

Post-secondary students' views on health: Support for individual and social health determinants

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This paper examines how post-secondary students understand health, and whether opinions about health are correlated with area of study. We present results from an online survey administered in 2011 to 287 students at one post-secondary institution in Western Canada. Overall, the survey students are more likely to adopt an individualistic, rather than a social, view of health determinants. Several demographic variables, including sex and political affiliation are associated with adopting a more individualistic view of health. However, students in the Health Sciences are significantly more likely to support the social determinants of health perspective. These results suggest that medical and health science educators at this post-secondary institution may be heeding the century-old call to address social structural causes of health inequalities in their curricula.

Cet article examine les perspectives d'étudiants postsecondaires sur la santé et la mesure dans laquelle celles-ci correspondent à leur domaine d'études. Nous présentons les résultats d'une enquête en ligne administrée en 2011 à 287 étudiants d'une institution postsecondaire dans l'Ouest canadien. Globalement, les étudiants ayant participé à l'enquête sont plus portés à adopter une vision individualiste, plutôt que sociale, des déterminants de la santé. Il existe un lien entre plusieurs autres variables démographiques, y compris le sexe et l'affiliation politique, et l'adoption d'une perspective plus individualiste de la santé. Toutefois, les étudiants en sciences de la santé sont beaucoup plus enclins à appuyer une vision de la santé qui tient compte des déterminants sociaux de la santé. Ces résultats portent à croire que les professeurs des sciences médicales et de la santé à cette institution postsecondaire répondent à l'appel centenaire de traiter des causes sociales et structurelles des inégalités en matière de santé dans leurs cours.

In his 1910 report, *Medical Education in the United States and Canada*, Abraham Flexner highlighted the need for physicians to understand complex interactions between the physical and social environment and health (Flexner, 1910). Flexner argued that physicians were responsible for promoting well-being, not only through an understanding of disease causation and spread, but also by promoting those social conditions which were conducive to physical health. At the time, Flexner felt that medical education was profoundly lacking, and stressed that prevention and public health should be part of the medical curriculum (Busing, Slade, Rosenfield, Gold, & Maskill, 2010).

One hundred years later, reflecting on the legacy of Flexner's work, a report produced by the Association of Faculties of Medicine of Canada stressed that comprehensive undergraduate medical education must include "the integration of prevention and public health competencies" (Busing et al., 2010, p. 342). Strong support remains throughout the medical education literature for the inclusion of an understanding of the social determinants of health (SDOH) in medical education curricula (Maeshiro et al., 2010).

The SDOH perspective promotes the view that the conditions in which individuals are "born, grow, live, work and age" are of key significance in addressing health and health inequalities (World Health Organization, 2008). This perspective, in contrast to a focus on individual determinants of health (such as individual health behaviours), additionally implicates the unequal access to power, money, and resources at the global, national, and local level in creating and perpetuating differential health outcomes (World Health Organization, 2008). It has long been recognized in the field of public health that social-structural factors (more than individual factors) strongly mediate health outcomes in Canada, and indeed, internationally (Bolaria & Bolaria, 2009; Mikkonen & Raphael, 2010; Raphael, 2006).

While many public health practitioners and academics in health-related fields support and promote the SDOH perspective in their work, these ideas do not resonate with many (perhaps even most) laypeople who tend to cite individual-level determinants (such as health and help-seeking behaviours) as the causes of health outcomes (MacIntyre, McKay, & Ellaway, 2006). This study examines whether the SDOH perspective resonates with university students at one institution in Western Canada, and further explores which students are most likely to support the SDOH. We are particularly interested in whether students studying in health-related fields are more aware of the SDOH perspective than other students.

