the dependent variable analyzed due to inconclusive data to assign some job descriptions designations of data/non-data, people/non-people, things/non-things, complex/non-complex, physical/non-physical, or line/non-line.

Crosstabulations and Chi-Square Tests

To summarize the data, both 2 by 3 (male-dominated, female-dominated and gender-neutral), and 2 by 2 (male-dominated and female-dominated, male-dominated and gender-neutral, and female-dominated and gender-neutral) crosstabulations were calculated for each dependent variable (data/non-data, people/non-people, things/non-things, complex/non-complex, physical/non-physical, and line/non-line). These crosstabulations show the number of male-dominated, female-dominated and gender-neutral occupations that primarily perform tasks related to the dependent variable under examination. In addition, expected frequencies (which are the frequencies one would expect if variables compared were unrelated or independent) are also reported to provide a reference point for comparison with observed frequencies. Chi-square tests were also performed on each crosstabulation to test if significant differences exist between observed and expected frequencies and consequently significant associations between variables under investigation.

Data/Non-Data

Tables 4.0 to 4.3, at the end of Chapter 4, contain four crosstabulations with observed counts, expected counts and chi-square values for data/non-data by gender-dominated and gender-neutral occupations (all tables produced in Analysis 1 and 2 are grouped in sequence at the end of Chapter 4). Table 4.0 displays the observed frequencies and expected frequencies of male-dominated, female-dominated and gender-neutral occupations for data/non-data. It is important to note that female-dominated and gender-neutral occupations worked more with data than expected. Furthermore, the inverse was observed as male-dominated occupations worked with data less than expected. These

differences between observed and expected counts for these variables were revealed with the chi-square probability equal to 0.110 ($\chi^2 = 4.410$, df. = 2).

Table 4.1 is the crosstabulation of male-dominated and female-dominated occupations with data/non-data. Although observed counts stayed the same as in Table 4.0, the expected counts for male-dominated occupations working with data decreased while expected frequencies for female-dominated occupations working with data increased. Consequently, the chi-square for Table 4.1 decreased but so did the degrees of freedom ($\chi^2 = 3.462$, df. = 1), thus yielding a lower probability of independence (p. = 0.063).

Table 4.2 displays the observed and expected frequencies for male-dominated and gender-neutral occupations. The differences between observed frequencies and expected frequencies were marginally less than those differences in Table 4.1. Of particular note is the differences between observed and expected frequencies for male-dominated occupations which work with non-data and gender-neutral occupations that work with data, both have higher observed counts than expected. Since the differences between observed and expected frequencies in Table 4.2 were slightly lower than those in Table 4.1, the chi-square is slightly smaller and the probability of independence is higher ($\chi^2 = 2.903$, df. = 1, p. = 0.088).

Table 4.3 shows the observed and expected frequencies for female-dominated and gender-neutral occupations with data/non-data. The differences between observed and expected frequencies were negligible. Thus, the chi-square was very low and the probability of independence was very high ($\chi^2 = 0.027$, df. = 1, p. = 0.870). This finding

suggests that the variable of female-dominated and gender-neutral occupations and the variable of working with data or non-data are independent of one another.

People/Non-People

Tables 4.4 to 4.7 contain four crosstabulations with observed frequencies, expected frequencies and chi-squares for people/non-people by gender-dominated and gender-neutral occupations. Table 4.4 shows the observed frequencies and expected frequencies of male-dominated, female-dominated and gender-neutral occupations for people/non-people. It is important to note that more female-dominated and gender-neutral occupations worked with people than expected if gender-domination and working with people or non-people were independent. Furthermore, the opposite was observed with more male-dominated occupations working with non-people than expected. These small differences between observed counts and expected counts for these variables were reflected by the small chi-square and high probability of independence ($\chi^2 = 0.434$, df. = 2, p. = 0.805).

Table 4.5 is the crosstabulation of male-dominated and female-dominated occupations with people/non-people. It is interesting to note that more female-dominated occupations worked with people than expected. For male-dominated occupations and people/non-people, the observed were marginally lower than the expected frequencies for working with people. These slight differences between observed and expected frequencies led to the small chi-square and high probability of independence ($\chi^2 = 0.178$, df. = 1, p. = 0.673).

Table 4.6 displays the frequencies and expected frequencies for male-dominated and gender-neutral occupations with people/non-people. Of note is that more gender-

neutral occupations work with people than expected and fewer male-dominated occupations work with people than expected. The differences between observed counts and expected counts were only 1.0, which yielded a low chi-square and a high probability of independence ($\chi^2 = 0.383$, df. = 1, p. = 0.536).

The observed and expected frequencies for female-dominated and gender-neutral occupations with people/non-people are displayed in Table 4.7. The counts of observed and expected frequencies were near equal. Consequently, the chi-square was very low and the probability of independence was very high ($\chi^2 = 0.027$, df. = 1, p. = 0.870). This finding suggests that the variable of female-dominated and gender-neutral occupations and the variable of working with people or non-people are independent of one another.

Things/Non-Things

Tables 4.8 to 4.11 contain four crosstabulations with expected counts and chi-squares for things/non-things by gender-dominated and gender-neutral occupations. Table 4.8 displays the observed and expected frequencies of male-dominated, female-dominated and gender-neutral occupations for things/non-things. It is important to note that more male-dominated occupations work with things than expected, which suggests an association between the gender-domination of the occupation and whether or not the occupation works with things. Furthermore, the inverse was observed with more female-dominated and gender-neutral occupations working with non-things than expected. In fact, none of the female-dominated nor gender-neutral occupations in the sample predominantly work with things. The polarization of differences between observed and expected counts is reflected by the large chi-square and low probability of independence

between occupational gender domination and working with things/non-things (χ^2 = 12.36, df. = 2, p. = 0.002).

Table 4.9 is the crosstabulation of male-dominated and female-dominated occupations with things/non-things. Of note is the greater than expected observed count for male-dominated occupations working with things. Also, it is interesting to observe that none of the female-dominated occupations in this sample work with things. This greater than expected count of male-dominated occupations and the absence of female-dominated occupations working with things led to the statistically significant chi-square and low probability of independence (χ^2 = 6.429, df. = 1, p. = 0.011).

Table 4.10 displays the observed and expected counts for male-dominated and gender-neutral occupations with things/non-things. Of note is that more male-dominated occupations work with things than expected and fewer gender-neutral occupations work with things than expected when analyzed together. The difference between the observed counts and the expected counts was 3.5, which yielded a statistically significant chi-square and low probability of independence (χ^2 = 6.815, df. = 1, p. = 0.009).

Table 4.11 shows the observed and expected frequencies for female-dominated and gender-neutral occupations with things/non-things. Since neither female-dominated nor gender-neutral occupations work with things in this sample, no comparisons could be made and a chi-square could not be calculated.

Complex/Non-Complex

Tables 4.12 to 4.15 show four crosstabulations with observed frequencies, expected frequencies and chi-square values for complex/non-complex by gender-dominated and gender-neutral occupations. Table 4.12 displays the observed and

expected counts of male-dominated, female-dominated and gender-neutral occupations for complex/non-complex. Of note is that more gender-neutral occupations work with complex tasks than expected. Furthermore, the inverse was observed with more female-dominated occupations working with non-complex tasks than expected. The observed and expected frequencies for male-dominated occupations were almost the same for working with complex and non-complex tasks. These differences between observed counts and expected counts for these variables were shown with the moderate chi-square and the probability of independence equal to 0.114 ($\chi^2 = 4.352$, df. = 2).

Table 4.13 is the crosstabulation of male-dominated and female-dominated occupations with complex/non-complex. There were more male-dominated occupations that perform predominantly complex tasks than expected. Also, there were more female-dominated occupations that work with non-complex tasks than expected. The chi-square for Table 4.1 was low ($\chi^2 = 1.212$, df. = 1), and the probability of independence was high (p. = 0.271).

Table 4.14 displays the observed and expected counts for male-dominated and gender-neutral occupations that work mainly with complex and non-complex task bundles. Of particular note is that the difference between observed and expected frequencies for gender-neutral occupations suggests that more gender-neutral occupations work with complex task bundles than expected. For male-dominated occupations, they work predominately with complex task bundles less than expected. The differences between observed and expected frequencies for male-dominated and gender-neutral occupations produced a relatively small chi-square and a higher probability of independence ($\chi^2 = 1.756$, df. = 1, p. = 0.185).

Table 4.15 shows the observed and expected frequencies for female-dominated and gender-neutral occupations with complex/non-complex. While more gender-neutral occupations tend to work with complex task bundles than expected, fewer female-dominated occupations work with complex task bundles than expected. The differences between observed and expected frequencies were considerable which led to a substantial chi-square and a low probability of independence ($\chi^2 = 4.386$, df. = 1, p. = 0.036). This finding suggests that the variable of female-dominated and gender-neutral occupations and the variable of working with complex/non-complex tasks are dependent on one another.

Physical/Non-Physical

Tables 4.16 to 4.19 contain four crosstabulations with expected counts and chi-squares for physical/non-physical by occupational gender-domination and gender-neutrality. Table 4.16 shows the observed and expected frequencies of male-dominated, female-dominated and gender-neutral occupations with physical/non-physical. It is important to note that there are more male-dominated and female-dominated occupations that work predominantly on physical components than expected. Furthermore, the opposite was observed with fewer gender-neutral occupations working mainly on physical tasks than expected. These differences between observed counts and expected counts for these variables were revealed with the chi-square probability equal to 0.078 ($\chi^2 = 5.101$, df. = 2).

Table 4.17 is the crosstabulation of male-dominated and female-dominated occupations with physical/non-physical. The differences between observed and expected counts for both male and female-dominated occupations were the same, with slightly

more female-dominated occupations working primarily with physical components than expected, and fewer male-dominated occupations working mainly with physical components than expected when analyzed together. The small differences between observed and expected frequencies led to a small chi-square and a high probability of independence ($\chi^2 = 0.578$, df. = 1, p. = 0.447).

Table 4.18 displays the observed and expected frequencies for male-dominated and gender-neutral occupations with physical/non-physical. Of note is that there are more male-dominated occupations that work mainly on physical tasks than expected and fewer gender-neutral occupations that work predominantly on physical components than expected when analyzed together. The difference between an observed count and an expected count is 2.5, which yielded a relatively high chi-square and low probability of independence ($\chi^2 = 3.443$, df. = 1, p. = 0.064).

Table 4.19 shows the observed and expected counts for female-dominated and gender-neutral occupations with physical/non-physical. It is important to note that more female-dominated occupations work predominantly on physical tasks than expected. Conversely, there are fewer gender-neutral occupations that work with physical tasks than expected. These differences between observed expected counts yielded a statistically significant chi-square and a low probability of independence ($\chi^2 = 5.179$, df. = 1, p. = 0.023).

Line/Non-Line

Tables 4.20 to 4.23 contain four crosstabulations with observed counts, expected counts and chi-square values for line/non-line by occupational gender domination and gender-neutrality. Table 4.20 shows the observed and expected frequencies of male-

dominated, female-dominated and gender-neutral occupations for line/non-line. Of note is that there are more male-dominated and gender-neutral occupations which work on line tasks than expected. Furthermore, the opposite was observed as there are fewer female-dominated occupations that work on line tasks than expected. These differences between observed frequencies and expected frequencies for these variables were revealed by a high chi-square and low probability of independence ($\chi^2 = 8.029$, df. = 2, p. = 0.018).

Table 4.21 is the crosstabulation of male-dominated and female-dominated occupations with line/non-line. It is interesting to note that there are more male-dominated occupations classified as working mainly with line tasks than expected and fewer female-dominated occupations classified as working line tasks than expected. In particular, the differences between observed and expected frequencies were considerable (4.3), which yielded a high chi-square and a low probability of independence ($\chi^2 = 7.318$, df. = 1, p. = 0.007).

Table 4.22 displays the observed and expected counts for male-dominated and gender-neutral occupations with line/non-line. The differences between observed and expected frequencies for both male-dominated and gender-neutral occupations were minimal (0.2). These differences led to a very low chi-square and a high probability of independence between occupational gender-domination and line/non-line ($\chi^2 = 0.020$, df. = 1, p. = 0.886).

The observed and expected frequencies for female-dominated and gender-neutral occupations with line/non-line are shown in Table 4.23. The observed frequencies counts for gender-neutral occupations that work on line tasks were higher than expected, while the observed frequencies for female-dominated occupations that work on line tasks were

fewer than expected. Consequently, the chi-square was relatively strong and the probability of independence is statistically low ($\chi^2 = 4.821$, df. = 1, p. = 0.028). This finding suggests that the variable of female-dominated and gender-neutral occupations and the variable of line/non-line are likely dependent on one another.

Cross-Product Ratios

In the previous section, crosstabulations and chi-square tests were used to explore possible patterns of association and to determine which patterns fit the data well. In this section, cross-product ratios are used to describe the strengths of associations. Also, cross-product ratios provide the odds of one level of the independent variable being classified on one particular level of the dependent variable. Tables 4.24 to 4.29 present cross-product ratio tables for each dependent variable (data/non-data, people/non-people, things/non-things, complex/non-complex, physical/non-physical and line/non-line). Cross-product ratios were calculated from the 2 by 2 tables discussed above.

Data/Non-Data

The cross-product table (Table 4.24) for data/non-data by occupational gender-domination and gender-neutrality reveals some useful descriptions. For example, female-dominated occupations are 3.5 times more likely to work with data than male-dominated occupations. Similarly, gender-neutral occupations are 3.11 times more likely than male-dominated occupations to work with data. Furthermore, female-dominated occupations are 1.125 times more likely to work with data than gender-neutral occupations.

People/Non-People

Table 4.25 is the cross-product table for people/non-people by occupational gender-domination and gender-neutrality. Of interest is that gender-neutral occupations

are 1.469 times more likely than male-dominated occupations to work with people. Also, female-dominated occupations are 1.306 times more likely to work with people than male-dominated occupations. In addition, gender-neutral occupations are 1.125 times more likely than female-dominated occupations to work with people as the major focus of their occupations.

