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Neo-Marxist class position and socioeconomic status: Distinct or complementary determinants of health?

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Abstract
Although the relationship between socioeconomic status and health has received careful attention from health researchers over the past half-century, the means by which income, education and occupational prestige are accumulated in society have received relatively short shrift in the health literature. This article explores the degree to which neo-Marxist conceptualizations of class position are 'upstream' determinants of health and well-being. Utilizing data from a survey sample of randomly selected and full-time employed residents of 25 communities in the Canadian province of British Columbia, it evaluates the usefulness of class position distinctions derived from the work of Erik Olin Wright as predictors of physical and mental health before and after controlling for socioeconomic status.

Keywords: *Social class, class position, socioeconomic status, physical health, mental health, self-rated health*

Introduction

> There is in our view entirely convincing evidence, consistent across a multiplicity of social domains, that there must (continue to) exist real relations of class based on the ownership and/or control of the means of production .... Taking class seriously requires moving beyond the present ubiquitous (neo-) positivist tendency to take socioeconomic status (SES), that is, 'inequality in income, prestige or education measured gradationally,' as a proxy for class. (Scambler & Higgs, 2001, p. 158)

A robust relationship between socioeconomic status and health has been shown to hold in most or all Western nations (Adler et al., 1994; Macintyre, 1997). Explanations for 'the gradient' are many and varied, encompassing material, behavioural and psychosocial factors, and existent empirical evidence serves to buttress competing explanations (Lynch, Davey Smith, Kaplan, & House, 2000; Wilkinson, 2000). The terms 'socioeconomic status' and 'social class' are often used interchangeably in the social determinants of

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health literature, however, further confusing the issue. The former usually refers to one or a combination of income, educational attainment and occupational prestige, continuously graded measures that serve to stratify individuals, whereas the latter, in the orthodox Marxian tradition at least, represents a social group with a certain degree of ownership of and/or control over the means of production in the labour market and economy. (Thus class position, an individual-level marker, indicates the social class to which an individual belongs, while class relations refer to the group-level dynamics between social classes.)

Clearly, socioeconomic status and social class should be clearly differentiated from one another in health research, both conceptually and empirically, as they may manifest complex distinct and interrelated associations with health. For instance, to the degree that class relations privilege some groups in the market and then reward the members of these groups and their families with better incomes, greater opportunities for educational attainment and/or jobs with higher prestige, socioeconomic status probably intervenes between class relations/position and health. To the extent that class relations influence the health of the members of some class groupings by pathways other than the accumulation of socioeconomic status, class relations/position and socioeconomic status are distinct determinants of health. To date, the degree to which social class, class position and socioeconomic status are distinct and complementary determinants of health is not well understood, especially in North America.

The goal of this article, in response to the call made by Scambler and Higgs, is to take class seriously, i.e. to focus, if only indirectly, on the processes that enable privileged groups to accrue the rewards that may then influence health. Utilizing quantitative data from an original survey sample of full-time-employed residents of 25 communities in the province of British Columbia, Canada, it explores the extent to which class position is a determinant of health 'upstream' of socioeconomic status. First, it describes a multifaceted scheme for identifying class positions and then explores zero-order (bivariate) relationships between this deductively derived class position scheme and various measures of physical and mental health. Second, it inductively assesses zero-order relationships between a wide range of potentially relevant class distinctions and health. Third, utilizing multivariate regression modelling, it considers the role of socioeconomic status as a factor mediating relationships between such class distinctions and health. The article concludes by discussing the utility of class for explaining health inequalities in Canada.

Explication of inequalities in health by virtue of both class position and socioeconomic status has the potential to inform the SES health literature in at least three ways. First, most SES health explanations accept without question the fact that wealth, for example, is distributed unequally within the populace, concerning themselves primarily with elucidating the routes by which higher or lower incomes positively or negatively affect health and well-being. The processes by which income, education or prestige are accumulated and distributed in our societies, potentially via class relations, have received short shrift in this health literature. This may be because of the complexities inherent in describing the many social and economic forces that distribute valued commodities, or may reflect a belief that the invisible hand of the market distributes rewards in a mostly meritorious fashion, making such explanations irrelevant. By seeking to explain the accumulation of wealth and educational credentials by virtue of class position and by noting that class relations are based on the exercise of power and exploitation, this article does not assume that the distribution of monetary and other rewards is based entirely on merit.

The second contribution pertains to the level of analysis best able to explicate the intricacies of the gradient. Much of the empirical research on socioeconomic status and health is located primarily at the level of the individual, exploring the means by which income or educational credentials, resources held by individuals, influence health. To the degree that group relations at the social structural level—such as class relations—produce *both* income *and* health inequalities, however, the individual-level relationship may be artefactual rather than truly causal. On the other hand, to the extent that personal resources such as educational credentials facilitate access to certain occupational settings and then entry into certain social classes, the individual-level relationship may be of fundamental causal importance. Most probably, relationships at the individual and structural levels are interrelated, with ultimate determinants of health inequalities to be found in both realms and in their interaction; to date, simultaneous attention to multiple levels of analysis is missing from most of the research into the relationship between socioeconomic status and health. As with most health research of this kind, the statistical analysis presented in this article is located exclusively at one level, the level of the individual. (Multilevel analysis requires an n of at least 25 at the second and higher level. Most class schemes identify no more than three or four primary classes, making the multilevel modelling techniques available in software packages such as HLM and MLWIN mostly irrelevant for class analysis.) Still, although class position is an individual-level measure and social classes themselves are specified outside individuals, Clement and Myles (1994) argue that individual reports of social relationships within the workplace serve to locate them within class relations and to specify the nature of those relationships. It seems reasonable to assume that individual-level relationships between class position and health can illuminate the nature of class dynamics and their health effects for class members. As such the analysis presented in this article is located conceptually at the levels of the individual *and* the social class.