Background

Evidence that differential access to power, money, and resources is linked to health disparities can be observed readily in Canada. For instance, Mikkonen and Raphael (2010) assert that income is the social determinant of health of highest importance, as it strongly determines the quality of other health determinants for Canadians, such as food, shelter, and other basic health resources. Socioeconomic status (which includes education, income, and occupation) must be viewed as a *fundamental cause* of health outcomes and disparities, as it determines the "broad range of resources that persons . . . have at their disposal" (Willson, 2009, p.107). Practically, this is exemplified by the social gradient in health, whereby richer and more educated individuals are shown to have better health, net of individual-level determinants (McIntosh, Finès, Wilkins, & Wolfson, 2009; Mikkonen & Raphael, 2010).

The SDOH perspective is well established within academic literature and strongly supported nationally by several Canadian public health groups (Canada Parliament Senate Subcommittee on Population Health, 2009; Public Health Agency of Canada, 2008) and internationally by the World Health Organization (World Health Organization, 2008). However, despite attention within the public health field, uptake of the SDOH perspective within government health policy and the mainstream media remains largely absent (Raphael, 2009). For instance, one study found that environmental determinants and personal health behaviours respectively account for 32% and 30% of media health coverage by 2003 Canadian print media (Canadian Institute for Health Information [CIHI], 2005). Moreover, only about 6% of health-related articles written in Canadian newspapers report on the SDOH (Hayes et al., 2007). Thus, the belief that personal

health choices are the strongest determinants of health is a view perpetuated by media and mainstream health science research (Niederdeppe, Bu, Borah, Kindig, & Robert, 2008).

Most studies examining lay beliefs regarding health have found a similar public inattention towards the social determinants of health. In a representative sample of Canadians, 30% of respondents indicated that economically disadvantaged groups suffer worse health than others, while 24% did not consider any group as having poorer health outcomes compared to other Canadians (CIHI, 2005). Moreover, this study also found that over 50% of Canadians believed that air and water quality, smoking, exposure to second-hand smoke, diet and eating habits, and amount of exercise had a strong or very strong impact on health. In terms of social determinants, an individual's level of income and education were supported by 33% of Canadians as strong/very strong health determinants (CIHI, 2005). However, the same representative sample of Canadians found that respondents identified diet/nutrition, physical activity, proper rest, and not smoking as the top four most important health factors that contribute to good health (CIHI, 2005).

In another broadly representative sample of lay Canadians, Krewski et al. (2008) found that 98.3% of respondents agreed that individuals can avoid health risks by improving their individual lifestyles, while 84.1% agreed that individual actions and choices were what largely determined exposure to health risks, and over 60% of respondents indicated that they felt they had control over risks to their health. This supports the assertion that lay perceptions of health have been found to emphasize individualistic explanations of illness (Krewski et al., 2008; MacIntyre, McKay, & Ellaway, 2005; Reutter, Neufeld, & Harrison, 1999; Smith, Sullivan, Bauman, Powell-Davies, & Mitchell, 1999;) and show little acknowledgement for social determinants (Collins, Abelson, & Eyles, 2007; Gollust, Lantz, & Ubel, 2009).

However, in Bolaria and Bolaria (2009, p. 510), Berliner notes that emphasis on individual lifestyle and health behaviours "serves only to reify the lifestyle as an entity apart from the social conditions from which it arises," and the individualistic discourse is, in effect, victim blaming. The widespread inattention to the SDOH in lieu of focus on individual health behaviours and responsibility is thus considered problematic by many working in the public health field.

Several additional studies have further analyzed demographic characteristics of importance when predicting support for the SDOH. Robert and Booske (2011), in a national American telephone survey of 2,791 adults, found that individuals of higher education and income were more likely to suggest that personal health practices strongly influence health, whereas individuals with less education were more likely to support broad social determinants of health. Young adults (aged 18-44 years) were less likely than their older counterparts to agree that social factors strongly impact health outcomes. In this U.S. sample, race/ethnicity was found to be the most consistent predictor of opinions about determinants of health, where racial/ethnic minorities more strongly supported social determinants, compared to whites (Robert & Booske, 2011). In Canada, a representative telephone study of over 1,200 Alberta residents found that those with lower socio-economic status, women, those living in rural settings, and individuals with more Liberal views were more likely to agree with a structural explanation of the relationship between poverty and health (Reutter et al., 1999).