Things/Non-Things

Table 4.26 is the cross-product table for things/non-things by occupational gender-domination and gender-neutrality. It is important to note that for the cross-product calculations 0.5 was added to each crosstabulation cell to stabilize the ratios. The adjusted frequencies revealed that male-dominated occupations are 16.902 times more likely than gender-neutral occupations to work with things. Also, male-dominated occupations are 15.878 times more likely to work with things than female-dominated occupations. Female-dominated and gender-neutral occupations are almost equally likely to work with things as female-dominated occupations are only 1.065 times more likely than gender-neutral occupations to work with things.

Complex/Non-Complex

The cross-product table for works with complex/non-complex task bundles and occupational gender-domination displayed in Table 4.27 also reveals some useful descriptions. For example, gender-neutral occupations are 6.125 times more likely to perform primarily complex tasks than female-dominated occupations. Similarly, male-dominated occupations are 2.042 times more likely than female-dominated occupations to work with complex tasks. Furthermore, gender-neutral occupations are 3.0 times more likely to perform mainly complex tasks than male-dominated occupations.

Physical/Non-Physical

The cross-product table (Table 4.28) of physical/non-physical by occupational gender-domination and gender-neutrality shows some surprising ratios. For example, female-dominated occupations are 10.50 times more likely than gender-neutral occupations to perform predominantly physical tasks. Also, male-dominated occupations are 6.364 times more likely to have tendencies towards physical aspects than gender-neutral occupations. In addition, female-dominated occupations are 1.65 times more likely than male-dominated occupations to work primarily on physical tasks.

Line/Non-Line

The cross-product ratios for line/non-line by occupational gender-domination and gender-neutrality are contained in Table 4.29. Of note in this cross-product ratio table is that male-dominated occupations are 6.05 times more likely than female-dominated occupations to perform mainly line tasks. Furthermore, gender-neutral occupations are 5.50 times more likely to perform predominately line tasks than female-dominated occupations. Finally, male-dominated and gender-neutral occupations are almost as likely to perform a majority of line tasks in their occupations (1.10 times).

Logistic Regression

Logistic regression analyses were conducted to investigate the possibilities that the preliminary findings were statistically significant in the sample. Furthermore, logistic regression analyses were adopted over linear regression techniques because of the dichotomous nature of the dependent variables. Consequently, logistic regression models how the proportion of outcomes on one of two categories depends on the independent variable; whereas, linear regression models the mean of the dependent variable in relation

to the independent variable. The following logistic regression analyses also combine the statistical power of the chi-square tests above and the explanatory power of the cross-product ratios. However, due to the limited sample sizes of the following logistic regression analyses, the criterion of rejection of the null hypothesis was expanded to the 0.1 level. Also, no table is available for the logistic regression analyses as the following text explains the results thoroughly and the ratios produced by logistic regression analyses are similar to those reported the cross-product ratio tables.

Data/Non-Data

The logistic regression analysis of data and non-data by gender-domination and gender-neutrality was separated into three separate effect coded logistic regression analyses. The first analysis was data/non-data by male and female dominated occupations. Interestingly, the ratio of female-dominated occupations being 3.5 times more likely than male-dominated occupations to work with data was statistically significant (p. = 0.0695). Also the ratio of gender-neutral occupations being 3.11 times more likely to work with data than male-dominated occupations was statistically significant (p. = 0.0951). However, female-dominated occupations being 1.125 times more likely to work with data than gender-neutral occupations was not statistically significant (p. = 0.8705).

People/Non-People

The logistic regression analyses of the associations between gender-dominant and gender-neutral occupations working with people and non-people showed no significant relationships. For example, the ratio of female-dominated occupations being 1.306 times more likely than male-dominated occupations to work with people was not statistically

significant (p. = 0.6735). In addition, the likelihood of gender-neutral occupations being 1.469 times more likely to work with people than male-dominated occupations was not statistically significant (p. = 0.5366). The relationship of gender-neutral occupations being 1.125 times more likely to work with people than female-dominated occupations was also not statistically significant (p. = 0.8705).

Things/Non-Things

Logistic regression of things/non-things by gender-dominant and gender-neutral occupations also showed no statistically significant relationships primarily due to the inability of the sample to identify any female-dominated or gender-neutral occupations as working predominantly with things. Both the relationship between male-dominated and female-dominated occupations, and the relationship between male-dominated and gender-neutral occupations showed large ratios, but both relationships were not statistically significant (p. = 0.8169). The relationship between female-dominated and gender-neutral occupations with things and non-things could not be calculated because neither worked primarily with things.

Complex/Non-Complex

Only one of the ratios of complex/non-complex by gender-dominant and gender-neutral occupations was statistically significant. The statistically significant relationship was that gender-neutral occupations are 6.125 times more likely to work predominantly on complex tasks than female-dominated-occupations (p. = 0.0479). The ratio of male-dominated occupations being 2.04 times more likely to work on complex tasks than female-dominated occupations was not statistically significant (p. = 0.2745). Also, the relationship of gender-neutral occupations being 3.0 times more likely than male-

dominated occupations to perform mainly complex tasks was not statistically significant (p. = 0.1986).

Physical/Non-Physical

Two out of the three ratios of physical/non-physical by gender-dominant and gender-neutral occupations were statistically significant. For example, female-dominated occupations are 10.5 times more likely than gender-neutral occupations to work on physical tasks (p. = 0.0440). Also, male-dominated occupations are 6.364 times more likely to work on physical tasks than gender-neutral occupations (p. = 0.0934). The ratio of female-dominated occupations being 1.65 times more likely than male-dominated occupations to work on physical tasks was not statistically significant (p. = 0.4488).

Line/Non-Line

Logistic regression analyses of line and non-line by gender-dominant and gender-neutral occupations uncovered two statistically significant relationships. The first of these relationships was the ratio that male-dominated occupations are 6.05 times more likely than female-dominated occupations to work predominantly on line tasks (p. = 0.0098). The second relationship was that gender-neutral occupations are 5.50 times more likely to work on line tasks than female-dominated occupations (p. = 0.0332). The relationship of male-dominated occupations being 1.10 times more likely than gender-neutral occupations to perform line tasks was not statistically significant (p. = 0.8864).

Analysis 2

Frequencies and Percentages

Analysis 2 involved the examination of an aggregated 141 provincial job descriptions and the matched equivalent of an aggregated 141 *National Occupational*

Classification (NOC) manual unit group descriptions for a total combined sample of 282 descriptions. This analysis investigates the usefulness of the *NOC* to describe the occupations encompassed within it. Furthermore, Analysis 2 was particularly relevant to this thesis because if no significant differences exist between provincial government job descriptions and *NOC* unit group descriptions, then generalizations can be made regarding occupations from Analysis 1 and their corresponding *NOC* unit groups. Due to the ties on some of the categories for both provincial government job descriptions and *NOC* unit group descriptions, samples varied depending on the variable analyzed. For example, the sample size for the variables of data/non-data, people/non-people, things/non-things and complex/non-complex was 271 (96.1%) descriptions. The sample size for physical/non-physical was 278 (98.6%) combined provincial government job descriptions and *NOC* unit group descriptions.

Crosstabulations and Chi-Square Tests

Tables 4.30 to 4.34, also at the end of Chapter 4, display four crosstabulations with observed counts, expected counts and chi-square values for data/non-data, people/non-people, things/non-things, complex/non-complex and physical/non-physical by provincial job descriptions and *NOC* unit group descriptions. The crosstabulations enable a comparison of provincial job descriptions and *NOC* unit group descriptions on each of the dependent variables with expected frequencies for reference purposes.

Data/Non-Data

Table 4.30 shows the observed and expected frequencies for data/non-data by provincial job descriptions and *NOC* unit group descriptions. It is important to note that the observed counts of *NOC* descriptions for data were higher than expected. The

opposite was observed for provincial job descriptions which showed fewer observed counts for data than expected. However, the differences between observed and expected frequencies were small relative to the sample size of 271 descriptions. For this reason, the chi-square value for this crosstabulation was low and the probability of independence was high ($\chi^2 = 0.746$, df. = 1, p. = 0.388).

People/Non-People

Table 4.31 displays the observed and expected counts for people/non-people by provincial job descriptions and *NOC* unit group descriptions. Of note is that the observed counts of provincial job descriptions working predominantly with people were higher than expected. The opposite was found for *NOC* descriptions which observed fewer counts for working primarily with people than expected. However, the differences between observed and expected frequencies were small relative to the sample size of 271 descriptions. Consequently, the chi-square value for this crosstabulation was low and the probability of independence was high ($\chi^2 = 0.495$, df. = 1, p. = 0.482).

Things/Non-Things

Table 4.32 shows the observed and expected frequencies for things/non-things by provincial job descriptions and *NOC* unit group descriptions. The differences between the observed and expected frequencies for both provincial job descriptions and *NOC* unit group descriptions were near equal. These differences between observed and expected frequencies were so small relative to the sample size of 271 descriptions that the chi-square value for this crosstabulation was extremely low and the probability of independence was very high ($\chi^2 = 0.065$, df. = 1, p. = 0.799).

Complex/Non-Complex

Table 4.33 shows the observed and expected frequencies for complex/non-complex by provincial job descriptions and *NOC* unit group descriptions. Of interest is that the observed counts of provincial job descriptions working primarily with complex tasks were higher than expected. Again, the opposite was found for *NOC* descriptions which showed fewer observed counts for working mainly with complex tasks than expected. However, the differences between observed and expected frequencies were also small relative to the sample size. For this reason, the chi-square value for this crosstabulation was low and the probability of independence was high ($\chi^2 = 0.454$, df. = 1, p. = 0.500).

Physical/Non-Physical

Table 4.34 presents the observed and expected frequencies for physical/non-physical by provincial job descriptions and *NOC* unit group descriptions. Of note is that the observed counts of *NOC* descriptions for physical tasks were higher than expected. Also, the inverse was observed for provincial job descriptions which showed fewer observed counts for physical than expected. However, the differences between observed and expected frequencies were again small compared to the sample size of 278 descriptions. For this reason, the chi-square value for this crosstabulation was fairly low and the probability of independence was high ($\chi^2 = 1.027$, df. = 1, p. = 0.311).

Cross-Product Ratios

Data/Non-Data

The cross-product ratio for data/non-data by provincial government job descriptions and *NOC* unit group descriptions showed that *NOC* descriptions were 1.236

times more likely than provincial government job descriptions to report data as the predominant focus of tasks.

People/Non-People

When people/non-people were calculated by the cross-product ratio, provincial government job descriptions were 1.187 times more likely to list people as the primary focus of the occupations than *NOC* unit group descriptions.

Things/Non-Things

The cross-product ratio for things/non-things by provincial government job descriptions and *NOC* unit group descriptions showed that provincial government job descriptions were 1.107 times more likely than *NOC* unit group descriptions to report occupations as working primarily with things.

Complex/Non-Complex

The cross-product ratio for complex/non-complex by provincial government job descriptions and *NOC* unit group descriptions revealed that provincial government job descriptions were 1.198 times more likely than *NOC* unit group descriptions to report occupations as working primarily with complex tasks.

Physical/Non-Physical

When physical/non-physical were calculated by the cross-product ratio, *NOC* unit group descriptions were 1.318 times more likely to list physical components of occupations than provincial government job descriptions.

Logistic Regression

Logistic regression analyses were performed on the sample for Analysis 2 to determine if the above cross-product ratios were statistically significant. Although each

dependent variable (data/non-data, people/non-people, things/non-things, complex/non-complex, and physical/non-physical) were investigated by provincial government job descriptions and *NOC* unit group descriptions with logistic regression, none of the analyses were statistically significant. The probability of significance ranged from 0.3115 to 0.7989. The relationships uncovered in Analysis 1 and the lack of significant differences revealed in Analysis 2 are more thoroughly examined in the following chapter.

Crosstabulations and Chi-Square Values for Data/Non-Data by Gender-Dominance and Gender-Neutrality of Occupations

Table 4.0 Crosstabulations and Chi-Square Value for Data/Non-Data by Male-Dominated, Female-Dominated and Gender-Neutral Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral	Total
Data	6 (9.8)	7 (4.9)	7 (5.2)	20 (20.0)
Non-Data	24 (20.2)	8 (10.1)	9 (10.8)	41 (41.0)
Total	30 (30.0)	15 (15.0)	16 (16.0)	61 (61.0)

expected counts are in brackets ( )
chi square = 4.40979 df. = 2 p. = 0.1102

Table 4.1 Crosstabulations and Chi-Square Value for Data/Non-Data by Male-Dominated and Female-Dominated Occupations

	Male-Dominated	Female-Dominated	Total
Data	6 (8.7)	7 (4.3)	13 (13.0)
Non-Data	24 (21.3)	8 (10.7)	32 (32.0)
Total	30 (30.0)	15 (15.0)	45 (45.0)

expected counts are in brackets ( )
chi square =3.462 df. = 1 p. = 0.063

Table 4.2 Crosstabulations and Chi-Square Value for Data/Non-Data by Male-Dominated and Gender-Neutral Occupations

	Male-Dominated	Gender-Neutral	Total
Data	6 (8.5)	7 (4.5)	13 (13.0)
Non-Data	24 (21.5)	9 (11.5)	33 (33.0)
Total	30 (30.0)	16 (16.0)	46 (46.0)

expected counts are in brackets ( )
chi-square = 2.903 df. = 1 p. = 0.088

Table 4.3 Crosstabulations and Chi-Square Value for Data/Non-Data by Female-Dominated and Gender-Neutral Occupations

	Female-Dominated	Gender-Neutral	Total
Data	7 (6.8)	7 (7.2)	14 (14.0)
Non-Data	8 (8.2)	9 (8.8)	17 (17.0)
Total	15 (15.0)	16 (16.0)	31 (31.0)

expected counts are in brackets ( )
chi-square = 0.027 df. = 1 p. = 0.870

Crosstabulations and Chi-Square Values for People/Non-People by Gender-Dominance and Gender-Neutrality of Occupations