Third, social class and health research is underrepresented in the United States and Canada, a shortage that is especially problematic considering the volume of work conducted on the nature of class relations (*sans* consideration of health) in North America. In health research, 'social class' measures based solely on educational attainment have been the norm in the United States, perhaps because this measure is available in most nationally representative data sets (Krieger & Fee, 1994; Davey Smith et al., 1998). Only a few North American studies have assessed the health effects of explicitly Marxian class distinctions. Thus occupational exposures, estimated to account for 4% of cancers, were found to be concentrated among manual workers in one study (Boffetta, Kogevinas, Westerholm, & Saracci, 1997), a survey of employees in four firms in southern California found that the amounts of routinization and control in the workplace correlated with greater and lesser stress, respectively, which was in turn related to health (Schwalbe & Staples, 1986), and two national surveys were used to assess the relevance of financial and physical assets and organizational control for the prevalence of psychiatric disorders (Muntaner, Eaton, Diala, Kessler, & Sorlie, 1998). These analyses, conceptually rooted in characteristics of jobs in workplaces, suggest that a manual/non-manual distinction and degree of control in the workplace are health-relevant phenomena in the United States. My review of the Canadian health literature produced no references to studies that incorporate neo-Marxist conceptualizations of class position. Given that the Canadian welfare state is more limited than those established elsewhere (in Northern Europe, for example, Esping-Anderson, 1990), the paucity of class and health research in Canada represents an important gap in the health literature. In order to contribute to this literature, this article presents an analysis of class

position and health relationships based in a specific Canadian context, coastal British Columbia, that may possess operative class dynamics. Classical theories of class, formulated in industrial times, originally pertained to ownership over and control of the physical means of production in *factories*; many of the coastal communities of the province of British Columbia, dependent on work conducted in factories, mines and mills and reliant on economic industries such as fishing, forestry and mining, retain a firm foothold in the industrial era.

Conceptualizing class position

The class position distinctions explored empirically in this study are drawn from Marx, Weber and especially Erik Olin Wright. According to Marx, classes are groups who differ in the roles they play in the productive system of economy (see Marx & Engels, 1970/1848, 1976/1846). Surplus wealth is expropriated by the capitalist at the expense of the worker in a division of labour that separates the owners and overseers from labourers. In this system, workers suffer alienation from their labour because they lack control over their created products and work thereby loses its rewarding character. Important differences exist, therefore, between those who have property and those who do not (with property referring to personal possessions as well as resources to generate wealth and to produce things of value), although for Marx the actual distribution of wealth is less important than are relations between these two primary groups. These classes are the capitalist class, called the bourgeoisie, and the working class, called the proletariat. The third class described by Marx, the petty (i.e. petite, small) bourgeoisie, defined by productive property mixed with or owned by family labour, is located between these two classes. The Weberian approach to class relations represents a subtle refinement of the Marxian perspective. For Weber, property and the lack of it are still basic categories of class situations, but can be further differentiated by the kind of property (within owners) and the kind of services (within workers), the latter distinguishing the property-less with marketable training and skills from those with basically labour skills only (Weber, 1968/1922). The distribution of valued objects among these classes again differs, according to Weber, but the bases upon which this unequal distribution depends include the political and ideological realms as well as the economic realm, in contrast with the orthodox Marxist approach that privileges economy.

More recently, theoretical schemes produced by the American class scholar Wright have proved fruitful in empirical research in the United States (Grabb, 1997). Wright, like Marx, argues that there are two main classes distinguished by degree of control of economic production, but that these exist only in abstract or ideal-typical form; the actual class structure is more complex than this and is non-linear in form, according to Wright. In his first of several influential class schemas,[1] he focuses specifically on three forms of control over economic production to delineate classes (Wright, 1978, 1979). The important forms of control, according to Wright, are real economic ownership, entailing control over economic surplus; command of the physical apparatus of production, entailing supervisory control over machines, factories, etc.; and command of labour power, entailing supervisory control over other workers. The bourgeoisie in Wright's scheme have all three forms of control, the proletariat have none and the petty bourgeoisie have some of the first and second forms of control but no supervisory control over workers. These represent three distinct class positions. Elaborating further, between the bourgeoisie and proletariat are top managers with minor supervisors and foremen below them (with varying degrees of control over the physical apparatus of production

and workers but no economic ownership), between the bourgeoisie and petty bourgeoisie are the medium to small capitalists (possessing varying degrees of supervisory control), and between the petty bourgeoisie and proletariat are located the semi-autonomous wage-earners with some control over economic surplus and the physical apparatus of production but no supervisory control. These are 'contradictory' class positions located between clearly defined positions. Like Weber, Wright argues that 'production' can refer to political and ideological creations as well as economic ones.

This article applies an operationalization of Wright's class position scheme to a sample of full-time employed adults from the coastal communities of British Columbia, Canada. His scheme is based in a long Marxist tradition, encompasses many of the dimensions of social class identified by Marx and Weber, has been used effectively in other North American settings (e.g. Baer, Grabb, & Johnston, 1987, 1990; Zipp & Plutzer, 1996) and has been found to be related to health in at least one other international context (Wohlfarth, 1997). With this background, it would seem that insight into the class positions of survey respondents could be obtained with information on (i) real economic ownership, (ii) kind of property within owners, (iii) degree of supervision over the physical apparatus of production and (iv) degree of supervision of labour power (of others and of self), following Wright, and (v) kind of services within workers, e.g. with or without marketable training, skills and/or credentials, following Weber (and Wright's later class formulation). It is unclear whether distinctions along these lines identify classes that are cohesive social groups or simply aggregates of individuals, however, although Wright's typology certainly suggests that the contradictory positions are least likely to constitute real social classes. Although the survey data set utilized in this article does not include survey items assessing command over the physical apparatus of production, it does contain information on the other possible dimensions of class position described here and on multiple dimensions of health, thereby enabling the first Canadian application of a multifaceted neo-Marxist class position framework to the explication of health inequalities.