In terms of political affiliation, analyses of opinions about the SDOH have noted no political differences regarding the belief that smoking, personal health practices, health knowledge, or genetics are important health determinants. However, individuals with leftist political affiliations have been found more likely to agree that broader SDOH factors, including healthcare and health insurance, have important implications for health (Robert & Booske,

2011). Overall, these studies point to a fairly stable trend, whereby those who have left-wing political view express more support for the SDOH (MacIntyre et al., 2005).

A literature search has found no studies specifically focused on the perceptions of health determinants held by university students. In the medical education literature, it is frequently suggested that physicians should *think upstream* to account for the broader health determinants and underlying causes that drive health disparities (Maeshiro et al., 2010). Moreover, Chokshi (2010, S183) argues that “a grounding in the social origins of disease would reinforce the importance of collaboration for superior health outcomes.” The importance for students studying in the health-related fields to develop a firm understanding of and advocate for action on the SDOH is evident (Maeshiro et al., 2010). Yet, we have little evidence as to whether students are receiving this training.

This paper aims to examine opinions about health held by post-secondary students at one institution, and to explore which demographic variables are most relevant in predicting support for the social determinants of health among students. In particular, we aim to examine whether students’ opinions about health are correlated with their area of study once political affiliation and other demographic variables are also taken into consideration.

Based on the literature summarized above, we developed the following hypotheses regarding the opinions of the students in our sample:

1. Overall, students will be likely to support an individualistic, rather than a social, perspective on health determinants.
2. Female students, those of lower socio-economic status, visible minorities, and those with more left-leaning political affiliations will be more likely to support the social determinants of health.
3. Students who are studying Health Sciences will be more likely to support a social perspective on health determinants.

Methodology

Survey Instrument

An online survey was designed to measure students’ opinions on health. Questions on the survey were adapted from three previous surveys (CIHI, 2005; Robert & Booske, 2011; Robert, Booske, Rigby, Rohan, 2008). In order to assess respondents’ opinions regarding the determinants of health, the three surveys that informed the current survey presented multiple health determinants and asked respondents to indicate the degree of influence each factor had on health using a Likert scale. A similar survey design was employed in the current study.

The first section of the survey asked respondents to indicate the degree of strength that 21 health items have on individual health. Responses were measured on a 5-point Likert-scale, ranging from *Very Weak* to *Very Strong*. Broadly, the 21 health factors could be categorized into individual and social determinants of health. The six factors categorized as individual, behavioural, and lifestyle determinants of health included: smoking status, diet and eating habits, exercise, stress, luck, and genetics (CIHI, 2005). The other 15 health factors represented social determinants of health, and included: factors from the physical environment along with social and economic conditions (e.g., air and water quality); availability and quality of housing;

community safety; community support; exposure to second hand smoke; access to food (e.g., food security); access to health services; social security programs; employment; early childhood experiences; level of income; education; race and ethnicity; sex; and community integration and involvement (CIHI, 2005; Mikkonen & Raphael, 2010). Similar to other surveys of this nature (Robert & Booske, 2011), the 21 factors in this study were presented to respondents in a fixed order to prevent response bias, and no reference was made within the survey as to whether a factor represented an individual or social health determinant.

Demographic information collected from the respondents included: the respondent's sex; age; years of post-secondary education completed; mother's and father's highest level of education (which served as a proxy for *social class*); political affiliation; place of birth (Canada or elsewhere); and visible minority status. The respondent's current or intended program of study was collected as an open response and subsequently categorized into one of five groups, according to the faculty that the department belonged to. The categories of *Science* and *Engineering* were composed of students in departments belonging to each of those faculties. The category of *Arts* included students in the humanities and social sciences. The category of *Health Sciences* included students studying medicine, nursing, health sciences, and kinesiology. The category of *Professional Faculties* included those students enrolled in education, social work, business, and law.