Table 4.4 Crosstabulations and Chi-Square Value for People/Non-People by Male-Dominated, Female-Dominated and Gender-Neutral Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral	Total
People	14 (15.2)	8 (7.6)	9 (8.1)	31 (31.0)
Non-People	16 (14.8)	7 (7.4)	7 (7.9)	30 (30.0)
Total	30 (30.0)	15 (15.0)	16 (16.0)	61 (61.0)

expected counts are in brackets ( )
chi-square = 0.43372 df. = 2 p. = 0.80504

Table 4.5 Crosstabulations and Chi-Square Value for People/Non-People by Male-Dominated and Female-Dominated Occupations

	Male-Dominated	Female-Dominated	Total
People	14 (14.7)	8 (7.3)	22 (22.0)
Non-People	16 (15.3)	7 (7.7)	23 (23.0)
Total	30 (30.0)	15 (15.0)	45 (45.0)

expected counts are in brackets ( )
chi square = 0.178 df. = 1 p. = 0.673

Table 4.6 Crosstabulations and Chi-Square Value for People/Non-People by Male-Dominated and Gender-Neutral Occupations

	Male-Dominated	Gender-Neutral	Total
People	14 (15.0)	9 (8.0)	23 (23.0)
Non-People	16 (15.0)	7 (8.0)	23 (23.0)
Total	30 (30.0)	16 (16.0)	46 (46.0)

expected counts are in brackets ( )
chi square = 0.383 df. = 1 p. = 0.536

Table 4.7 Crosstabulations and Chi-Square Value for People/Non-People by Female-Dominated and Gender-Neutral Occupations

	Female-Dominated	Gender-Neutral	Total
People	8 (8.2)	9 (8.8)	17 (17.0)
Non-People	7 (6.8)	7 (7.2)	14 (14.0)
Total	15 (15.0)	16 (16.0)	31 (31.0)

expected counts are in brackets ( )
chi square = 0.027 df. = 1 p. = 0.870

Crosstabulations and Chi-Square Values for Things/Non-Things by Gender-Dominance and Gender-Neutrality of Occupations

Table 4.8 Crosstabulations and Chi-Square Value for Things/Non-Things by Male-Dominated, Female-Dominated and Gender-Neutral Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral	Total
Things	10 (4.9)	0 (2.5)	0 (2.6)	10 (10.0)
Non-Things	20 (25.1)	15 (12.5)	16 (13.4)	51 (51.0)
Total	30 (30.0)	15 (15.0)	16 (16.0)	61 (61.0)

expected counts are in brackets ( )
chi-square = 12.35948 df. = 2 p. = 0.00207

Table 4.9 Crosstabulations and Chi-Square Value for Things/Non-Things by Male-Dominated and Female-Dominated Occupations

	Male-Dominated	Female-Dominated	Total
Things	10 (6.7)	0 (3.3)	11 (11.0)
Non-Things	20 (23.3)	15 (11.7)	36 (36.0)
Total	31 (31.0)	16 (16.0)	47 (47.0)

expected counts are in brackets ( )
chi square = 6.429 df. = 1 p. = 0.011

Table 4.10 Crosstabulations and Chi-Square Value for Things/Non-Things by Male-Dominated and Gender-Neutral Occupations

	Male-Dominated	Gender-Neutral	Total
Things	10 (6.5)	0 (3.5)	10 (10.0)
Non-Things	20 (23.5)	16 (12.5)	36 (36.0)
Total	30 (30.0)	16 (16.0)	46 (46.0)

expected counts are in brackets ( )
chi square = 6.815 df. = 1 p. = 0.009

Table 4.11 Crosstabulations and Chi-Square Value for Things/Non-Things by Female-Dominated and Gender-Neutral Occupations

	Female-Dominated	Gender-Neutral	Total
Things	0 (0.0)	0 (0.0)	0 (0.0)
Non-Things	15 (15.0)	16 (16.0)	31 (31.0)
Total	15 (15.0)	16 (16.0)	31 (31.0)

expected counts are in brackets ( )
no chi square value was calculated as neither category worked with things

Crosstabulations and Chi-Square Values for Complex/Non-Complex by Gender-Dominance and Gender-Neutrality of Occupations

Table 4.12 Crosstabulations and Chi-Square Value for Complex/Non-Complex by Male-Dominated, Female-Dominated and Gender-Neutral Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral	Total
Complex	21 (21.1)	8 (10.6)	14 (11.3)	43 (43.0)
Non-Complex	9 (8.9)	7 (4.4)	2 (4.7)	18 (18.0)
Total	30 (30.0)	15 (15.0)	16 (16.0)	61 (61.0)

expected counts are in brackets ( )
chi square = 4.352 df. = 2 p. = 0.114

Table 4.13 Crosstabulations and Chi-Square Value for Complex/Non-Complex by Male-Dominated and Female-Dominated Occupations

	Male-Dominated	Female-Dominated	Total
Complex	21 (19.3)	8 (9.7)	16 (16.0)
Non-Complex	9 (10.7)	7 (5.3)	29 (29.0)
Total	30 (30.0)	15 (15.0)	45 (45.0)

expected counts are in brackets ( )
chi square = 1.212 df. = 1 p. = 0.271

Table 4.14 Crosstabulations and Chi-Square Value for Complex/Non-Complex by Male-Dominated and Gender-Neutral Occupations

	Male-Dominated	Gender-Neutral	Total
Complex	21 (22.8)	14 (12.2)	35 (35.0)
Non-Complex	9 (7.2)	2 (3.8)	11 (11.0)
Total	30 (30.0)	16 (16.0)	46 (46.0)

expected counts are in brackets ( )
chi-square = 1.756 df. = 1 p. = 0.185

Table 4.15 Crosstabulations and Chi-Square Value for Complex/Non-Complex by Female-Dominated and Gender-Neutral Occupations

	Female-Dominated	Gender-Neutral	Total
Complex	8 (10.6)	14 (11.4)	9 (9.0)
Non-Complex	7 (4.4)	2 (4.6)	22 (22.0)
Total	15 (15.0)	16 (16.0)	31 (31.0)

expected counts are in brackets ( )
chi square = 4.386 df. = 1 p. = 0.036

Crosstabulations and Chi-Square Values for Physical/Non-Physical by Gender-Dominance and Gender-Neutrality of Occupations

Table 4.16 Crosstabulations and Chi-Square Value for Physical/Non-Physical by Male-Dominated, Female-Dominated and Gender-Neutral Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral	Total
Physical	10 (8.9)	6 (3.9)	1 (4.2)	17 (17.0)
Non-Physical	22 (23.1)	8 (10.1)	14 (10.8)	44 (44.0)
Total	32 (32.0)	14 (14.0)	15 (15.0)	61 (61.0)

expected counts are in brackets ( )
chi-square = 5.10091 df. = 2 p. = 0.07805

Table 4.17 Crosstabulations and Chi-Square Value for Physical/Non-Physical by Male-Dominated and Female-Dominated Occupations

	Male-Dominated	Female-Dominated	Total
Physical	10 (11.1)	6 (4.9)	16 (16.0)
Non-Physical	22 (20.9)	8 (9.1)	30 (30.0)
Total	32 (32.0)	14 (14.0)	46 (46.0)

expected counts are in brackets ( )
chi-square = 0.578 df. = 1 p. = 0.447

Table 4.18 Crosstabulations and Chi-Square Value for Physical/Non-Physical by Male-Dominated and Gender-Neutral Occupations

	Male-Dominated	Gender-Neutral	Total
Physical	10 (7.5)	1 (3.5)	11 (11.0)
Non-Physical	22 (24.5)	14 (11.5)	36 (36.0)
Total	32 (32.0)	15 (15.0)	47 (47.0)

expected counts are in brackets ( )
chi-square = 3.443 df. = 1 p. = 0.064

Table 4.19 Crosstabulations and Chi-Square Value for Physical/Non-Physical by Female-Dominated and Gender-Neutral Occupations

	Female-Dominated	Gender-Neutral	Total
Physical	6 (3.4)	1 (3.6)	7 (7.0)
Non-Physical	8 (10.6)	14 (11.4)	22 (22.0)
Total	14 (14.0)	15 (15.0)	29 (29.0)

expected counts are in brackets ( )
chi-square = 5.179 df. = 1 p. = 0.023

Crosstabulations and Chi-Square Values for Line/Non-Line by Gender-Domination and Gender-Neutrality of Occupations

Table 4.20 Crosstabulations and Chi-Square Value for Line/Non-Line by Male-Dominated, Female-Dominated and Gender-Neutral Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral	Total
Line	22 (18.6)	4 (8.7)	10 (8.7)	36 (36.0)
Non-Line	10 (13.4)	11 (6.3)	5 (6.3)	26 (26.0)
Total	32 (32.0)	15 (15.0)	15 (15.0)	62 (62.0)

expected counts are in brackets ( )
chi-square = 8.02931 df. = 2 p. = 0.01805

Table 4.21 Crosstabulations and Chi-Square Value for Line/Non-Line by Male-Dominated and Female-Dominated Occupations

	Male-Dominated	Female-Dominated	Total
Line	22 (17.7)	4 (8.3)	26 (26.0)
Non-Line	10 (14.3)	11 (6.7)	21 (21.0)
Total	32 (32.0)	15 (15.0)	47 (47.0)

expected counts are in brackets ( )
chi-square = 7.318 df. = 1 p. = 0.007

Table 4.22 Crosstabulations and Chi-Square Value for Line/Non-Line by Male-Dominated and Gender-Neutral Occupations

	Male-Dominated	Gender-Neutral	Total
Line	22 (21.8)	10 (10.2)	32 (32.0)
Non-Line	10 (10.2)	5 (4.8)	15 (15.0)
Total	32 (32.0)	15 (15.0)	47 (47.0)

expected counts are in brackets ( )
chi-square = 0.020 df. = 1 p. = 0.886

Table 4.23 Crosstabulations and Chi-Square Value for Line/Non-Line by Female-Dominated and Gender-Neutral Occupations

	Female-Dominated	Gender-Neutral	Total
Line	4 (7.0)	10 (7.0)	14 (14.0)
Non-Line	11 (8.0)	5 (8.0)	16 (16.0)
Total	15 (15.0)	15 (15.0)	30 (30.0)

expected counts are in brackets ( )
chi-square = 4.821 df. = 1 p. = 0.028

Cross-Product Ratios for Data/Non-Data, People/Non-People, Thing/Non-Things, Complex/Non-Complex, Physical/Non-Physical and Line/Non-Line by Gender-Dominance and Gender-Neutrality of Occupations

Table 4.24 Cross-Product Ratios for Data/Non-Data by Gender-Dominance and Gender-Neutrality of Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral
Male-Dominated	1.0	0.286	0.321
Female-Dominated	3.5	1.0	1.125
Gender-Neutral	3.11	0.889	1.0

Cross-product ratio tables are intended to be read by rows as "more likely to" the intercepting column.
Those cross-product ratios that are less than 1.0 are the inverses of the corresponding cross-product ratios.

Table 4.25 Cross-Product Ratios for People/Non-People by Gender-Dominance and Gender-Neutrality of Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral
Male-Dominated	1.0	0.766	0.681
Female-Dominated	1.306	1.0	0.889
Gender-Neutral	1.469	1.125	1.0

Cross-product ratio tables are intended to be read by rows as "more likely to" the intercepting column.
Those cross-product ratios that are less than 1.0 are the inverses of the corresponding cross-product ratios.

Table 4.26 Cross-Product Ratios for Things/Non-Things by Gender-Dominance and Gender-Neutrality of Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral
Male-Dominated	1.0	15.878*	16.902*
Female-Dominated	0.063*	1.0	1.065*
Gender-Neutral	0.059*	0.939*	1.0

* 0.5 was added to each cell to compensate for empty cells
Cross-product ratio tables are intended to be read by rows as "more likely to" the intercepting column.
Those cross-product ratios that are less than 1.0 are the inverses of the corresponding cross-product ratios.

Table 4.27 Cross-Product Ratios for Complex/Non-Complex by Gender-Dominance and Gender-Neutrality of Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral
Male-Dominated	1.0	2.042	0.333
Female-Dominated	0.490	1.0	0.163
Gender-Neutral	3.00	6.125	1.0

Cross-product ratio tables are intended to be read by rows as "more likely to" the intercepting column.
Those cross-product ratios that are less than 1.0 are the inverses of the corresponding cross-product ratios.

Table 4.28 Cross-Product Ratios for Physical/Non-Physical by Gender-Dominance and Gender-Neutrality of Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral
Male-Dominated	1.0	0.606	6.364
Female-Dominated	1.65	1.0	10.50
Gender-Neutral	0.157	0.095	1.0

Cross-product ratio tables are intended to be read by rows as "more likely to" the intercepting column.
Those cross-product ratios that are less than 1.0 are the inverses of the corresponding cross-product ratios.

Table 4.29 Cross-Product Ratios for Line/Non-Line by Gender-Dominance and Gender-Neutrality of Occupations

	Male-Dominated	Female-Dominated	Gender-Neutral
Male-Dominated	1.0	6.05	1.10
Female-Dominated	0.165	1.0	0.182
Gender-Neutral	0.909	5.50	1.0

Cross-product ratio tables are intended to be read by rows as "more likely to" the intercepting column.
Those cross-product ratios that are less than 1.0 are the inverses of the corresponding cross-product ratios.