Methods

The *Toward a Healthy British Columbia* research project was funded to explore social and economic determinants of the health of people living in coastal communities.[2] In the summer of 2002, a selection of households from each community ($n = 3000$) was drawn from the most current telephone listings using a systematic random sampling technique, and a survey questionnaire was administered by post in a five-stage process. To select a household member randomly, the person who received the initial letter was asked to give the questionnaire to the person in the household, aged 18 and over, whose birthday was first in the year. Based on 1435 completed questionnaires, and acknowledging in the calculation of the denominator that some questionnaires did not reach the intended target, some persons were deceased at the time of survey administration and some questionnaires remained unclaimed at post offices, the overall response rate to the survey was 56.5%. While not exceptional, this is a fairly good result for mailed surveys of the general public.[3] The analysis included in this article focuses exclusively on the 655 respondents aged 18–64 who claimed to be full-time employed or self-employed at the time of the survey.

Frequency distributions for many of the variables utilized in this article, including educational attainment and income, are contained in Table I.

Table I. Sociodemographic characteristics of the sample.

Survey item or variable	Response categories	Distribution
In what year were you born?	Mean (n, SD)	1957.46 (655, 9.43)
What is your gender?	Female (n, %)	273 (41.7)
	Male	382 (58.3)
Please indicate the highest level of education completed by you, by your mother and by your father	Some elementary school (n, % for self)	1 (0.2)
	Elementary school	6 (0.9)
	Some high school	39 (6.0)
	High school	113 (17.5)
	Some community college	66 (10.2)
	Community college	61 (9.4)
	Some technical school	48 (7.4)
	Technical school	104 (16.1)
	Some university	64 (9.9)
	Bachelor's degree at university	91 (14.1)
	Master's degree	22 (3.4)
	Professional degree: Law, Medicine, Dentistry, etc.	29 (4.5)
	Doctorate	2 (0.3)
What is your best estimate of your personal income from all sources during the last 12 months (including home savings, investments, pensions, rent and unemployment insurance as well as wages)?	Less than $20,000 ($n$, %)	43 (6.9)
	Between $20,000 and $29,999	73 (11.7)
	Between $30,000 and $39,999	120 (19.3)
	Between $40,000 and $49,999	98 (15.7)
	Between $50,000 and $59,999	109 (17.5)
	Between $60,000 and $69,999	53 (8.5)
	Between $70,000 and $79,999	50 (8.0)
	Between $80,000 and $89,999	32 (5.1)
	Between $90,000 and $99,999	6 (1.0)
	More than $100,000	39 (6.3)
In the past 12 months, did you have any injuries that were serious enough to limit your normal activities?	Yes (n, %)	152 (23.5)
Do you have any long-term illness, health problem or handicap which limits daily activities or the work that can be done?	Yes (n, %)	88 (13.6)
Calculated item: body-mass index	Underweight, BMI <20 (n, %)	25 (3.9)
	Normal weight, $20 \leq$ BMI ≤ 25	252 (39.2)
	Moderate overweight, $25 <$ BMI ≤ 30	254 (39.5)
	Obese, BMI >30	112 (17.4)
Calculated item: recent depressive symptoms scale	Mean (n, SD)	2.01 (649, 0.57)
In general, how would you rate your health?	Excellent (n, %)	124 (19.3)
	Very good	264 (41.0)
	Good	213 (33.1)
	Fair	39 (6.1)
	Poor	4 (0.6)
Calculated item: class position scheme	Large employer (n, %)	35 (5.5)
	Small employer	37 (5.9)
	Petty bourgeoisie	45 (7.1)
	Manager	136 (21.5)
	Decision-maker	77 (12.2)
	Supervisor	51 (8.1)
	Semi-autonomous worker	96 (15.2)
	Worker	155 (24.5)

To date, social class and health research has focused more attention on (risk of) mortality than on morbidity (Borooah, 1999), even though it has been suggested that health differences between classes may be more clearly illustrated by health and illness *experiences* than by life expectancy (Blaxter, 1989). To measure morbidity in this study, respondents were asked (i) whether they had a recent injury that limits normal activities and (ii) whether they had any long-term illness, health problem or handicap that limits daily activities or the work that can be done. The latter is a measure which, in addition to its face validity, has been found to predict the use of health services (Dale & Marsh, 1993). (iii) Body-mass index (BMI) scores were also calculated from respondents' heights and weights.

To measure mental health, perhaps an even better indicator of class-relevant health and illness experiences, a series of eleven questions were asked pertaining to recent depressive symptoms[4] that were then summed to create (iv) a mental well-being scale (alpha = 0.8760 in the full survey sample). Finally, to assess overall subjectively evaluated health, (v) a standard self-rated health status question asked respondents to rate their overall health in general. Self-rated health is a reliable predictor of other, more objective, measures of health (Idler & Benyamini, 1997), has been shown to vary across social classes in a number of studies (e.g. Power, Matthews, & Manor, 1996, Power, Hertzman, Matthews, & Manor, 1997), and has been found to be predictive of mortality across socioeconomic subgroups (Burstrom & Fredlund, 2001).

To assess class position, the employers in the sample were distinguished from the employees. One hundred and fifteen respondents claimed to be full-time self-employed[5] and seven claimed to be part-owners of the companies at which they worked,[6] together designated employers. Three employer classes were then created from this group based on the number of full- or part-time employees in each respondent's business,[7] with four or more employees representing *large employers*, one to three employees representing *small employers* and no employees representing the *petty bourgeoisie*. These categories represent the bourgeoisie, petty bourgeoisie and their intervening contradictory positions in Wright's model.