Approval was obtained from the Conjoint Faculties Research Ethics Board at the institution, and informed consent was collected prior to respondents' participation in the survey. Recruitment was conducted on campus, in person, by disseminating printed business cards with the URL of the online survey. Recruitment and data collection occurred throughout November and December 2011. Efforts were made to ensure a diverse sample was obtained in terms of area of study by disseminating business cards throughout campus. However, the sample was a convenience sample and was by no means representative of all students at the institution.

Statistical Analyses

In order to summarize respondents' opinions about health, we conducted an exploratory factor analysis on the 21 health items. Factor analysis examines the covariation among a set of variables (in this case, the 21 health items) and summarizes the relationships among the variables by producing *factors* (Kim & Mueller, 1978). In our data, six factors accounted for most of the variation among the 21 health items. We examined the factors in two groups of three. The first group consisted of three factors which would fall under the SDOH perspective—*Social Determinants*, *Community Determinants*, and *Social Status Determinants*. The second group consisted of three factors which would fall under the individual-level health determinants perspective—*Environmental Determinants*, *Health Behaviour*, and *Luck*.

Once we had obtained individual scores on each of the six factors, we next ran bivariate analyses. Using ANOVA, we compared group means on all of the factors, to examine which of the independent variables were significantly related to scores on the individual factors. Next, we ran multiple regression models predicting individual scores on each of the factors. We ran the models with the demographic predictors first, and then ran the models adding academic major as a sixth independent variable.

Results

Table 1 summarizes the demographic composition of the sample. It is worth noting that sex and academic major were significantly correlated ($p < .05$). Women were predominantly enrolled in Arts, Professional Faculties, and Health Sciences, and Engineering was largely composed of men. Age and academic major were also significantly correlated. More than three-quarters of Professional Faculty students were younger than 22 years, half of all Engineering students sampled were 19 years or younger, and less than 17% of students in Sciences were 23 years or older. Notably, academic major and political affiliation were *not* significantly correlated ($p < .05$). Given the non-random sampling methods used to recruit respondents, the sample was not assessed for representativeness.

Table 1

Sample Descriptive Statistics (N = 287)

Variable		Number	Percent (%)
Sex	Male	113	39.4%
	Female	174	60.6%
Age	18 years	45	15.7%
	19 years	47	16.4%
	20 years	45	15.7%
	21 years	50	17.4%
	22 years	35	12.2%
	23 years	19	6.6%
	24 years	12	4.2%
> 25 years	33	11.5%	
Years of Completed Post-Secondary Education	<1 year	32	11.2%
	1 – 2 years	73	25.5%
	2 – 3 years	39	13.6%
	3 – 4 years	60	21.0%
	4 – 5 years	36	12.6%
	> 5 years	46	16.1%
Major Area of Study	Arts	88	31.0%
	Science	54	19.0%
	Engineering	32	11.3%
	Health Sciences	71	25.0%
	Professional Faculties	39	13.7%
Visible Minority	Yes	62	21.7%
	No	224	78.3%
Highest Parental Education	Less than Bachelor's	104	36.4%
	Bachelor's or Higher	182	63.6%
Political Affiliation	Bloc Quebecois	0	0.0%
	Conservative Party	122	42.8%
	Green Party	21	7.4%
	Liberal Party	68	23.9%
	New Democratic Party	66	23.2%
	Other	8	2.8%

Note. Some categories may not sum to 100% due to rounding.

Overall Opinions on Health

Mean scores were calculated for each of the 21 health items presented in the survey (Figure 1). The response *Very Weak Factor* was given a value of 1.0, and *Very Strong Factor* was given a value of 5.0. Figure 1 shows that most health factors were considered important, as 18 of 21 health items had a mean score over 3.0, and considered stronger than a *Moderate* health determinant. Smoking, diet/eating habits, exercise, food security, and stress were the five most important factors believed to affect health outcomes among respondents, and these factors scored an average above 4.0, or a *Strong Factor* in determining health. Of these top five factors, four were commonly recognized as individual health determinants. The means of the three least important factors, race and ethnicity, sex, and luck, were calculated to be below 3.0, and thus considered weaker than *Moderate* determinants of health.