Crosstabulations and Chi-Square Values for Data/Non-Data, People/Non-People, Things/Non-Things, Complex/Non-Complex, Physical/Non-Physical by Job Descriptions and *NOC* Unit Descriptions Occupations

Table 4.30 Crosstabulations and Chi-Square Value for Data/Non-Data by Job Descriptions and *NOC* Unit Descriptions Occupations

	Job Descriptions	*NOC* Descriptions	Total
Data	57 (60.5)	61 (57.5)	118 (118.0)
Non-Data	82 (78.5)	71 (74.5)	153 (153.0)
Total	139 (139.0)	132 (132.0)	271 (271.0)

expected counts are in brackets ( )
chi square =0.746 df. = 1 p. = 0.388

Table 4.31 Crosstabulations and Chi-Square Value for People/Non-People by Job Descriptions and *NOC* Unit Descriptions Occupations

	Job Descriptions	*NOC* Descriptions	Total
People	67 (64.1)	58 (60.9)	125 (125.0)
Non-People	72 (74.9)	74 (71.1)	146 (146.0)
Total	139 (139.0)	132 (132.0)	271 (271.0)

expected counts are in brackets ( )
chi square = 0.495 df. = 1 p. = 0.482

Table 4.32 Crosstabulations and Chi-Square Value for Things/Non-Things by Job Descriptions and *NOC* Unit Descriptions Occupations

	Job Descriptions	*NOC* Descriptions	Total
Things	15 (14.4)	13 (13.6)	28 (28.0)
Non-Things	124 (124.6)	119 (118.4)	243 (243.0)
Total	139 (139.0)	132 (132.0)	271 (271.0)

expected counts are in brackets ( )
chi square = 0.065 df. = 1 p. = 0.799

Table 4.33 Crosstabulations and Chi-Square Value for Complex/Non-Complex by Job Descriptions and *NOC* Unit Descriptions Occupations

	Job Descriptions	*NOC* Descriptions	Total
Complex	101 (98.5)	91 (93.5)	192 (192.0)
Non-Complex	38 (40.5)	41 (38.5)	79 (79.0)
Total	139 (139.0)	132 (132.0)	271 (271.0)

expected counts are in brackets ( )
chi square = 0.454 df. = 1 p. = 0.500

Table 4.34 Crosstabulations and Chi-Square Value for Physical/Non-Physical by Job Descriptions and *NOC* Unit Descriptions Occupations

	Job Descriptions	*NOC* Descriptions	Total
Physical	33 (36.7)	41 (37.3)	74 (74.0)
Non-Physical	105 (101.3)	99 (102.7)	204 (204.0)
Total	138 (138.0)	140 (140.0)	278 (278.0)

expected counts are in brackets ( )
chi square = 1.027 df. = 1 p. = 0.311

CHAPTER 5

Discussion

The comparison of the major task focus of occupations (data/people/things), task complexity, and physical components of occupations specified by provincial government job descriptions with the same variables specified by matched *National Occupational Classification (NOC)* unit group descriptions (Analysis 2), and the comparison of major task focus of occupations (data/people/things), task complexity, physical components and line versus staff by gender-domination and gender-neutrality of the occupations (Analysis 1) both uncovered some interesting findings. For example, Analysis 2 supports the assumption that the *NOC* describes the occupations contained within it well. On the other hand, Analysis 1 discovered both similarities and differences between male and female-dominated occupations, male-dominated and gender-neutral occupations, and female-dominated and gender-neutral occupations that were unexpected.

Analysis 2 did not show any significant differences between provincial government job descriptions and *NOC* unit group descriptions. This may be interpreted as support for the ability of the *NOC* to reflect those occupations it describes. However, the *NOC* was somewhat difficult to use in matching Descriptive Work Titles of provincial job descriptions with the *NOC's Index of Titles*. For example, of the 141 provincial government job descriptions matched with *NOC* unit group descriptions, 38 (27.0%) were very difficult to match, and another 61 (43.3%) were matched on the main subject of the Descriptive Work Title only. The remaining 42 (30.0%) were matched verbatim with the *NOC's Index of Titles*. Yet these difficulties in matching did not appear to complicate the analyses. The aggregated analyses that were performed in Analysis 2

strengthen generalizations offered from Analysis 1, since it is now clear that the provincial government classification and description of jobs compare well with the national classification system, which in turn is in part derived from other national and international classification schemes.

Turning now to Analysis 1, the examination of constituent task elements of gender-dominant and gender-neutral occupations to determine if there is a sexual or gender basis for occupational segregation revealed some interesting results. Table 5.0 shows all of the statistical findings discovered in Analysis 1. Since the central objective of this analysis is to uncover the similarities and differences between male and female-dominated occupations, Column 1 (Male-Dominated vs. Female-Dominated) of Table 5.0 is the focus of the following discussion. Column 2 (Male-Dominated vs. Gender-Neutral) and Column 3 (Female-Dominated vs. Gender-Neutral) of Table 5.0 are provided as reference points for the discussion of similarities and differences between male and female-dominated occupations. However, where interesting findings emerged that are not related to the central focus of this analysis, they are also discussed below.

The first set of comparisons were data/non-data, people/non-people and things/non-things by male-dominated and female-dominated occupations. As is evident in Table 5.0, female-dominated occupations are significantly more likely to work with data than male-dominated occupations ($p. < 0.1$). Although some of this difference may be due to the only 3 upper-level management occupations in this sample being male, it cannot explain it all. Moreover, the overabundance of female, clerical occupations cannot explain gender-neutral occupations' statistically significant likelihood of working with data when compared to male-dominated occupations. The analysis of working with

people did not reveal any statistically significant differences between male and female-dominated occupations. Although one may postulate that this is due to the public service nature of these occupations in this sample, this conjecture must be moderated with the fact that the analyses compared proportions of gender-dominant and gender-neutral categories working with people, not totals. As for working with things, a statistically significant chi-square value ($p. < .05$) showed a finding that male-dominated occupations are more likely to work with things than female-dominated occupations. Although this finding also holds when male-dominated occupations are compared with gender-neutral occupations, it must be pointed out that these are chi-squared values only. More analysis should be done to confirm these findings, but a more diverse sample containing female-dominated and gender-neutral occupations that work predominantly with things would be required.

When looking at occupational complexity, there are no statistically significant differences between male and female-dominated occupations. The only statistically significant finding was that gender-neutral occupations are more likely to work mainly on complex tasks than female-dominated occupations.

The analyses of physical components of occupations revealed some interesting findings. For example, there is no statistically significant difference between male and female-dominated occupations when examining the physical aspects of occupations. This finding is supported by the fact that both male and female-dominated occupations are more likely to work predominantly on physical tasks than the reference category of gender-neutral occupations.

Table 5.0 Finding from Analysis 1 for Data, People, Things, Complexity, Physical Components and Line Functions by Chi-Square Values, Cross-Product Ratios, Logistic Regression, and Gender-Dominated and Gender-Neutral Occupations

		Male-Dominated vs. Female-Dominated	Male-Dominated vs. Gender-Neutral	Female-Dominated vs. Gender-Neutral
Data	Chi-Square Values	3.462* (df. = 1)	2.903* (df. = 1)	0.027 (df. = 1)
	Cross-Product Ratios	3.5 times (+ Female)	3.11 times (+ Neutral)	1.125 times (+ Neutral)
	Logistic Regression	3.5 times* (+ Female)	3.11 times* (+ Neutral)	1.125 times (+ Neutral)
People	Chi-Square Values	0.178 (df. = 1)	0.383 (df. = 1)	0.027 (df. = 1)
	Cross-Product Ratios	1.306 times (+ Female)	1.469 times (+ Neutral)	1.125 times (+ Neutral)
	Logistic Regression	1.306 times (+ Female)	1.469 times (+ Neutral)	1.125 times (+ Neutral)
Things	Chi-Square Values	6.429** (df. = 1)	6.815*** (df. = 1)	could not be calculated
	Cross-Product Ratios †	15.878 times (+ Male)	16.902 times (+ Male)	1.065 times (+ Female)
	Logistic Regression	were unreliable	were unreliable	could not be calculated
Complexity	Chi-Square Values	1.212 (df. = 1)	1.756 (df. = 1)	4.386** (df. = 1)
	Cross-Product Ratios	2.042 times (+ Male)	3.0 times (+ Neutral)	6.125 times (+ Neutral)
	Logistic Regression	2.042 times (+ Male)	3.0 times (+ Neutral)	6.125 times** (+ Neutral)
Physical	Chi-Square Values	0.578 (df. = 1)	3.443* (df. =1)	5.179** (df. = 1)
	Cross-Product Ratios	1.65 times (+ Female)	6.364 times (+ Male)	10.5 times (+ Female)
	Logistic Regression	1.65 times (+ Female)	6.362 times* (+ Male)	10.5 times** (+ Female)
Line	Chi-Square Values	7.318*** (df. = 1)	0.020 (df. = 1)	4.821** (df. = 1)
	Cross-Product Ratios	6.05 times (+ Male)	1.10 (+ Male)	5.50 times (+ Neutral)
	Logistic Regression	6.05*** times (+ Male)	1.10 (+ Male)	5.50** times (+ Neutral)

* p. < 0.1 ** p. < 0.05 *** p. < 0.01 + refers to the direction of the relationship

† Cross-Product Ratios were adjusted by 0.5 to compensate for empty cells

The analyses of the line functions of occupations showed that male-dominated occupations are significantly more likely to work on line tasks than female-dominated occupations ($p. < .01$). This finding is further supported by the statistically significant finding that gender-neutral occupations are also more likely than female-dominated occupations to work on line tasks.

The combined findings of Analysis 1 suggest the following conclusions. Female-dominated occupations are more likely than male-dominated occupations to work primarily with data. There is no statistically significant difference between male and female-dominated occupations regarding working with people. There is tentative evidence that male-dominated occupations are more likely to work with things than female-dominated occupations. Male and female-dominated occupations are not statistically different when comparing those occupations which work on complex tasks. The proportions of male and female-dominated occupations that work predominantly on physical aspects are similar, with female-dominated occupations slightly more likely to work on these tasks. Finally, male-dominated occupations are significantly more likely than female-dominated occupations to work on line tasks.

These findings call into question some of the theories outlined in Chapter 2, such as biological determinism, sociobiology, and human capital theory. Both biological determinism and sociobiology claim that the concentration of men and women into different occupations which perform different tasks is primarily due to their biological suitability for these occupations. Clearly the sample of job descriptions analyzed in this sample does not support this premise. For example, it is hard to imagine how women could be more biologically suited to work more with data than men, particularly when

gender-neutral occupations are also more likely to work with data than men. Furthermore, it is difficult to argue that men's biological make-up give them more advantages than women to work on line tasks. Moreover, if men's biological compositions did predispose them for line tasks, then the finding that gender-neutral occupations are more likely to work on line tasks than women should not be statistically significant. Even if some *post hoc* explanations could be manufactured for these findings, biological determinism and sociobiology cannot explain the lack of statistical differences between the proportions of male and female-dominated occupations working predominantly on physical tasks. Furthermore, of the jobs examined in this analysis, the female-dominated occupations are slightly **more** likely to work on physically demanding tasks than male-dominated jobs.

Even human capital theory does not completely explain the findings of Analysis 1. For instance, human capital theory claims that women choose occupations that require general skills that do not deteriorate while they are out of the labour force raising children. If this premise is true, then male-dominated occupations should be significantly more complex than female-dominated occupations. Also, the finding that women are more likely to work with data than men is contrary to this human capital premise given the rapidly changing technological skills necessary to work primarily with data. Furthermore, human capital theory posits that women choose occupations that do not demand large amounts of effort so they can save their energy for their families; yet this fact was simply not found, as female-dominated occupations are slightly more likely to perform physical tasks than male-dominated occupations.

Gender-role socialization theory gains limited support from the data generated in Analysis 1. The statistically significant finding that male-dominated and gender-neutral

occupations are more likely than female-dominated to work mainly on line tasks lends preliminary support to the notion that women are still working in staff or support capacities. However, according to gender-role socialization theory's emphasis on gender stereotypes, female-dominated occupations should also work predominantly with people more than male-dominated jobs. According to the theory, women are more likely to perform tasks that are nurturant, sensitive and devoted to others. Yet there is virtually no difference between male-dominated and female-dominated occupations on this task component.

Limitations

It is important to point out that all of the findings and interpretations of this thesis must be taken in the context in which the sample was collected. The job descriptions, and the corresponding *NOC* unit group descriptions, examined in this thesis were the best available data; however, they were not randomly selected. More job descriptions, especially female-dominated and gender-neutral ones, would have strengthened this research. Also, it is important to remember that a single coder was used to classify this data. Although I did test inter-coder reliability as reported in Chapter 3, multiple coders would have been preferred.

It is also important to point out that this research sampled only public sector occupations. This is especially important when considering the findings of this thesis which involved *line* and *staff* occupations. In particular, the functional aspects of occupations, and their *line-staff* designations, can vary considerably between public and private sector organizations (see Parsons, 1961). Furthermore, the differences between men and women concerning their reproductive roles disadvantage women relative to

men. Not only does society expect women to perform most of the child care, but pregnancy and lactation biologically limit some of the work tasks, at least for some of the time, women can perform. Although the limitations of this thesis present problems for generalizations to all gender-dominated or gender-neutral occupations, given the reliability between provincial government job descriptions and *NOC* unit group descriptions, the considerable validity of this research is noteworthy. Moreover, considering the diversity of the occupations investigated, tentative conclusions may be drawn.

In sum, this analysis found no support consistent with the assertion that formal tasks performed in gender-dominated occupations result from biological differences between men and women. In fact, only limited support was found consistent with the supposition that socialization and cultural expectations are responsible for the occupational segregation by gender. However, this research does contribute some evidence on the debate about why the gendered division of labour has persisted. Although this research tends to support social explanations for the concentration of men and women into different occupations, the specific reasons have not yet been sufficiently isolated. For example, are female-dominated occupations characterized by working mainly with data and staff tasks because they are the best available occupations open to women, or is it because employers view women as most appropriate for these occupations? Similarly, are women and men concentrated in different occupations because they have sought or been persuaded to pursue training in these areas, or are the occupations that women perform more compatible with their non-paid tasks? Answers to these questions must await further research.

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APPENDIX A

Operationalization and Coding of Data, People and Things Hierarchies Adopted from the *Dictionary of Occupational Titles* (United States Department of Labor, 1965)

The following is an excerpt from Robinson, Athanasiou, and Head (1969:444-445).