An adapted version of the decision tree scheme used by Wohlfarth (1997) was used to assess the class position of employees. Control over the physical apparatus of production was not assessed in the questionnaire, and so the scheme utilized (i) control over budgets, (ii) authority over other workers and (iii) control over the nature of one's own work to identify five different employee classes. The first two types of control distinguished four classes: managers, who have both types; supervisors, who control the labour power of others but do not participate in decisions; decision-makers, who participate in decisions but do not control labour power; and a final group with neither type of control. Lastly, control over one's own work distinguished, within this final group, those who have autonomy, labelled semi-autonomous employees, from those who do not have a large amount of control over their own work, simply named workers (and representing the proletariat in Wright's model). To operationalize this scheme, it was determined whether or not respondents have control over the budget, in their own opinion.[8] If they replied yes, and if they also have authority over other employees,[9] they were designated *managers*; if they have budgetary control but do not have authority over other employees they were designated *decision-makers*. If they do not have control over the budget but do have authority over other employees they were designated *supervisors*. If they do not have control over the budget and are without authority over other employees it was then determined how much autonomy they have over their own work.[10] If no one else decides how they do their work they were designated *semi-autonomous employees*, otherwise they

were designated *workers*. In total, 632 of the 655 respondents received a class position score utilizing this scheme (see Table I).

Finally, a series of additional survey items assessed related and other aspects of occupations in order to facilitate an inductive exploration of elements of jobs related to health and well-being in this survey sample. In addition to the items utilized above in the class position scheme, survey items assessing influence over salaries and wages,[11] responsibility for hiring[12] and firing[13] other employees, personal autonomy at work,[14] skills[15] and credentials,[16] and degree of (dangerous) manual labour at work[17] were also presented to respondents.

Results

Zero-order relationships between class position scheme and health

Table II displays zero-order relationships between the class position scheme and health. Larger employers and workers had the highest incidence of injuries, managers and small employers had the highest incidence of illnesses, semi-autonomous workers were most likely to be underweight, workers, managers and decision-makers were most likely to be obese, and large employers, mid-sized employers and workers were the most likely to display depressive symptoms.

Thus the workers, the lowest position in this class position scheme, were somewhat more likely than survey respondents in other class categories to manifest poor health outcomes, consistent with expectations. Among the three employer classes, however, large employers manifested more injuries and depression and reported poorer self-rated health than did the petty bourgeoisie and, considered as a whole, the employer classes did not report markedly better health than the employee classes, contrary to expectations. None of the relationships displayed in Table II was statistically significant, however, indicating that this deductively derived class position scheme was in fact a poor predictor of health in this context.

Zero-order relationships between class distinctions and health

This section describes zero-order relationships between various class distinctions and the health variables. Only statistically significant results are reported. However, because a large number of statistical tests of significance and association were conducted (five health variables and 18 class position variables equals 90 tests in total), several significant relationships can be expected, simply by chance. Accordingly, the statistical results presented in this and the subsequent section should be treated as exploratory rather than confirmatory in nature.

Economic ownership. A variable distinguishing owners/employers from employees was not significantly related to health. Among employers, however, number of full-time employees was positively related to the incidence of depressive symptoms ($\text{tau\_b} = 0.149, p = 0.033, n = 114$), suggesting that the petty bourgeoisie in the sample tended to have *better* mental health scores than the small- and large-scale bourgeoisie. This result could reflect the negative health effects of an 'executive stress' associated with owning and managing a large business.

Table II. Relationships between class position and health.

	Injuries		Illnesses		Body-mass index			
Class position	No	Yes	No	Yes	Underweight	Normal	Overweight	Obese
Large employer	25 (71.4%)	10 (28.6%)	30 (85.7%)	5 (14.3%)	1 (2.9%)	12 (34.3%)	19 (54.3%)	3 (8.6%)
Small employer	26 (72.2)	10 (27.8)	30 (83.3)	6 (16.7)	2 (5.6)	16 (44.4)	13 (36.1)	5 (13.9)
Petty bourgeoisie	37 (84.1)	7 (15.9)	38 (86.4)	6 (13.6)	1 (2.3)	15 (34.1)	22 (50.0)	6 (13.6)
Manager	106 (78.5)	29 (21.5)	113 (83.1)	23 (16.9)	4 (3.0)	58 (43.0)	47 (34.8)	26 (19.3)
Decision-maker	64 (83.1)	13 (16.9)	68 (88.3)	9 (11.7)	3 (3.9)	27 (35.5)	32 (42.1)	14 (18.4)
Supervisor	40 (80.0)	10 (20.0)	45 (90.0)	5 (10.0)	2 (4.0)	20 (40.0)	21 (42.0)	7 (14.0)
Semi-autonomous worker	70 (73.7)	25 (26.3)	83 (88.3)	11 (11.7)	6 (6.4)	39 (41.5)	36 (38.3)	13 (13.8)
Worker	109 (71.2)	44 (28.8)	132 (87.4)	19 (12.6)	6 (4.0)	57 (38.0)	55 (36.7)	32 (21.3)
Measure of association	Cramer's V = 0.110, $p = 0.377$[1]		Cramer's V = 0.067, $p = 0.903$			Cramer's V = 0.085, $p = 0.890$		

	Mental health	Self-rated health				
		Excellent	Very good	Good	Fair	Poor
Large employer	2.15 (32)	6 (17.6%)	15 (44.1%)	10 (29.4%)	3 (8.8%)	0 (0%)
Small employer	2.05 (37)	11 (30.6)	11 (30.6)	13 (36.1)	1 (2.8)	0 (0)
Petty bourgeoisie	1.92 (45)	10 (22.7)	18 (40.9)	15 (34.1)	1 (2.3)	0 (0)
Manager	2.02 (135)	29 (21.8)	50 (37.6)	46 (34.6)	6 (4.5)	2 (1.5)
Decision-maker	2.00 (77)	17 (22.4)	33 (43.4)	22 (28.9)	3 (3.9)	1 (1.3)
Supervisor	1.88 (51)	10 (20.0)	19 (38.0)	14 (28.0)	6 (12.0)	1 (2.0)
Semi-autonomous worker	1.96 (96)	16 (17.0)	40 (42.6)	32 (34.0)	6 (6.4)	0 (0)
Worker	2.06 (153)	21 (13.6)	65 (42.2)	56 (36.4)	12 (7.8)	0 (0)
Measure of association	*Eta* = 0.112, $p = 0.342$[2]			Cramer's V = 0.109, $p = 0.392$[3]		