In order to better understand the range of opinions expressed by the students, we performed a factor analysis on the 21 health items (Table 2). Varimax rotation was used, and coefficients below 0.50 were suppressed. Missing responses for the health items were replaced by the sample mean of that item. Six factors resulted from the factor analysis, which accounted for 58.50% of the variation in the responses.

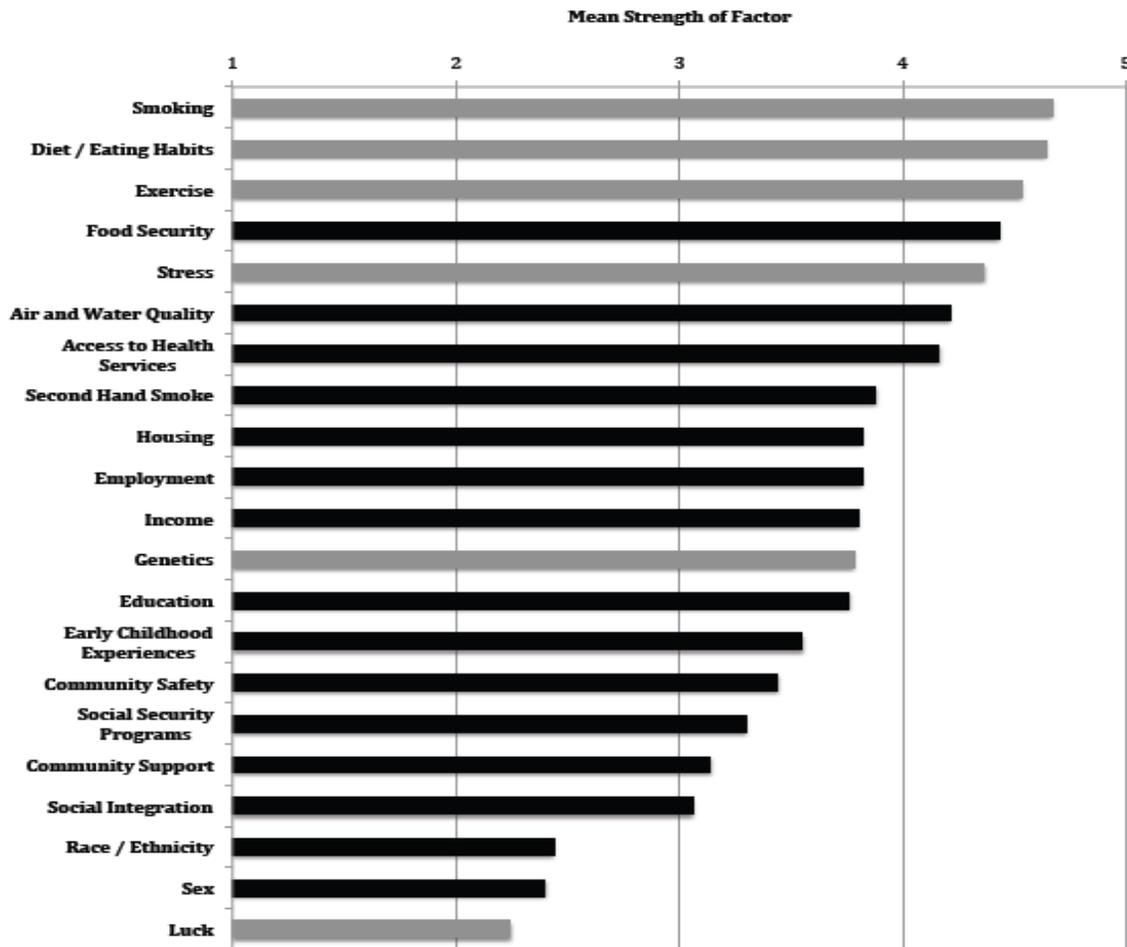


Figure 1. Mean Strength of Determinants of Health

Mean strength of 21 health determinants for 287 respondents. Respondents were asked to indicate the strength of each health determinant. Responses were coded in numerical values (Very Weak Factor = 1; Weak Factor = 2; Moderate Factor = 3; Strong Factor = 4; and Very Strong Factor = 5). Determinants in grey indicate individual or behavioural determinants. Determinants in black indicate social determinants of health.

The first factor, *Social Determinants* (23% variance explained; Cronbach's alpha = 0.76), loaded the following items together: (a) access to health services; (b) employment; (c) community safety; (d) social security programs; (e) housing; (f) income; and (g) food security.

The second factor, *Community Determinants* (11% variance explained; Cronbach's alpha = 0.76), included: (a) social integration; (b) community support; and (c) early childhood experiences.

The third factor, *Environmental Determinants* (7% variance explained; Cronbach's alpha = 0.58), included three health items: (a) air and water quality; (b) second hand smoke; and (c) stress.