Much of the information in this edition of the Dictionary is based on the premise that every job requires a worker to function in relation to Data, People, and Things, in varying degrees. These relationships are identified and explained below. They appear in the form of three hierarchies arranged in each instance from relatively simple to complex in such a manner that each successive relationship includes those that are simpler and excludes the more complex. The identifications attached to these relationships are referred to as worker functions, and provide standard terminology for use in summarizing exactly what a worker does on the job by means of one or more meaningful verbs.
A job's relationship to Data, People, and Things can be expressed in terms of the highest appropriate function in each hierarchy to which the worker has an occupationally significant relationship, and these functions taken together indicate the total level of complexity at which he [or she] must perform. The last three digits of the occupational code numbers in the Dictionary reflect significant relationships to Data, People, and Things, respectively. These last three digits express a job's relationship to Data, People, and Things by identifying the highest appropriate function in each hierarchy to which the job requires the worker to have a significant relationship, as reflected by the following table:

	DATA (4th digit)		PEOPLE (5th digit)		THINGS (6th digit)
0	Synthesizing	0	Mentoring	0	Setting-Up
1	Coordinating	1	Negotiating	1	Precision Working
2	Analyzing	2	Instructing	2	Operating-Controlling
3	Compiling	3	Supervising	3	Driving-Operating
4	Computing	4	Diverting	4	Manipulating
5	Copying	5	Persuading	5	Tending
6	Comparing	6	Speaking-Signaling	6	Feeding-Offbearing
7	No Significant Relationship	7	Serving	7	Handling
8	No Significant Relationship	8	No Significant Relationship	8	No Significant Relationship

DATA: Information, knowledge, and conceptions, related to data, people, or things, obtained by observation, investigation, interpretation, visualization, mental creation; incapable of being touched; written data take the form of numbers, words, symbols; other data are ideas, concepts, oral verbalization.

0 **Synthesizing:** Integrating analyses of data to discover facts and/or develop knowledge concepts or interpretations.

1 **Coordinating:** Determining time, place, and sequence of operations or action to be taken on the basis of analysis of data; executing determinations and/or reporting on events.

2 **Analyzing:** Examining and evaluating data. Presenting alternative actions in relation to the evaluation is frequently involved.

3 **Compiling:** Gathering, collating, or classifying information about data, people, or things. Reporting and/or carrying out prescribed action in relation to the information is frequently involved.

4 **Computing:** Performing arithmetic operations and reporting on and/or carrying out a prescribed action in relation to them. Does not include counting.

5 **Copying:** Transcribing, entering, or posting data.

6 **Comparing:** Judging the readily observable, functional, structural, or compositional characteristics (whether similar to or divergent from obvious standards) of data, people, or things.

PEOPLE: Human beings; also animals dealt with on an individual basis as if they were human.

0 **Mentoring:** Dealing with individuals in terms of their total personality in order to advise, counsel, and/or guide them with regard to problems that may be resolved by legal, scientific, clinical, spiritual, and/or other professional principles.

1 **Negotiating:** Exchanging ideas, information, and opinions with others to formulate policies and programs and/or arrive jointly at decisions, conclusions, or solutions.

2 **Instructing:** Teaching subject matter to others, or training others (including animals) through explanation, demonstration, and supervised practice; or making recommendations on the basis of technical disciplines.

3 **Supervising:** Determining or interpreting work procedures for a group of workers, assigning specific duties to them, maintaining harmonious relations among them, and promoting efficiency.

4 **Diverting:** Amusing others.

5 **Persuading:** Influencing others in favor of a product, service, or point of view.

6 **Speaking-Signaling:** Talking with and/or signaling people to convey or exchange information. Including giving assignments and/or directions to helpers or assistants.

7 **Serving:** Attending to the needs or requests of people or animals or the expressed or implicit wishes of people. Immediate response is involved

THINGS: inanimate objects as distinguished from human beings; substances or materials; machines, tools, equipment; products. A thing is tangible and has a shape, form, and other physical characteristics.

0 **Setting Up:** Adjusting machines or equipment by placing or altering tools, jigs, fixtures, and attachments to prepare them to perform their functions, change their performance, or restore their proper functioning if the break down. Workers who set up one or a number of machines for other workers or who set up and personally operate a variety of machines are included here.

1 **Precision Working:** Using body members and/or tools or work aids to work, move, guide, or place objects or materials in situations where ultimate responsibility for the attainment of standards occurs and selection of appropriate tools, objects, or materials, and the adjustment of the tool to the task require exercise of considerable judgment.

2 **Operating- Controlling:** Starting, stopping, controlling, and adjusting the progress of machines or equipment designed to fabricate and/or process objects or materials. Operating machines involves setting up the machine and adjusting the machine or material as the work progresses. Controlling equipment involves observing gages, dials, etc., and turning valves and other devices to control such factors as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials. Setup involves several variables and adjustment is more frequent than tending.

3 **Driving-Operating:** Starting, stopping, and controlling the actions of machines or equipment for which a course must be steered, or which must be guided, in order to fabricate, process, and/or move things or people. Involves such activities as observing gages and dials; estimating distances and determining speed and direction of other objects; turning cranks and wheels; pushing clutches and brakes; and pushing or pulling gear lifts or levers. Includes such machines as cranes, conveyor systems, tractors, furnace charging machines, paving machines and hoisting machines, such as electric wheelbarrows and handtrucks.

4 **Manipulating:** Using body members, tools, or special devices to work, move, guide, or place objects or materials. Involves some latitude for judgment with regard to precision attained and selecting appropriate tool, object, or material, although this is readily manifest.

5 **Tending:** Starting, stopping, and observing the functioning of machines and equipment. Involves adjusting materials or controls of the machine, such as changing guides, adjusting timers and temperature gages, turning valves to allow flow of materials, and flipping switches in response to lights. Little judgment is involved in making these adjustments.

6 **Feeding-Offbearing:** Inserting, throwing, dumping, or placing materials in or removing them from machines or equipment which are automatic or tended or operated by other workers.

7 **Handling:** Using body members, handtools, and/or special devices to work, move, or carry objects or materials. Involves little to no latitude for judgment with regard to attainment of standards or in selecting appropriate tool, object, or material.

NOTE: Included in the concept of Feeding-Offbearing, tending, Operating-Controlling, and Setting Up, is the situation in which the worker is actually part of the setup of the machine, either as the holder and guider of the material or holder and guider of the tool.

APPENDIX B

Work Intensity and Duration Categories

Six Categories of Work Intensity

The following is a verbatim list of Wardle, Gloss and Gloss' (1987:113-114) six grades of physical work:

1. ***Sedentary work***. This grade encompasses work at which the person remains seated most of the time, performing tasks which do not require much physical exertion. Jobs in this category include bookkeepers, inspectors, watchmakers and electronic assemblers. This work grade requires expenditure or 1.1 - 1.9 kcals/minute. Approximately 800 kilocalories would be expended over an 8 hour day. The heart rate of a person performing sedentary work would probably not be elevated by work factors.

2. ***Light work***. This grade includes periods of sitting combined with other activities in which the person is frequently moving about, but not doing any heavy carrying. Light work includes postal clerks, filing clerks, shoemakers, drill press operators and messengers and requires 2.0 - 2.9 kcals/minute of energy expended. Approximately 1100 kilocalories a day would be expended during the work period. The average person performing light work would have a heart-rate increase if 72 beats/minute is considered average.

3. ***Moderate work***. This grade includes tasks in which the person is lifting and carrying small articles, walking up and down stairs, and operating many machines. Those doing moderate work include bricklayers, carpenters, bedside nurses, automobile mechanics, milling machine operators and locomotive operators. Moderate work requires 3.0 - 4.9 kcals/minute of energy expended and requires approximately 1500 kilocalories of energy expended per work day. While the person is working at moderate work tasks, the heart rate will range from 90 to 100 beats/minute.

4. ***Heavy work***. This grade requires strenuous physical work during the whole working period (Grandjean, 1969). It would require lifting heavy objects, carrying loads, sawing wood by hand, and shovelling sand or cement. Miners, rolling mill hands, foresters and construction laborers fall into the heavy work grade. Heavy work requires 5.0 to 7.9 kcals/minute of energy, expended, and requires approximately 2000 kilocalories of energy expended per day. The person's heart rate during heavy work would be from 120 to 150 beats/minute. Grandjean (1969) has specified that work should be graded as heavy work if the workers expend more than 240 kilocalories/hour.

5. ***Very heavy work***. This grade requires extreme physical exertion. Energy exerted is quite similar in nature to that exerted in physical training such as running and swimming. A person does not usually perform very heavy work for long periods. Very heavy work includes unloading freight cars by hand and felling trees by ax and requires an energy expenditure greater than 8.00 kcals/minute. The heart rate exceeds 150 beats/minute.

6. ***Ultra-heavy work***. This work is rarely done in our society. It encompasses extreme lifting and is performed only in short intervals, such as piano moving or carrying heavy furniture up stairs. Ultra-heavy work requires an energy expenditure greater than 12.50 kcals/minute.

APPENDIX C

Ministry Mission Statements, Mandates and Goals

Ministry of Aboriginal Affairs

"The mission of the Ministry of Aboriginal Affairs is to work with First Nations, the federal government, other provincial ministries and all British Columbians to help build a society in which: relationships between aboriginal people and all British Columbians are based on equality and respect; aboriginal people can fulfill their aspirations for self-determining and self-sustaining communities; all British Columbians enjoy the social and economic benefits of cooperation and certainty" (Ministry of Aboriginal Affairs, 1996:3).

Ministry of Agriculture, Fisheries and Food

"The mission of the Ministry of Agriculture, Fisheries and Food is: to foster the socioeconomic viability and sustainability of the agriculture, fish and food sector throughout British Columbia" (Ministry of Agriculture, Fisheries and Food, 1998:mission.htm).

Ministry of Attorney General

Community Justice Branch

"The Community Justice Branch serves the public by working to ensure that British Columbians have access to justice and consumer services and by increasing community involvement in crime prevention and alternative solutions to justice and consumer protection issues" (Ministry of Attorney General, 1997:1).

Coordinated Law Enforcement Unit

"The Coordinated Law Enforcement Unit (CLEU) combats organized and major crime in British Columbia" (Ministry of Attorney General, 1997:10).

Corrections Branch

"The Corrections Branch is responsible for the delivery of provincial institutional and community-based correctional programs. The branch operates 19 adult correctional centres, 10 custody centres for youth, and an electronic monitoring program for adults. The branch's 78 probation offices across the province provide community supervision and family court counselling services.

The corrections Branch accommodates and provides services for all adults and youth remanded in custody and awaiting trial, all women sentenced to imprisonment, all men sentenced to imprisonment for less than two years, and all young offenders sentenced to custody. The branch also:

- supervises accused persons on bail and diversion, and offenders sentenced to probation or release on parole by the B.C. Board of Parole
- administers victim reparation and community work service programs and provides counselling and mediation services to families who need help in resolving child custody and access issues
- provides reports to the court on offenders, victims and disposition options
- prepares child custody and access reports" (Ministry of Attorney General, 1997:12).

Criminal Justice Branch

"The Criminal Justice Branch prosecutes offenders under the Criminal Code of Canada, the *Young Offenders Act*, provincial statutes and certain municipal bylaws in the Provincial, Supreme and Appeals Courts of British Columbia and the Supreme Court of Canada" (Ministry of Attorney General, 1997:19).

"The branch also provides legal advice on criminal law to government ministries and the police, and develops policies and procedures on issues relating to the prosecution of criminal cases.

Throughout the prosecution process, the branch offers a service to victims of crime who suffer serious emotional or physical trauma by addressing their needs for information, court preparation and appropriate referral" (Ministry of Attorney General, 1997:19).

Land Title Branch

"The Land Title Branch provides for the registration of ownership of land based on the Torrens Land Title Registration System. This system ensures security of title and other interests of land such as mortgages, life estates, leases, rights of way, easements and liens registered against the land. In performing the duties described in the *Land Title Act* the branch fulfills a quasi-judicial function" (Ministry of Attorney General, 1997:24).

Legal Services Branch

"The Legal Services Branch is responsible for advising the B.C. government, its ministers and officials on all civil law matters" (Ministry of Attorney General, 1997:25).

Liquor Control and Licensing Branch

"The primary purpose of the Liquor Control and Licensing Branch is to maximize economic and social benefits to the community while minimizing the social cost associated with the public consumption of liquor.

The branch issues and transfers licences for the sale of liquor; licenses breweries, distilleries, wineries and their agents; approves and monitors product advertising; inspects licensed premises to ensure they comply with the law; maintains public relations with law enforcement and regulatory agencies; takes appropriate disciplinary action

against licensees for contravention of the *Liquor Control and Licensing Act and Regulations*; and performs a preventative and educational role" (Ministry of Attorney General, 1997:28).

Liquor Distribution Branch

"The Liquor Distribution Branch is responsible for distributing, wholesaling and retailing beverage alcohol products in British Columbia" (Ministry of Attorney General, 1997:31).

Management Services Branch

"The Management Services Branch assists and supports the ministry's Executive Committee and its managers in meeting their program objectives and in adhering to government and ministry-wide policies and directives" (Ministry of Attorney General, 1997:33).

Multiculturism and Immigration Department

"The department is responsible for taking the lead in all immigration matters on behalf of the province and for increasing public awareness of multiculturalism and cross-cultural understanding" (Ministry of Attorney General, 1997:37).

Policy and Communications Branch

"The Policy and Communications Branch provides policy, planning and communications support to the ministry as a whole, and ensures that the ministry's programs and services continue to respond to the changing needs and priorities of British Columbians" (Ministry of Attorney General, 1997:41).

Public Safety and Regulatory Branch

"The Public Safety and Regulatory Branch ensures that the province's public police forces, security agencies and related emergency preparedness agencies provide adequate and effective services. The branch also plans and coordinates provincial responses to major emergencies and disasters" (Ministry of Attorney General. 1997:46).

Ministry of Children and Families

"The first goal, *to promote the healthy development of children, youth and families*, and its associated outcome objectives and indicators, looks at the healthy development and functioning of children from infancy through adolescence. It addresses the capacity of families to care for their children and flags critical issues that affect the health and well-being of youth" (Ministry of Children and Families, 1997:3).

"The second goal, *to protect children and youth from abuse, neglect and harm,* focuses on what happens to children and youth when the family and society fail to provide

adequately for them. The indicators for this goal track the incidence of abuse, neglect, exploitation, injury and premature death" (Ministry of Children and Families, 1997:3).

"The third goal is *to support adults with developmental or multiple disabilities to live successfully and participate in the community*. This goal addresses the unique situation of adults with developmental or multiple disabilities who are receiving services from the ministry" (Ministry of Children and Families, 1997:3).