[1]Cramer's V assessed association, the chi-squared statistic assessed statistical significance.
[2]Self-rated health was dichotomized for this chi-squared test: excellent, very good and good versus fair and poor.
[3]*Eta* assessed association, the one-way ANOVA assessed statistical significance.

Control over budgets. Neither of the budgetary control variables—influence over the salaries or wages of others and control over budget decisions—was significantly related to health.

Supervisory control over other workers. None of the supervisory control variables—influence over promotions, responsibility for hiring new employees and responsibility for firing employees—was significantly related to health.

Personal autonomy. Freedom to do one's job was significantly associated with self-rated health (tau_b $= 0.113, p = 0.001, n = 630$) and the incidence of depressive symptoms (tau_b $= 0.073, p = 0.019, n = 632$). Similarly, freedom from the conflicting demands of others was related to self-rated health (tau_b $= 0.067, p = 0.049, n = 628$) and the incidence of depressive symptoms (tau_b $= 0.126, p < 0.001, n = 631$). Lastly, decision-making control over one's own work was significantly related to the incidence of depressive symptoms ($eta = 0.085, p = 0.040, n = 582$) and the presence of injuries (Cramer's V $= 0.087, p = 0.035, n = 582$). In all cases more autonomy in the workplace corresponded with better health outcomes. Thus control over one's own time and energies at work was a better predictor of well-being than was control over other employees and control over budgets.

Skills and credentials. Working at a job that requires specific credentials corresponded with lower BMI scores ($eta = 0.117, p = 0.005, n = 580$) and better self-rated health ($eta = 0.100, p = 0.016, n = 584$). Working at a job that requires learning new things was associated with better self-rated health (tau_b $= 0.082, p = 0.023, n = 631$), as was working at a job that requires a high level of skill (tau_b $= 0.102, p = 0.004, n = 631$). These relationships were in the expected directions. Conversely, working at a job that requires creativity was associated with a *higher* likelihood of reporting a limiting illness ($eta = 0.107, p = 0.007, n = 632$). Taken together, these results suggest that skilled and credentialed occupations generally foster higher levels of well-being.

Manual labour. Degree of physical effort at work was associated with injuries ($eta = 0.134, p = 0.001, n = 635$), whereas working at a 'dangerous' job was associated with depressive symptoms (tau_b $= -0.088, p = 0.003, n = 636$) and the presence of injuries ($eta = 0.171, p < .001, n = 635$). In all instances, more physical effort at work corresponded with poorer health outcomes.

Multivariate predictors of health

Some of the zero-order associations presented in the preceding section may be spuriously related, to the degree that age or gender, for example, influences the nature of people's jobs and their health status. Tables III–VII describe multivariate models for the dependent health variables and the most relevant class distinction variables before and after controlling for age and gender (Models I and II respectively in each table). Each table also contains a model that additionally controls for educational attainment and personal income in order to determine whether the class distinction variables retain statistically significant relationships with the health variable after controlling for socioeconomic status, and vice versa (Model III in each table). The reader should note in particular the change in the coefficients for the class distinction variables from model to model in a given table.

Table III. Binary logistic regressions on risk for injuries.

	Model I			Model II			Model III		
	B	Exp(B)	SIG	*B*	Exp(B)	SIG	*B*	Exp(*B*)	SIG
Constant	−1.710			−1.183			−1.746		
Physical effort[1] (yes)	0.644	1.904	0.001	0.592	1.807	0.004	0.594	1.811	0.006
Someone else decides[2] (yes)	0.419	1.521	0.036	0.393	1.482	0.051	0.443	1.557	0.033
Gender (male)	–	–	–	0.252	1.287	0.229	0.275	1.317	0.239
Age	–	–	–	−0.015	0.986	0.170	−0.010	0.990	0.387
Educational attainment[3]	–	–	–	–	–	–	0.053	1.055	0.389
Personal income[4]	–	–	–	–	–	–	−0.011	0.989	0.834
n	580			580			548		
Model chi-square (sig.)	14.87 (0.001)			17.89 (0.001)			16.30 (0.012)		
% correctly classified	76.6			76.6			76.3		
Nagelkerke *R*-squared	0.038			0.046			0.044		

[1]My job requires a lot of physical effort. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[2]Does someone else decide how you will do your work?
[3]Highest educational attainment in 13 ordered categories.
[4]Personal income in 10 ordered categories.

Table IV. Binary logistic regressions on presence of long-term limiting illness.

	Model I			Model II			Model III		
	B	Exp(*B*)	SIG	*B*	Exp(B)	SIG	*B*	Exp(*B*)	SIG
Constant	−2.398			−3.780			−3.420		
Creativity at work[1] (yes)	0.749	2.114	0.009	0.673	1.960	0.020	0.662	1.939	0.025
Gender (male)	–	–	–	0.012	1.012	0.959	−0.057	0.945	0.832
Age	–	–	–	0.031	1.032	0.018	0.030	1.030	0.031
Educational attainment[2]	–	–	–	–	–	–	−0.033	0.967	0.633
Personal income[3]	–	–	–	–	–	–	0.003	1.003	0.964
n	632			632			594		
Model chi-square (sig.)	7.68 (0.006)			13.51 (0.004)			12.08 (0.034)		
% correctly classified	86.4			86.4			86.4		
Nagelkerke *R*-squared	0.022			0.039			0.037		

[1]My job requires creativity. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[2]Highest educational attainment in 13 ordered categories.
[3]Personal income in 10 ordered categories.