The fourth factor, *Social Status Determinants* (6% variance explained), was composed of two items: (a) race/ethnicity; and (b) sex.

The fifth factor, *Health Behaviour* (6% variance explained; Cronbach's alpha = 0.71), included two items: (a) diet/eating habits; and (b) exercise.

Finally, no other health item loaded with the item luck, thus, it was the sole item included in the sixth factor, *Luck* (5% variance explained).

Notably, smoking, genetics, and education did not load on any factor. Therefore, they were eliminated from the remainder of the analysis. Once the six factors were obtained, the factor scores were saved for the entire sample and used as dependent variables for subsequent regression analyses.

Table 2

Factor Analysis of Health Determinants

Item	Factor Loading					
	I	II	III	IV	V	VI
Access to Health Services	0.587					
Employment	0.682					
Community Safety	0.586					
Social Security Programs	0.508					
Housing	0.680					
Income	0.521					
Food Security	0.549					
Social Integration		0.805				
Community Support		0.795				
Early Childhood Experiences		0.668				
Air and Water Quality			0.606			
Second Hand Smoke			0.740			
Stress			0.617			
Race / Ethnicity				0.710		
Sex				0.797		
Diet / Eating Habits					0.830	
Exercise					0.771	
Luck						0.767
Percent Variance Explained	23.44%	11.24%	6.92%	6.21%	5.82%	4.87%
Cronbach's Alpha Coefficient	0.761	0.763	0.581	0.689	0.707	-

Note. Factor loadings less than 0.50 were suppressed. Three of the original 21 items (Smoking, Genetics, and Education) did not load on any factor. Thus, they were excluded from this table.