"The fourth goal, *to protect public safety*, explores the extent to which the safety and security of British Columbians is affected by youth involvement in criminal activity. This goal is specifically focused on youth 12 - 17 years as defined by the *Young Offender's Act*" (Ministry of Children and Families, 1997:3).

Ministry of Education

"The purpose of the British Columbia school system is to enable all learners to develop their individual potential and to acquire the knowledge, skills and attitudes needed to contribute to a healthy, democratic and pluralistic society and a prosperous and sustainable economy" (Ministry of Education, 1996:3).

Ministry of Employment and Investment

"The mandate of the Ministry of Employment and Investment is to assist in creating jobs throughout B.C. by:

- Assisting the public sector in its economic development responsibilities;
- Facilitating and coordinating strategic public sector capital investments;
- Promoting and fostering private sector capital and trade investments;
- Assisting in developing the science and technology and value-added sectors and building B.C.'s electronic highway; and,
- Encouraging the revitalization of traditional industries" (Ministry of Employment and Investment, 1996:11).

Ministry of Environment, Lands and Parks

"The vision of the Ministry of Environment, Lands and Parks is *an environment that is naturally diverse and healthy, and enriches people's lives*. This vision statement recognizes the intrinsic value of a naturally diverse and healthy environment, along with the benefits to society that can be derived from it" (Ministry of Environment, Lands and Parks, 1997:3).

"The ministry has three related goals that reflect the vision statement and are critical to achieving the ministry's vision. These goals can only be achieved through close coordination of ministry activities, and through partnerships with other ministries, other governments, ministry clients, First Nations and the public" (Ministry of Environment, Lands and Parks, 1997:3).

"**Natural Diversity:** protection, conservation and restoration of a full range of biological and physical diversity native to British Columbia" (Ministry of Environment, Lands and Parks, 1997:3).

"The province's unique diversity of plants and animals, and the ecological processes that support them, will be protected" (Ministry of Environment, Lands and Parks, 1997:3).

"**Healthy and Safe Land, Water and Air:** clean, healthy and safe land, water and air for all living things" (Ministry of Environment, Lands and Parks, 1997:3).

"This goal focuses on maintaining and restoring the quality of land, water and air, and on managing water resources to support the health of humans and all living things, now and for the future generations" (Ministry of Environment, Lands and Parks, 1997:3).

"Protection from environmental hazards - both human-induced and natural - is part of achieving a safer environment" (Ministry of Environment, Lands and Parks, 1997:3).

"**Sustainable Social, Economic and Recreational Benefits:** provision of social, economic and outdoor recreational opportunities within the province, consistent with maintaining a naturally diverse and healthy environment" (Ministry of Environment, Lands and Parks, 1997:4).

"This goal focuses on supporting human social and settlement needs, and on environmentally sensitive economic development" (Ministry of Environment, Lands and Parks, 1997:4).

Ministry of Forests

"The mandate of the Forest Service, as stated in section 4 of the *Ministry of Forests Act*, is to:

a) encourage maximum productivity of the forest and range resources in the Province,
b) manage, protect and conserve the forest and range resources of the Crown, having regard to the immediate and long term economic and social benefits they may confer on the Province,
c) plan the use of the forest and range resources of the Crown, so that the productivity of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the Crown and with the private sector,
d) encourage a vigorous, efficient and world-competitive timber processing industry in the Province, and,
e) assert the financial interest of the Crown in its forest and range resources in a systematic and equitable manner" (Ministry of Forests, 1996:18).

"In addition, the Forest Service is required under the preamble to the *Forest Practices Code of British Columbia Act* to manage the forest and range resource to ensure sustainable use, which includes:

a) managing forests to meet present needs without compromising the needs of future generations,
b) providing stewardship of forests based on an ethic of respect for the land,
c) balancing productive, spiritual, ecological and recreational values of forests to meet the economic and cultural needs of peoples and communities, including First Nations,
d) conserving biological diversity, soil, water, fish, wildlife, scenic diversity and other forest resources, and,
e) restoring damaged ecologies" (Ministry of Forests, 1996:18).

Ministry of Health and Ministry Responsible for Seniors

"The mission of British Columbia's health system is to promote and provide for the physical, mental, and social well-being of all British Columbians. To achieve this mission, we are working towards a truly responsive, comprehensive and integrated health system.

The Ministry of Health and Ministry Responsible for Seniors provides management and leadership of the health care system on behalf of the provincial government. Through a broad range of programs, services and public funding, the ministry is responsible for maintaining high quality, affordable health care for all British Columbians" (Ministry of Health and Ministry Responsible for Seniors, 1998:intro:html).

Ministry of Municipal Affairs and Housing

"The mission of the Ministry of Municipal Affairs and Housing is to work with the people of British Columbia to create and sustain the kinds of local and regional communities in which they wish to live -- communities that are strong, well planned and administered, safe, and that contain diverse and affordable housing choices" (Ministry of Municipal Affairs and Housing, 1998:05.html).

Mandate and Responsibilities:
Working in partnership with communities and other ministries, the Ministry of Municipal Affairs and Housing provides leadership, support and service in the following areas:

- developing and maintaining a legal framework for local government, housing and safety
- regional growth strategies
- local government structure
- overseeing municipal finances
- administering local government grant programs
- the public library system
- the property assessment appeal system
- housing policy, including program development
- overseeing social housing delivery and management

- shelter assistance for elderly renters
- home owner grant administration
- building safety and accessibility
- fire safety
- safety of provincial railways, aerial tramways, gas and electrical installations, boiler and pressure vessels, and elevators
- administration of the University Endowment Lands
- effective management of the ministry" (Ministry of Municipal Affairs and Housing, 1998:05.html).

Ministry of Small Business, Tourism and Culture

"The Ministry of Small Business, Tourism and Culture works with the people of British Columbia to support small business, tourism, culture, recreation, heritage, sport, film and the Royal British Columbia Museum to strengthen and diversify communities and regions throughout the province.

The Ministry has six strategic priorities:
- promoting job development and training initiatives;
- encouraging innovation, leadership and excellence;
- developing strategic alliances and partnerships with communities, organizations, industries, government and other agencies;
- fostering equity and fairness;
- preserving and enhancing British Columbians' quality of life; and,
- making government information, services and programs accessible" (Small Business, Tourism and Culture, 1996:2).

Ministry of Transportation and Highways

"The Ministry of Transportation and Highways' mandate is to provide and maintain safe and efficient movement of people and resources on a multi-modal provincial transportation network in a social and environmentally acceptable manner" (Ministry of Transportation and Highways, 1995:5).

APPENDIX D

Skill Level Criteria Used in the *National Occupational Classification (NOC)* Manual

The following table is an excerpt from the *National Occupational Classification* manual (Human Resources Development Canada, 1995ii).

	NOC SKILL LEVEL CRITERIA	
	EDUCATION/TRAINING	**OTHER**
SKILL LEVEL A	• University degree (bachelor's, master's or post-graduate)	
SKILL LEVEL B	• Two to three years of post-secondary education at community college, institute of technology or CEGEP *or* • Two to four years of apprenticeship training *or* • Three to four years of secondary school and more than two years of on-the-job training, training courses or specific work experience	• Occupations with supervisory responsibilities are assigned to skill level B. Occupations with significant health and safety responsibilities (e.g., fire fighters, police officers and registered nursing assistants are assigned to skill level B.
SKILL LEVEL C	• One to four years of secondary school education • Up to two years of on-the-job training, training courses or specific work experience	
SKILL LEVEL D	• Up to two years of secondary school and short work demonstration or on-the-job training	

APPENDIX E

Skill Type Categories Identified by the *National Occupational Classification (NOC)* Manual

The following text is an excerpt from the *National Occupational Classification* manual (Human Resources Development Canada, 1995:iii-iv).

0. Management Occupations

This skill type category contains legislators, senior management occupations and middle and other management occupations.

1. Business, Finance and Administration

This category contains occupations that are concerned with supervising and providing financial and business services, administrative and regulatory services and clerical support services. Some occupations in this category are unique to financial and business service industries; most are found in all industries.

Often, occupations at skill levels A and B are supplied from educational programs specific to the profession or occupation. Some occupations at skill level B are also supplied from experienced workers in related clerical occupations.

2. Natural and Applied Sciences and Related Occupations

This category contains professional and technical occupations in the sciences, including physical and life sciences, engineering and architecture.

Occupations in this skill type category require post-secondary education in an appropriate scientific discipline. Progression from occupations in skill level B to occupations in skill level A is not usually possible without completion of additional formal education.

3. Health Occupations

This category includes occupations concerned with providing health care services directly to patients and occupations that provide support to professional and technical staff.

Most occupations in this skill type category require post-secondary education in a related health care program. Progressions from occupations in skill level B to occupations in skill level A is not usually possible without completion of additional formal education. Occupations in skill level C require short training programs.

4. Occupations in Social Science, Education, Government Service and Religion

This skill type category includes a range of occupations that are concerned with law, teaching, counselling, conducting social science research, developing government policy and administering government and other programs.

Occupations in this skill type category usually require completion of a related post-secondary program. Progression from occupations in skill level B to occupations in skill level A is not usually possible without completion of additional formal education.

5. Occupations in Art, Culture, Recreation and Sport

This skill type category includes professional and technical occupations related to art and culture, including the performing arts, film and video, broadcasting, journalism, writing, creation design, libraries and museums. it also includes occupations in recreation and sport.

This category is characterized by occupations which are linked by subject matter to formal post-secondary education programs but which have, for the most part, a range of acceptable qualifications. Occupations in this category are also characterized by a requirement for creative talent, such as designers and performers, or for athletic ability. Unit groups which contain occupations for which university graduation in a professional discipline is usually required, such as journalism or library science, have been classified in skill level A. Most others have been classified in skill level B in recognition of the wide range of entry routes that are possible.

6. Sales and Service

This skill type category contains sales occupations, personal and protective service occupations and occupations related to the hospitality and tourism industries.

Occupations in skill level B of this category can be linked, for the most part, to formal post-secondary or apprenticeship training programs. Others are characterized by periods of formal on-the-job training other than apprenticeship. Progression from occupations in skill level C or D to those in skill level B usually requires completion of a related training program. Some progression through experience is possible for supervisory positions.

7. Trades, Transport and Equipment Operators and Related Occupations

This skill type category includes construction and mechanical trades, trades supervisors and contractors and operators of transportation and heavy equipment. These occupations are found in a wide range of industrial sectors, with many occuring in the construction and transportation industries.

This category includes most of the apprentice-able trades, including all of those related to the construction industry. Other occupations in this category usually require completion

of college or other programs combined with on-the-job training. Progression to supervisory or self-employed contractor status is possible. There is little mobility among occupations in this category due to specific apprenticeship, training and licensing requirements for most occupations.

8. Occupations Unique to Primary Industry

This category contains non-technical occupations in mining, oil and gas production, forestry and logging, agriculture, horticulture and fishing.

Most occupations in this category are industry-specific and do not occur outside of the primary industries. While some occupations in skill level B require completion of college or other training programs, most are characterized by on-the-job training and progression through experience.

9. Occupations Unique to Processing, Manufacturing and Utilities

This category contains supervisory and production occupations in manufacturing, processing and utilities.

Occupations in this category are characterized by internal progression and on-the-job training. Workers typically enter these occupations at an entry level (such as a labourer or helper) and progress to increasingly higher skilled occupations through experience. Mobility between employers or industries may be limited by seniority provisions of collective agreements. The occupations in skill level B of this category are increasingly technical in nature and post-secondary training links have been developed for some
.

APPENDIX F

Synonyms for the Dictionary of Occupational Titles (United States Department of Labor, 1965) Classification of Data, People, and Things

DATA

1	**Comparing**	Sorting	2	**Copying**	Retrieving	3	**Computing**	Reconciling
	Checking	Verifying		Disseminating	Storing		Balancing	Resetting
	Confirming			Distributing	Submitting		Calculating	Plotting
	Delivering			Documenting	Tabulating		Completing	Simplify
	Forwarding			Entering	Taking Minutes		Confirming	
	Judging			Logging	Transcribing		Correcting	
	Labeling			Posting	Transferring		Cross-Reference	
	Locating			Printing	Sending		Describing	
	Protecting			Recording	Storing		Drawing	
	Proofing			Registering	Uploading		Measuring	
	Scoring			Requisitioning			Reading	
4	**Compiling**	Classifying		Editing	Ordering		Receiving	Tracking
	Accessing	Closing Files		Filing	Organizing		Referencing	Upgrading
	Accomplishing	Collecting		Indexing	Performing		Requisitioning	Updating
	Acknowledging	Composing Correspond.		Keeping Records	Placing		Routing	Writing
	Acquiring	Consolidating		Listing	Preparing		Securing	
	Administering Tests	Directing		Maintaining	Processing		Searching	
	Assembling	Documenting		Monitoring	Producing		Setting	
	Assigning	Drafting Corresp.		Obtaining	Providing		Summarizing	
	Cataloguing	Gathering		Opening Files	Pulling Info.		Supplying	
5	**Analyzing**	Examining	6	**Coordinating**	Directing		Issuing	Selecting
	Appraising	Grading		Accounting for	Enforcing		Locating	Signing
	Assessing	Rectifying		Addressing Gaps	Establishing		Managing	
	Auditing	Reviewing		Administering	Executing		Organizing	
	Calculating	Revising		Allocating	Identifying		Paying	
	Checking	Testing		Arranging	Implementing		Prioritize	
	Conducting	Screening		Conducting	Imposing Standards		Processing	
	Drafting Issues	Studying		Controlling	Improving		Reallocating	
	Ensuring	Translating		Designing	Initiating		Resolving	
	Evaluating			Developing	Integrating		Responsible for Info.	
7	**Synthesizing**	Becoming Know.		Creating	Estimating		Modifying	Publishing Validating
	Anticipating	Complying		Deciding	Formulating		Planning	Recommending
	Applying Expert	Comprehending		Defining	Isolating		Predicting	Reports On
	Know/Exp.	Conceptualizing		Designing	Interpreting		Projecting	Researching
	Applying Models	Condemning		Determining	Investigating		Providing	Resolving
	Approving	Conducting Exp.		Developing	Judging		Know/Exper	Understanding