Injuries. Physical effort at work and a lack of control over one's own efforts in the workplace were both associated with the presence of injuries before and after controlling for age, gender and socioeconomic status (Models I, II and III, Table III). Conversely, socioeconomic status was not associated with the presence of injuries after controlling for these other variables (Model III).

Illnesses. The expression of creativity at work was associated with a *higher* likelihood of reporting an illness before and after controlling for age, gender and socioeconomic status (Models I, II and III, Table IV). Socioeconomic status, by contrast, was not associated with the presence of a limiting illness after controls (Model III).

Table V. Binary logistic regressions on risk for obesity.

	Model I			Model II			Model III		
	B	Exp(*B*)	SIG	*B*	Exp(B)	SIG	*B*	Exp(*B*)	SIG
Constant	−1.170			−2.688			−1.725		
Credentials required[1] (yes)	−0.517	0.596	0.026	−0.549	0.577	0.019	−0.492	0.612	0.055
Gender (male)	–	–	–	0.320	1.377	0.161	0.255	1.291	0.322
Age	–	–	–	0.030	1.030	0.013	0.023	0.1024	0.066
Educational attainment[2]	–	–	–	–	–	–	−0.122	0.885	0.079
Personal income[3]	–	–	–	–	–	–	0.027	1.027	0.629
n	581			581			549		
Model chi-square (sig.)	4.77 (0.029)			13.74 (0.003)			15.02 (0.010)		
% correctly classified	82.3			82.3			82.9		
Nagelkerke *R*-squared	0.013			0.038			0.045		

[1]Does your job require specific credentials of any kind?
[2]Highest educational attainment in 13 ordered categories.
[3]Personal income in 10 ordered categories.

Table VI. Multiple linear regressions on mental health scale[1].

	Model I			Model II			Model III		
	B	beta	SIG	*B*	beta	SIG	*B*	beta	SIG
Constant	1.178			1.193			1.199		
Owner with employees[2] (yes)	0.024	0.082	0.050	0.025	0.086	0.042	0.024	0.080	0.064
No conflicting demands[3] (yes)	−0.033	−0.187	<0.001	−0.032	−0.183	<0.001	−0.035	−0.198	<0.001
Someone else decides[4] (yes)	0.013	0.080	0.057	0.013	0.078	0.066	0.015	0.091	0.034
Dangerous job[5] (yes)	0.020	0.109	0.008	0.021	0.116	0.008	0.026	0.138	0.002
Gender (male)	–	–	–	−0.005	−0.027	0.536	0.001	0.006	0.902
Age	–	–	–	<0.001	−0.033	0.425	<0.001	−0.020	0.650
University degree[6] (yes)	–	–	–	—	–	–	0.013	0.064	0.160
Personal income[7]	–	–	–	–	–	–	−0.004	−0.106	0.030
n	575			575			543		
F statistic (sig.)	8.60 (<0.001)			5.92 (<0.001)			5.50 (<0.001)		
R-squared	0.057			0.059			0.076		
Adjusted *R*-squared	0.050			0.049			0.062		

[1]Fourth root (to normalize the dependent variable).
[2]Calculated variable: small- and large-scale bourgeoisie versus petty bourgeoisie and all employees.
[3]I am generally free from the conflicting demands of others. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree
[4]Does someone else decide how you will do your work?
[5]My job is quite dangerous and I could get hurt. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[6]A dichotomous version of educational attainment was used in these models.
[7]Personal income in 10 ordered categories.

Table VII. Binary logistic regressions on self-rated health[1].

	Model I			Model II			Model III		
	B	Exp(*B*)	SIG	*B*	Exp(*B*)	SIG	*B*	Exp(*B*)	SIG
Constant	−1.536			−2.062			−1.063		
Freedom to do job[2] (yes)	0.003	1.003	0.995	−0.009	0.991	0.983	−0.095	0.909	0.834
Job requires skill[3] (yes)	0.505	1.658	0.369	0.508	1.662	0.369	0.362	1.436	0.544
No conflicting demands[4] (yes)	−0.443	0.642	0.261	−0.470	0.625	0.236	−0.418	0.659	0.332
Credentials required[5] (yes)	−0.508	0.601	0.179	−0.507	0.602	0.182	−0.243	0.784	0.567
Learn new things[6] (yes)	−1.198	0.302	0.022	−1.224	0.294	0.020	−1.160	0.314	0.036
Gender (male)	–	–	–	0.037	1.037	0.916	0.036	1.036	0.929
Age	–	–	–	0.012	1.012	0.507	−0.009	0.991	0.671
Educational attainment[7]	–	–	–	–	–	–	−0.117	0.889	0.280
Personal income[8]	–	–	–	–	–	–	0.127	1.136	0.132
n	571			571			538		
Model chi-square (sig.)	8.14 (0.149)			8.61 (0.282)			9.36 (0.405)		
% correctly classified	93.3			93.3			93.7		
Nagelkerke *R*-squared	0.037			0.039			0.046		

[1]Risk of good/fair/poor health (versus excellent/very good health).
[2]My job allows me freedom to decide how I do my job. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[3]My job requires a high level of skill. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[4]I am generally free from the conflicting demands of others. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[5]Does your job require specific credentials of any kind?
[6]My job requires that I learn new things. Yes = agree and strongly agree, no = neutral, disagree and strongly disagree.
[7]Highest educational attainment in 13 ordered categories.
[8]Personal income in 10 ordered categories.