Table 3
 Mean Factor Scores by Demographic Variables

Variable	Category	N	Mean Factor Scores					
			Social Determinants	Community Determinants	Social Status	Environmental Determinants	Health Behavior	Luck
Highest Parental Education	< Bachelors	104	-.072 ± .099	-.066 ± .094	-.010 ± .100	.099 ± .101	-.095 ± .107	.005 ± .104
	≥ Bachelors	182	.045 ± .074	.041 ± .076	.001 ± .073	-.055 ± .073	.055 ± .070	-.017 ± .070
Visible Minority	Vis. Min	62	-.121 ± .133	.124 ± .127	.198 ± .118	.092 ± .113	-.211 ± .139	-.007 ± .136
	Non-Vis. Min	224	.038 ± .066	-.030 ± .067	-.057 ± .068	-.021 ± .069	.060 ± .065	.005 ± .066
Sex	Male	113	-.111 ± .097	-.184 ± .100	-.103 ± .101	-.158 ± .102	.053 ± .106	.215 ± .100
	Female	174	.072 ± .074	.119 ± .072	.067 ± .072	.103 ± .071	-.034 ± .069	-.140 ± .071
Political Affiliation	Conservative (ref)	122	-.287 ± .091	-.167 ± .096	-.042 ± .093	.044 ± .089	.068 ± .093	.028 ± .097
	Green	21	.084 ± .260	.240 ± .164	-.022 ± .201	.162 ± .192	-.082 ± .203	.324 ± .195
	Liberal	68	.281 ± .121*	.143 ± .112	.352 ± .118	-.072 ± .121	-.095 ± .122	.047 ± .119
	NDP	66	.208 ± .104*	.077 ± .124	-.255 ± .119	-.058 ± .126	.002 ± .119	-.131 ± .107
Major	Health Sci. (ref)	71	.465 ± .102	.359 ± .113	.467 ± .098	-.455 ± .115	-.046 ± .121	-.081 ± .102
	Arts	88	-.188 ± .111*	-.112 ± .106*	-.173 ± .115*	.097 ± .095*	-.132 ± .113	-.100 ± .114
	Sciences	54	-.096 ± .101*	-.252 ± .152*	-.176 ± .149*	.307 ± .116*	.252 ± .133	-.045 ± .114
	Engineering	32	-.308 ± .212*	-.130 ± .176	-.165 ± .161*	-.337 ± .232	.096 ± .166	.334 ± .242
	Prof. Faculties	39	.017 ± .164	.056 ± .127	-.076 ± .125*	.513 ± .119*	.085 ± .116	.186 ± .146

Note. Mean factor scores reported as: Mean ± Standard Error.

* $p < 0.05$ (two-tailed tests).

We examined the factors in two groups. The first group consisted of the three factors that would fall under the SDOH perspective: *Social Determinants*, *Community Determinants*, and *Social Status Determinants*. The second group consisted of the three factors that would fall under the individual-level health determinants perspective: *Environmental Determinants*¹, *Health Behaviour*, and *Luck*.

Factor Scores and Demographic Variables

Using the six newly obtained health item factors, factor means were calculated and compared across several demographic variables for the sample (Table 3). We found no significant differences in any of the average factor scores by sex, highest parental education, visible minority status, or age. With respect to political affiliation, we found significant differences in average scores on the *Social Determinants* factor. The results show that Liberals (Mean = 0.28 ± S.E. = 0.12) and NDP supporters (0.21 ± 0.10) scored significantly higher than Conservative respondents (-0.29 ± 0.09) on this factor.

Academic major was related to scores on four out of the six factors. On the three factors that fell into the SDOH perspective, Health Science students scored higher than students in other majors. On the *Social Determinants* factor, Health Science students (0.47 ± 0.10) scored significantly higher than Science (-0.10 ± 0.10), Arts (-0.19 ± 0.11) and Engineering students (-0.31 ± 0.21). For the *Community Determinants* factor, Science (-0.25 ± 0.15) and Arts students (-0.11 ± 0.11) scored lower than Health Science students (0.36 ± 0.11). Health Science students scored higher than all other groups on the *Social Status* factor.

Health Science students scored lower than students in other majors on one of the factors that fell into the individual-level health determinants perspective, the *Environmental Determinants* factor. For the *Environmental Determinants* factor, students in Arts (0.10 ± 0.10), Science (0.31 ± 0.12) and the Professional Faculties (0.51 ± 0.12) scored significantly higher than Health Science students (-0.46 ± 0.12). No significant demographic differences were found for the factors representing *Health Behaviour* or *Luck*.

Thus, bivariate analysis of the mean factor scores indicated that both academic major and political affiliation were important in predicting support for various determinants of health among these students. To clarify whether these variables remained significant predictors of opinions about health when controlling for other demographic variables, individual scores on the six dependent factor variables were analyzed using multiple regression.