PEOPLE

1	**Serving**	2	**Speaking-Signaling**		Contributing		Processing Requests		Taking Messages
	Accompanying		Alerting		Enforcing		Providing Routine Info.		Welcoming
	Assisting		Answering		Exchanging Info.		Questioning People		
	Delivering		Arranging		Following Up		Receiving Telephone Calls		
	Escorting		Attending		Greeting		Releasing		
	Helping		Calling		Initiating Contact		Reminding		
	Involving with		Clarifying		Issuing Requests		Replying		
	Locating		Checking		Liaisoning		Reporting To		
	Protecting		Communicating		Maintaining Contact		Responding		
	Relieving		Contacting		Notifying		Supporting		
3	**Persuading**	4	**Diverting**	5	**Supervising**		Establishing Work Proced		Patrolling
	Apprehending		Direct Calls		Administering		Invigilating		Procuring
	Pursuing		Forwarding		Assigning		Managing Monitoring		Providing Jurisdiction
	Selling		Referring		Budgeting		Observing		Scheduling
	Suggesting		Relaying Calls		Arranging		Organizing		Verifying Others' Work
			Screening Calls		Ensuring		Overseeing		
6	**Instructing**		Examining	7	**Negotiating**	8	**Mentoring**		Providing Expertise
	Acquiring		Explaining		Chairing		Advising		Providing Feedback
	Acting as		Hiring Informing		Collaborating		Aiding		Responsible for Staff
	Allocating		Interviewing		Conferencing		Anticipating		Recommending
	Arranging		Orienting		Cooperating		Approving		Projecting
	Arresting		Planning		Determining		Authorizing		Proposing
	Assessing		Prioritizing		Discussing		Caring for		
	Commanding		Publicizing		Eliciting Support		Consulting		
	Connecting		Recruiting		Facilitating		Counselling		
	Convening		Removing		Inputting Info.		Developing		
	Coordinating		Selecting		Liquidating		Diagnosing		
	Correcting		Setting Terms		Maintaining relationships		Disciplining		
	Deciding		Specifying		Mediating		Guarding		
	Delegating		Stipulating		Participating		Guiding		
	Demonstrating		Terminating		Representing		Intervening		
	Developing Perfor.		Training		Resolving		Leading		
	Diagnosing		Tutoring		Presenting		Motivating		
	Directing		Walking Thru.		Settling		Promoting		
	Educating				Working With		Providing Alternatives		

THINGS

1	**Handling**	Pulling Docs	**2**	**Feeding-Offbearing**	**3**	**Tending**
	Canceling	Receiving		Faxing		Assessing
	Collecting	Recovering		Photocopying		Checking
	Date Stamping	Releasing				Guarding
	Dispersing	Renewing				Measuring
	Distributing	Retrieving				Monitoring
	Dusting	Seizing				Reconnoitering
	Filling	Sorting				Testing
	Issuing	Stocking				Visual Inspection
	Loading Light Equipment	Storing				
	Maintaining Shop	Sweeping				
	Mopping	Transferring				
	Picking Up	Using Hand Tools				
	Pouring	Voiding				
		Washing				
4	**Manipulating**	Preparing	**5**	**Driving-Operating**	**6**	**Operating-Controlling**
	Arranging	Pumping		Docking		Photographing
	Carrying Out Work	Typing		Loading Heavy Equipment		Starting
	Cleaning	Scraping		Maneuvering		Stopping
	Chipping	Searching		Patrolling		Utilizing
	Disinfecting	Securing		Steering		Weighing
	Maintaining Machinery	Servicing				
	Making	Splicing				
	Masking	Spreading				
	Mixing					
	Modifying					
	Painting					
7	**Precision Working**	Erecting	**8**	**Setting-Up**		Modifying
	Acquiring	Estimating		Adjusting		Organizing
	Adapting	Evaluating		Applying Correct Methods		Repairing
	Assembling	Examining		Configuring		Replacing
	Assessing	Identifying Problems		Formulating Solutions		Responsible for
	Constructing	Joining		Installing		Stripping down
	Cutting	Organizing		Laying Out		
	Diagnosing	Troubleshooting				
	Dismantling					

APPENDIX G

Table 4.35 Provincial Government Job Descriptions Used in Analysis 1

Classification Titles by Major Occupational Group, Gender Domination and Descriptive Work Titles

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
1	**Upper-Level**	Male	Management Level 6	Negotiator	Aboriginal Affairs
2	**Managers**	Male	Management Level 7	Chief Veterinarian	Agriculture, Fisheries and Food
3		Male	Management Level 8	Executive Director, Policy, Planning & Legislation	Education, Skills & Training
	Major Occupational Group	**Gender-Domination**	**Classification Title**	**Descriptive Work Title**	**Ministry**
4	**Middle or Other**	Neutral	Administration Officer 2	Area Manager Trainee, Road Maintenance	Transportation & Highways
5	**Managers**	Neutral	Administration Officer 3	Licencing Officer 3	Health
6		Neutral	Administration Officer 5	Translator, French Programs	Education, Skills & Training
7		Neutral	Administration Officer 6	Senior Planning Analyst	Small Business, Tourism & Culture
8		Neutral	Administration Officer 7	Manager, Property Services	Transportation & Highways
9		Male	Driver Examiner 1	Driver Examiner	Transportation & Highways
10		Male	Inspector - Boiler	Design Survey Engineer	Municipal Affairs & Housing
11		Male	Inspector - Elevator	Elevator Inspector	Municipal Affairs & Housing
12		Male	Inspector - Mechanical Motor Vehicle 5	Senior Area Vehicle Inspector	Transportation and Highways
13		Female	Management Level 1	Junior Personnel Officer	Attorney General
14		Neutral	Management Level 2	Deputy Government Agent	Small Business, Tourism & Culture
15		Neutral	Management Level 3	Coordinator, Granting Program	Small Business, Tourism & Culture
16		Neutral	Public Information Officer 1	Parks Information Coordinator	Environment, Lands & Parks
17		Female	Social Program Officer 6	Local Director - Large Office	Attorney General

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
18	**Professionals**	Male	Biologist 3	Aquaculture Production Biologist	Agriculture, Fisheries and Food
19		Female	Community Nurse 5	Senior Mental Health Nurse	Health
20		Female	Court Clerk	Registrar/Supervisor	Attorney General
21		Male	Deputy Sheriff 3	Unit Supervisor, Deputy Sheriffs	Attorney General
22		Male	Economist 2	First Nations Governance Economist	Aboriginal Affairs
23		Neutral	Education Officer 3	Education Officer	Education, Skills & Training
24		Male	Financial Officer 6	Financial Systems Administrator	Small Business, Tourism & Culture
25		Female	Librarian 4	Director	Attorney General
26		Male	Licenced Science Officer - (Forests)	Resource Officer - Range	Forests
27		Male	Licenced Science Officer 3 (Eng.)	Regional Project Manager	Transportation & Highways
28		Male	Licensed Science Officer 3 - (Geology)	Regional Hydrologist	Environment, Lands & Parks
29		Female	Nurse 4	Shift Coordinator, Patient Care	Health
30		Female	Occupational Therapist 2	Supervisor, Occupational Therapy	Health
31		Neutral	Pharmacist 2	Pharmacy Consultant	Health
32		Neutral	Psychologist 4 (Licenced)	Program Coordinator, Child & Youth	Health
33		Neutral	Research Officer 2	Health Information Research Officer	Health
34		Neutral	Social Program Officer 3	Working Level Probation Officer	Attorney General

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
35	**Semi-**	Neutral	Child Care Counsellor 2	Child Care Counsellor	Health
36	**Professionals**	Male	Photo Arts Technician 4	Senior Photo Arts Technician	Environment, Lands & Parks
37	**& Technicians**	Male	Science/Technical Officer 4	Geotechnical Operations Technician	Transportation & Highways
38		Neutral	Technical Assistant 3	Resource Assistant - Timber	Forests

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
39	**Supervisors**	Female	Clerk 5	Senior Processing Clerk	Environment, Lands & Parks
40		Neutral	Financial Officer 1	Revenue Officer	Small Business, Tourism & Culture

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
41	**Foremen/women**	Male	Foremen 1	Regional Hydroseeder Foreman	Transportation & Highways
42		Male	TS Electrician	Electrician	Transportation & Highways

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
43	**Clerical Workers**	Female	Clerk 3	Senior Clerk	Children & Families
44		Female	Clerk Stenographer 4	Office Manager	Health
45		Female	Executive Secretary (Supvr)	Executive Secretary	Transportation & Highways
46		Female	Judge's Secretary	Senior Executive Secretary	Attorney General
47		Female	Office Assistant 1	Document Processing/Forms Control Clerk	Transportation & Highways
48		Female	Operator - Data Processing 3	Security Administrator	Attorney General
49		Female	Senior Executive Secretary (Supvr)	Senior Executive Secretary	Transportation & Highways
50		Male	Stockworker 3	Stockman	Attorney General
51		Male	Technical Enforcement Officer 2	Shift Inspector, Commercial Transport	Transportation & Highways

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
52	**Service Workers**	Male	Principal Officer	Supervisor Admission/Discharge	Attorney General
53		Male	Senior Correctional Officer	Shift Supervisor	Attorney General
54		Male	Technical Enforcement Officer 5	Inspector, Permanent Weigh Station	Transportation & Highways

	Major Occupational Group	Gender-Domination	Classification Title	Descriptive Work Title	Ministry
55	**Skilled Crafts &**	Male	Marine Captain 2/3	Marine Captain	Transportation & Highways
56	**Trades Workers**	Male	Marine Engineer 2/3	Marine Engineer	Transportation & Highways
57		Male	Marine Mate 2/3	Marine Mate	Transportation & Highways
58		Male	TJ Electrician	Electrician	Transportation & Highways
	Major Occupational Group	**Gender-Domination**	**Classification Title**	**Descriptive Work Title**	**Ministry**
59	**Semi-Skilled**	Male	Deckhand	Deckhand	Transportation & Highways
60	**Manual Workers**	Male	Engineering Aide 2-3	Core/Sample Laboratory Assistant	Employment
61		Male	Machine Operator	Assistant Ferry Operator	Transportation & Highways
62		Male	Oiler	Oiler	Transportation & Highways
	Major Occupational Group	**Gender-Domination**	**Classification Title**	**Descriptive Work Title**	**Ministry**
63	**Other Manual Workers**	Male	Bridgeworker 2	Bridge Resurfacer 2	Transportation & Highways

APPENDIX H

Table 4.36 Provincial Government Job Descriptions and *NOC* Unit Group Description Used in Analysis 2

Provincial Government Job Descriptions by Major Occupational Group, Classification Title, Descriptive Work Title and Ministry

	Major Occupational Group	Classification Title	Descriptive Work Title	Ministry
1	**Upper-Level**	Management Level 6	Negotiator	Aboriginal Affairs
2	**Managers**	Management Level 7	Regional Operating Officer	Children & Families
3		Management Level 7	Chief Veterinarian	Agriculture, Fisheries and Food
4		Management Level 8	Executive Director, Policy, Planning & Legislation	Education, Skills & Training
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
5	**Middle or Other**	Administration Officer 1	Project Administrator	Education, Skill & Training
6	**Managers**	Administration Officer 1	Manager, Prorate Reciprocity & Fin. Responsibility	Transportation & Highways
7		Administration Officer 1	Financial Assistance Worker (FAW)	Children & Families
8		Administration Officer 1	Supervisor, Driver Examination Unit	Transportation & Highways
9		Administration Officer 2	Branch Administrator	Education, Skills & Training
10		Administration Officer 2	Manager - Pensioner Services	Health
11		Administration Officer 2	Area Manager Trainee, Road Maintenance	Transportation & Highways
12		Administration Officer 2	Manager, Crown Victim/Witness Services	Attorney General
13		Administration Officer 3	Regional Contracts Manager	Children & Families
14		Administration Officer 3	Regional Manager - Vital Statistics	Health
15		Administration Officer 3	Licencing Officer 3	Health
16		Administration Officer 4	Area Manager, Road and/or Bridge Maintenance	Transportation & Highways
17		Administration Officer 4	Field Operations Manager	Agriculture & Fisheries
18		Administration Officer 4	Planning Analyst	Small Business, Tourism & Culture
19		Administration Officer 4	Manager Administration	Attorney General
20		Administration Officer 5	Projects Officer	Small Business, Tourism & Culture

21	Administration Officer 5	Translator, French Programs	Education, Skills & Training
22	Administration Officer 5	Regional Manager- Estate Administration	Attorney General
23	Administration Officer 6	Manager, Communications Planning	Transportation & Highways
24	Administration Officer 6	Manager, Family Justice Programs	Attorney General
25	Administration Officer 6	Senior Planning Analyst	Small Business, Tourism & Culture
26	Administration Officer 7	Manager, Property Services	Transportation & Highways
27	Communications Officer 1	Assistant Communications Officer	Transportation & Highways
28	Driver Examiner 1	Driver Examiner	Transportation & Highways
29	Inspector - Boiler	Design Survey Engineer	Municipal Affairs & Housing
30	Inspector - Elevator	Elevator Inspector	Municipal Affairs & Housing
31	Inspector - Mechanical Motor Vehicle 4	Area Vehicle Inspector	Transportation & Highways
32	Inspector - Mechanical Motor Vehicle 5	Senior Area Vehicle Inspector	Transportation and Highways
33	Management Level 1	Junior Personnel Officer	Attorney General
34	Management Level 2	Regional Human Resource/Safety Officer	Transportation & Highways
35	Management Level 2	Manager, Administrative Services & Systems	Attorney General
36	Management Level 2	Deputy Government Agent	Small Business, Tourism & Culture
37	Management Level 3	Coordinator, Granting Program	Small Business, Tourism & Culture
38	Management Level 3	Operations Manager	Attorney General
39	Management Level 3	Classification Advisor	Environment, Lands & Parks
40	Management Level 4	Assistant Director	Municipal Affairs & Housing
41	Management Level 5	Area Manager	Children & Families
42	Public Information Officer 1	Parks Information Coordinator	Environment, Lands & Parks
43	Social Program Officer 5	District Supervisor	Children & Families
44	Social Program Officer 5	Coordinator, Elderly Services	Health
45	Social Program Officer 6	Local Director - Large Office	Attorney General