Body-mass index. Working at a job that requires credentials was associated with a lower risk for obesity before and after controlling for age and gender (Models I and II, Table V), a relationship that weakened a little upon controlling for socioeconomic status (Model III). Socioeconomic status was not significantly associated with obesity after controls (Model III).

Depressive symptoms. A greater number of depressive symptoms was associated with conflicting demands from others at work, working at a dangerous job and little control over one's own work after controlling for all of age, gender and socioeconomic status (Model III, Table VI). In addition, owning a business with employees was associated with more depressive symptoms after controlling for age and gender (Model II). Regarding socioeconomic status, higher incomes (but not educational credentials) were significantly associated with fewer depressive symptoms after controls (Model III).

Self-rated health. Working at a job that requires learning new things was associated with better self-rated health scores before and after controlling for age, gender and socioeconomic status (Models I, II and III, Table VII). Socioeconomic status was not significantly related to self-rated health after controls (Model III).

In summary:

(1) The deductively derived class position scheme, distinguishing large- and small-scale owners from the petty bourgeoisie, managers, decision-makers, supervisors, semi-autonomous employees and workers and based in the tradition of Marx, Weber and Wright, was not significantly associated with health.
(2) With regard to specific class distinctions, the presence of injuries was significantly associated with more physical effort at work and also with a lack of decision-making control over one's own work.
(3) The presence of long-term limiting illnesses was associated with *more* creativity at work.
(4) Obesity was negatively associated with working at jobs that require credentials.
(5) The incidence of depressive symptoms was associated with the presence of employees (for owners), freedom from the conflicting demands of others in the workplace, little decision-making control over one's own work and working at a dangerous job.
(6) Better self-rated health scores were associated with working at jobs that require learning new things.
(7) After controlling for age, gender and a variety of class position distinctions, socioeconomic status, assessed by income and educational attainment, was significantly associated with only the amount of recent depressive symptoms (of five different measures of physical and mental health).

Discussion

The limitations of the analysis should be noted. First, it is based on self-reports of control in the workplace rather than on objective assessments of control, potentially problematic given that some people tend to overestimate control in surveys (Schwalbe & Staples, 1986). Second, the sample size is small, making it difficult to discern weak but real relationships. Third, as in most surveys of the general public, the classes at the extremes are undoubtedly poorly represented in the sample. On the one hand, the true capitalist class is probably vastly underrepresented—four employees does not constitute a substantial business enterprise. The so-called underclass, generally located in urban spaces and difficult to include in a questionnaire survey that samples on the basis of household addresses from telephone listings, is also certainly underrepresented. This latter 'class', marginalized and with members who are often homeless, will undoubtedly suffer from poorer health in comparison with the other classes. In short, any health study like this one, based on individual reports from a survey of the general public, will probably produce a sample inadequate for comprehensive and compelling social class research. Fourth, the study is based in only one province and so cannot be generalized to Canada. It would be interesting to compare the results from this study with a similar study conducted in more or less industrialized parts of the same country, or within another, newly industrializing, nation. As it stands, results from this study that are at odds with results from similar research in other nations (such as the UK, see below) cannot be necessarily attributed to differences in national socioeconomic infrastructures, since differences in results may simply stem from peculiarities inherent in a non-representative sample from a unique economic context. Lastly, the study is cross-sectional, making all interpretations pertaining to causality at best speculative and making comparisons

with the British Columbia of earlier decades, when class relations may have been more or less important for health, impossible. The strengths of the study are: (i) it applies a neo-Marxist conceptualization of class position *and* socioeconomic status to health inequalities in Canada, unique to health research in that country, (ii) it applies a wide range of different class position distinctions to health inequalities, including attention to various kinds of controls in the workplace, and (iii) it explores determinants of a variety of different measures of health and well-being, thereby encompassing a broader range of health and illness experiences than can be found in most other survey-based class and health studies.

The deductively derived class position scheme based on economic ownership, control over organization assets, supervisory control and personal autonomy did little to explicate health inequalities. The inductive analysis, by contrast, showcased relationships between certain class position distinctions, e.g. personal autonomy at work, manual labour and the requirement for credentials, and various measures of health, i.e. injuries, obesity, depressive symptoms and self-rated health. These relationships persisted even after controlling for socioeconomic status, suggesting that these class distinctions and socioeconomic status are distinct determinants of health. But an important level of analysis question remains: are these attributes of occupations indications of (a) the class position of individuals in group-level class relations that affect the life circumstances of class members outside the workplace and then health and well-being, or (b) direct determinants of the health of individuals within the workplace? There is certainly evidence in the literature noting that occupational factors such as control over one's own work, physical working conditions (Marmot, 1996; Stansfield, Bosma, Heminway, & Marmot, 1998) and precarious employment (Quinlan, Mayhew, & Bohle, 2001) directly affect health, as might self-efficacy (AbuSabha & Achterberg, 1997) and locus of control (Wallston & Wallston, 1978) more generally. In the context of the individual-level and cross-sectional analysis presented in this article it is impossible to answer this important question pertaining to ultimate causes, but it seems plausible that these phenomena are direct determinants of well-being rather than indicators of health-relevant class relations since most of the relationships make sense at face value. Manual work can lead to physical injury. Psychological state of mind at work, influenced by control over one's own efforts and positive relationships with co-workers, can influence subjectively evaluated self-rated health status and levels of depression. These class position distinctions *appear* to be characteristics of workplaces that influence health directly rather than indicators of placement in class dynamics that influence the health of entire classes. That is, most of the findings described in this article fail to clearly identify class relations that influence health. (The requirement for credentials, on the other hand, is an attribute of some occupations that *might* provide some indication of relations between class dynamics and health inequalities.)

Although research into class differences in health that transcend socioeconomic differentials is rare in North America, this kind of work has a long and storied past in the United Kingdom. The Registrar-General's social class classification (RGSC) surfaced in Britain as early as 1921 to measure general standing in the community and in 1981 emerged in different form to measure level of occupational skill. The latter version of the RGSC, a hierarchy of five classes, has regularly shown a pattern of increasing mortality and morbidity, with the worst health measures found in Class V, the unskilled manual category (Bartley, Carpenter, Dunnell, & Fitzpatrick, 1996;

Hattersley, 1997; Borooah, 1999). The classes of the RGSC are arrayed in linear order, however, suggesting that the scheme assesses stratification more than it identifies classes with internal homogeneity and clear group boundaries. Thus Prandy (1999) compared the RGSC with the Cambridge Scale of social stratification and found that, in relation to mortality ratios, the classes of the RGSC were more continuous in nature than they were well delineated from one another. Bartley et al. (1996) compared the RGSC to a non-linear class scheme (E–G) attributable to Robert Erikson and John Goldthorpe, the latter a scheme that differentiates between employers and employees, manual and non-manual work, agricultural versus non-agricultural occupational settings, and service versus labourer employment contracts. With reference to male mortality, they found that both classifications predicted mortality differentials, but that the E–G scale performed a little better than the R–G scale. Their findings support further explication of health inequalities focused on class *and* status rather than investigations focused exclusively on (socioeconomic) status.

The National Statistics Socio-Economic Classification (NS-SEC), based on the E–G conceptualization, is a relatively new class scheme applied to the population of the UK. The NS-SEC assigns people to classes based on their occupational title and responsibilities over the workforce, distinguishing between large-scale employers, small-scale employers, the self-employed with no employees, managers and professionals, intermediate occupations, employees in the working class and the unemployed. So far the scheme has proved useful for explaining health inequalities in the UK (e.g. Fitzpatrick & Dollamore, 1999). One study utilizing a large data set of adult men and women found class differences in physical and mental health before and after controlling for age that did not hold after controlling for lifestyle, housing and neighbourhood conditions (Chandola & Jenkinson, 2000), suggesting that the class–health relationship operates in part via physical, material phenomena located *outside* the workplace. These findings and their interpretation are contested, however (by Rose & Pevalin, 2000).

But the success of the E–G and NS-SEC class position schemes for explicating health inequalities in the United Kingdom was not replicated by this study, utilizing a neo-Marxist scheme applied to survey respondents in British Columbia, Canada. Does class even matter in Canada? Scambler and Higgs (2001), responding to charges that the form of Western capitalism has changed from an organized version to a disorganized one, argue that '(increasingly transnational) class relations appear to have grown rather than diminished in salience relative to the ''command'' relations of states during the course of disorganized capitalism', but that class relations may increasingly 'obtain without recognition' (p. 158). Class analysis bounded to one sub-national context such as this one may not address fundamental relations playing out globally. Taken further, some theorists even doubt whether class is at all compatible with 'recent economic and social changes such as the internationalization of capital, the decline in manual work, the shift to a service economy, the higher employment of women, and the reconceptualization of the citizen as a consumer rather than producer' (Annandale, 1998, p. 96). They argue that the disorganized nature of capitalism has led to a proliferation of occupations that are not readily contained within power struggles between owners and employees, implying that the rewards, both material and sociocultural, that accrue to occupations are perhaps the most important and relevant determinants of health, but that the means by which they are accrued are not readily identifiable. These are weighty issues deserving of serious attention. Currently, however, the nature of class relations in Canada and their health effects remain mostly undiscovered.

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Notes

1. Grabb (1997) argues that the second class scheme described in Wright (1985), based on the notion of 'exploitation' rather than on 'domination', is less consistent with classical Marxist thought, creates as many or more class categories than the first formulation and is somewhat less amenable to empirical exploration.
2. The 25 communities are Campbell River, Comox, Courtenay, Duncan, Gibsons, Gold River, Kitimat, Ladysmith, Masset, Nanaimo, Parksville, Port Alberni, Port Alice, Port Hardy, Port McNeill, Powell River, Prince Rupert, Qualicum Beach, Sechelt, Squamish, Tahsis, Tofino, Ucluelet, Vancouver and Victoria. See Veenstra (2005) for more information on the project and these communities.
3. Babbie and Benaquisto (2002) consider a response rate of 50% to be 'adequate' and 60% to be 'good' for mailed surveys.
4. During the past seven days, how often did you feel: downhearted and blue? really happy? quite nervous? calm and peaceful? worthless? restless and fidgety? hopeless? depressed? that everything you did was an effort? that people disliked you? that your sleep was restless? [none of the time, almost never, some of the time, most of the time, all of the time?]
5. What is your current occupational status? (Please check all that apply) [employed full time; employed part time; self-employed full time; self-employed part time; unemployed currently, looking for job; unemployed currently, not looking for job; full-time student; part-time student; homemaker; retired]
6. Do you own more than 20% of the company? [yes, no]
7. How many employees do you have? How many full-time employees do you have?
8. Do you influence budget decisions in your workplace? [yes, no]
9. Can you influence the promotion of others in your workplace? [yes, no]
10. Does someone else decide how you will do your work? [yes, no]
11. Can you influence how much others get paid? [yes, no]
12. Are you sometimes responsible for hiring new people? [yes, no]
13. Do you have responsibility for firing other workers? [yes, no]
14. My job allows me freedom to decide how I do my job. I am generally free from the conflicting demands of others. [strongly agree, agree, neutral, disagree, strongly disagree]
15. My job requires that I learn new things. My job requires a high level of skill. My job requires abstract knowledge about the ideas behind my work. My job requires creativity. My job produces highly complex problems which require a high level of abstract theory to solve. [strongly agree, agree, neutral, disagree, strongly disagree]
16. Does your job require specific credentials of any kind? [yes, no]
17. My job requires a lot of physical effort. My job is quite dangerous and I could get hurt. [strongly agree, agree, neutral, disagree, strongly disagree]

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