	Major Occupational Group	Classification Title	Descriptive Work Title	Ministry
46	**Professionals**	Biologist 3	Aquaculture Production Biologist	Agriculture, Fisheries and Food

47	Community Nurse 5	Senior Mental Health Nurse	Health
48	Court Clerk	Registrar/Supervisor	Attorney General
49	Deputy Sheriff 3	Unit Supervisor, Deputy Sheriffs	Attorney General
50	Economist 2	First Nations Governance Economist	Aboriginal Affairs
51	Education Officer 3	Career Projects Coordinator	Education, Skills & Training
52	Education Officer 3	Education Officer	Education, Skills & Training
53	Financial Officer 4	Supervisor, Reconciliations & Balancing	Transportation & Highways
54	Financial Officer 4	Financial System Officer	Attorney General
55	Financial Officer 4	Supervisor, Financial Operations	Small Business, Tourism & Culture
56	Financial Officer 6	Financial Systems Administrator	Small Business, Tourism & Culture
57	Librarian 1	Librarian	Transportation & Highways
58	Librarian 2	Judges Librarian	Attorney General
59	Librarian 3	Librarian	Transportation & Highways
60	Librarian 4	Director	Attorney General
61	Licenced Science Officer (Eng.)	Senior Geophysical Engineer	Transportation & Highways
62	Licenced Science Officer - Forests	Resource Officer - Range	Forests
63	Licenced Science Officer - Forests	Resource Officer- Timber	Forests
64	Licenced Science Officer 3 (Eng.)	Bridge Design Engineer	Transportation & Highways
65	Licenced Science Officer 3 (Eng.)	Regional Project Manager	Transportation & Highways
66	Licenced Science Officer 4 (Eng.)	Bridge Seismic Rehab. Consultant Liaison Engineer	Transportation & Highways
67	Licensed Science Officer 3 - Geology	Regional Hydrologist	Environment, Lands & Parks
68	Nurse 4	Shift Coordinator, Patient Care	Health
69	Occupational Therapist 2	Supervisor, Occupational Therapy	Health
70	Pharmacist 2	Pharmacy Consultant	Health
71	Psychologist 2 (Licenced)	Clinical Psychologist	Health
72	Psychologist 4 (Licenced)	Program Coordinator, Child & Youth	Health
73	Research Officer 2	Program Analyst	Health

74		Research Officer 2	Health Information Research Officer	Health
75		Research Officer 3	Research Manager	Attorney General
76		Research Officer 3	Senior Coordinator, Inventory Program	Small Business, Tourism & Culture
77		Social Program Officer 3	Working Level Probation Officer	Attorney General
78		Social Program Officer 4	Senior Practitioner	Attorney General
79		Social Program Officer 4	Residential Care Worker	Health
80		Systems Analyst 1	Supervisor, Data Control Unit	Attorney General
81		Systems Analyst 1	Help Desk & Office Automation Analyst	Attorney General
82		Systems Analyst 1	Security Analyst	Transportation & Highways
83		Systems Analyst 2	Business Analyst	Small Business, Tourism & Culture
84		Systems Analyst 2	Program Support Analyst	Attorney General
85		Systems Analyst 6	Corporate Data Manager	Attorney General

	Major Occupational Group	Classification Title	Descriptive Work Title	Ministry
86	**Semi-Professionals**	Activity Worker 3	Coordinator, Maximum Security Programs	Health
87	**& Technicians**	Child Care Counsellor 2	Child Care Counsellor	Health
88		Lab Health Science Officer 1	Audiometric Technician	Health
89		Photo Arts Technician 4	Senior Photo Arts Technician	Environment, Lands & Parks
90		Science/Technical Officer 3	District Development Technician	Transportation & Highways
91		Science/Technical Officer 3	Research Technician	Forests
92		Science/Technical Officer 4	Geotechnical Operations Technician	Transportation & Highways
93		Science/Technical Officer 5	Materials Engineering Technician	Transportation & Highways
94		Science/Technical Officer 6	Regional Project Manager	Transportation & Highways
95		Technical Assistant 3	Resource Assistant - Timber	Forests

	Major Occupational Group	Classification Title	Descriptive Work Title	Ministry
96	**Supervisors**	Clerk 5	Office Manager	Agriculture, Fisheries and Food
97		Clerk 5	Office Manager	Health

98		Clerk 5	Senior Processing Clerk	Environment, Lands & Parks
99		Financial Officer 1	Revenue Officer	Small Business, Tourism & Culture
100		Financial Officer 1	Health Unit Financial Officer	Health
101		Financial Officer 2	Coordinator, Finance & Administration	Municipal Affairs & Housing
102		Financial Officer 2	Regional Financial Officer	Transportation & Highways
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
103	**Foremen/women**	Foremen 1	Regional Hydroseeder Foreman	Transportation & Highways
104		Foremen 3	Bridge Resurfacing Foreman	Transportation & Highways
105		TS Electrician	Electrician	Transportation & Highways
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
106	**Clerical Workers**	Clerk 3	Senior Clerk	Children & Families
107		Clerk 3	Contract Administration Clerk	Transportation & Highways
108		Clerk 3	Client Service Representative	Transportation & Highways
109		Clerk 3	Human Resource Assistant	Transportation & Highways
110		Clerk 4	Regional Property Clerk	Transportation & Highways
111		Clerk 4	Office Manager	Health
112		Clerk Stenographer 3	Regional Manager's Secretary	Transportation & Highways
113		Clerk Stenographer 4	Secretary to the Regional Director	Transportation & Highways
114		Clerk Stenographer 4	Office Manager	Health
115		Executive Secretary (Non-Supvr)	Executive Secretary	Transportation & Highways
116		Executive Secretary (Supvr)	Executive Secretary	Transportation & Highways
117		Judge's Secretary	Senior Executive Secretary	Attorney General
118		Office Assistant	Document Processing/Forms Control Clerk	Transportation & Highways
119		Office Assistant 2	Office Assistant	Children & Families
120		Operator - Data Processing 3	Security Administrator	Attorney General
121		Operator - Data Processing 2	Data Clerk	Attorney General

122		Senior Executive Secretary (Non-Supvr)	Senior Executive Secretary	Transportation & Highways
123		Senior Executive Secretary (Supvr)	Senior Executive Secretary	Transportation & Highways
124		Stockworker 3	Stockman	Attorney General
125		Stockworker 3	Stores Person	Attorney General
126		Technical Enforcement Officer 2	Shift Inspector, Commercial Transport	Transportation & Highways
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
127	**Service Workers**	Principal Officer	Supervisor Admission/Discharge	Attorney General
128		Senior Correctional Officer	Shift Supervisor	Attorney General
129		Technical Enforcement Officer 4	Inspector, Com. Transport - Stand Alone Station	Transportation & Highways
130		Technical Enforcement Officer 5	Inspector, Permanent Weigh Station	Transportation & Highways
131		Technical Enforcement Officer 6	Supervising Inspector, Major Weigh Scale	Transportation & Highways
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
132	**Skilled Crafts &**	Marine Captain 2/3	Marine Captain	Transportation & Highways
133	**Trades Workers**	Marine Engineer 2/3	Marine Engineer	Transportation & Highways
134		Marine Mate 2/3	Marine Mate	Transportation & Highways
135		TJ Electrician	Electrician	Transportation & Highways
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
136	**Semi-Skilled**	Deckhand	Deckhand	Transportation & Highways
137	**Manual Workers**	Engineering Aide 2-3	Core/Sample Laboratory Assistant	Employment
138		Machine Operator	Assistant Ferry Operator	Transportation & Highways
139		Oiler	Oiler	Transportation & Highways
	Major Occupational Group	**Classification Title**	**Descriptive Work Title**	**Ministry**
140	**Other Manual**	Bridgeworker 2	Bridge Resurfacer 2	Transportation & Highways
141	**Workers**	Bridgeworker 3	Bridge Resurfacer 3	Transportation & Highways

APPENDIX I

Table 4.37 *NOC* Unit Group Descriptions by Major *NOC* Occupational Group and *NOC* Unit Group Description Titles Used in Analysis 2

	NOC Major Occupational Group	NOC Unit Group Description Title
1	Senior Management Occupations	Senior Government Managers and Officials
	NOC Major Occupational Group	**NOC Unit Group Description Title**
2	Middle and Other Management Occupations	Financial Managers
3		Other Administrative Services Managers
4		Architecture and Science Managers
5		Information Systems and Data Processing Managers
6		Managers in Health Care
7		Managers in Social, Community and Correctional Services
8		Government Managers in Health and Social Policy Development and Program Administration
9		Government Managers in Economic Analysis, Policy Development and Program Administration
10		Library, Archive, Museum and Art Gallery Managers
11		Sales, Marketing and Advertising Managers
12		Construction Managers
	NOC Major Occupational Group	**NOC Unit Group Description Title**
13	Professional Occupations in Business and Finance	Financial Auditors and Accountants
14		Specialists in Human Resources
	NOC Major Occupational Group	**NOC Unit Group Description Title**
15	Skilled Administrative and Business Occupations	Supervisors, General Office and Administrative Support
16		Supervisors, Finance and Insurance Clerks
17		Administrative Officers
18		Personnel and Recruitment Officers
19		Property Administrators
20		Court Officers and Justices of the Peace
21		Immigration, Unemployment Insurance and Revenue Officers
22		Secretaries (except Legal and Medical)
23		Legal Secretaries
	NOC Major Occupational Group	**NOC Unit Group Description Title**
24	Clerical Occupations	General Office Clerks
25		Data Entry Clerks
26		Banking, Insurance and Other Financial Clerks
27		Administrative Clerks
28		Personnel Clerks
29		Customer Service, Information and Related Clerks

30		Storekeepers and Parts Clerks
	NOC Major Occupational Group	**NOC Unit Group Description Title**
31	Professional Occupations in Natural and Applied Sciences	Geologists, Geochemists and Geophysicists
32		Biologists and Related Scientists
33		Civil Engineers
34		Mechanical Engineers
35		Geological Engineers
36		Other Professional Engineers, n.e.c.
37		Urban and Land Use Planners
38		Computer System Analysts
	NOC Major Occupational Group	**NOC Unit Group Description Title**
39	Technical Occupations Related to Natural and Applied Sciences	Geological and Mineral Technologists and Technicians
40		Biological Technologists and Technicians
41		Forestry Technologists and Technicians
42		Civil Engineering Technologists and Technicians
43		Industrial Engineering and Manufacturing Technologists and Technicians
44		Engineering Inspectors and Regulatory Officers
45		Inspectors in Public and Environment Health and Occupational Health and Safety
46		Deck Officers, Water Transport
	NOC Major Occupational Group	**NOC Unit Group Description Title**
47	Professional Occupations in Health	General Practitioners and Family Physicians
48		Veterinarians
49		Pharmacists
50		Head Nurses and Supervisors
51		Registered Nurses
	NOC Major Occupational Group	**NOC Unit Group Description Title**
52	Technical and Skilled Occupations in Health	Other Technical Occupations in Therapy and Assessment
	NOC Major Occupational Group	**NOC Unit Group Description Title**
53	Professional Occupations in Social Science, Education, Government Services and Religion	Post-Secondary Teaching and Research Assistants
54		Psychologists
55		Family, Marriage and Other Related Counsellors
56		Probation and Parole Officers and Related Occupations
57		Economists and Economic Policy Researchers and Analysts
58		Economic Development Officers and Marketing Researchers and Consultants
59		Social Policy Researchers, Consultants and Program Officers
60		Health Policy Researchers, Consultants and Program Officers
61		Education Policy Researchers, Consultants and Program Officers
62		Recreation and Sports Program Supervisors and Consultants

	NOC Major Occupational Group	NOC Unit Group Description Title
63	Paraprofessional Occupations in Law, Social	Community and Social Service Workers
64	Science, Education and Religion	Other Instructors
	NOC Major Occupational Group	**NOC Unit Group Description Title**
65	Professional Occupations in Art and Culture	Librarians
66		Professional Occupations in Public Relations and Communications
67		Translators, Terminologists and Interpreters
	NOC Major Occupational Group	**NOC Unit Group Description Title**
68	Skilled Sales and Service Occupations	Insurance Agents and Brokers
	NOC Major Occupational Group	**NOC Unit Group Description Title**
69	Intermediate Sales and Service Occupations	Sheriffs and Bailiffs
70		Correctional Service Officers
71		By-law Enforcement and Other Regulatory Officers, n.e.c.
	NOC Major Occupational Group	**NOC Unit Group Description Title**
72	Elemental Sales and Service Occupations	Security Guards and Related Occupations
73		Light Duty Cleaners
	NOC Major Occupational Group	**NOC Unit Group Description Title**
74	Trades and Skilled Transport and Equipment	Contractors and Supervisors, Electrical Trades and Telecommunications Occupations
75	Operators	Contractors and Supervisors, Metal Forming, Shaping and Erecting Occupations
76		Contractors and Supervisors, Heavy Construction Equipment Crews
77		Industrial Engineers
	NOC Major Occupational Group	**NOC Unit Group Description Title**
78	Intermediate Occupations in Transport, Equipment,	Deck Crew, Water Transport
79	Operation, Installation and Maintenance	Engine Room Crew, Water Transport
	NOC Major Occupational Group	**NOC Unit Group Description Title**
80	Trades Helpers, Construction Labourers and Related Occupation	Construction Trades Helpers and Labourers
	NOC Major Occupational Group	**NOC Unit Group Description Title**
81	Processing and Manufacturing Machine Operators and Assemblers	Photographic and Film Processors

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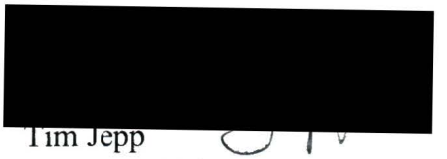
Author 

Tim Jepp

August 5, 1998