Multiple Regression Analyses

Two models were tested for each dependent variable: the first model individually regressed each of the six factors on all the demographic variables of age, highest parental education, visible minority status, sex, and political affiliation. The second model added academic major as a sixth independent variable. Tables 4, 5, and 6 each show the multiple regression results for the three factors that fall under the SDOH perspective (*Social Determinants*, *Community Determinants*, and *Social Status Determinants*).

No significant demographic differences were found in bivariate analyses for the factors *Health Behaviour* or *Luck*. Multiple regression analyses for each of these factors did not reach statistical significance ($p < .05$). Therefore, results for these variables were not included. Table 7 shows the multiple regression results for the one remaining factor, *Environmental Determinants*, which falls under the individual-level health determinants perspective.

Table 4

*Social Determinants Regression**Demographic Variables (Model 1); Demographic Variables and Academic Major (Model 2)*

		Model 1	Model 2
Age		.015 (.027)	-.004 (.027)
Highest Parental Education		.053 (.041)	.040 (.040)
Visible Minority (Visible Minority = 1)		.099 (.142)	.105 (.140)
Sex (Male = 1)		-.173 (.118)	-.075 (.121)
Political Affiliation	Green	.321 (.230)	.402 (.228)
(Ref = Conservative)	Liberal	.568 (.149)*	.518 (.148)*
	NDP	.469 (.147)*	.471 (.145)*
Major	Arts		-.574 (.155)*
(Ref = Health Sciences)	Science		-.411 (.178)*
	Engineering		-.637 (.214)*
	Professional Faculties		-.247 (.196)
Adjusted R^2		.057	.099

Note. $N = 287$. Reported as b (Standard Error), where b = unstandardized regression coefficient.

* $p < 0.05$ (two-tailed tests).

Ref = Reference Group.

Table 4 shows the multiple regression results for the *Social Determinants* factor. Controlling for age, highest parental education, visible minority status, sex, and discrimination, Model 1 shows that students with political affiliations to the Liberal Party ($b = 0.58$; $S.E. = 0.15$) and NDP ($b = 0.47$; $S.E. = 0.15$) scored significantly higher on the *Social Determinants* factor than their Conservative counterparts. These results did not change significantly with the addition of academic major in Model 2. Additionally, Model 2 demonstrates that students in Arts ($b = -0.62$; $S.E. = 0.16$), Science ($b = -0.45$; $S.E. = 0.18$) and Engineering ($b = -0.65$; $S.E. = 0.21$) scored significantly lower on the *Social Determinants* factor than their Health Science counterparts, controlling for all other variables, including political affiliation.

Table 5 shows regression results for the *Community Determinants* factor. In both models 1 and 2, men showed less support than women ($b = -0.24$; $S.E. = 0.12$ in Model 2), while men with higher levels of parental education showed more support for this factor ($b = 0.08$; $S.E. = 0.04$ in Model 2). There was no effect of political affiliation on support for this factor in either model. However, there was an effect of academic major. Arts students ($b = -.39$; $S.E. = .16$) and Science students ($b = -.46$; $S.E. = .18$) scored lower on the *Community Determinants* factor than Health Science students, controlling for the other demographic variables.

Table 6 shows regression results for the *Social Status* factor. Model 1 indicates that Liberals scored significantly higher on this factor than their Conservative counterparts, (which indicated agreement with the statements that race/ethnicity and sex were important determinants of health) ($b = 0.39$; $S.E. = 0.15$), controlling for demographic variables. No other demographic variables reached statistical significance in Model 1. Controlling for academic major in Model 2, the effect of Liberal political affiliation remained significant, although it was slightly lower

Table 5

*Community Determinants Regression**Demographic Variables (Model 1); Demographic Variables and Academic Major (Model 2)*

		Model 1	Model 2
Age		.033 (0.027)	.019 (0.027)
Highest Parental Education		.092 (0.041)*	.080 (0.041)*
Visible Minority (Visible Minority = 1)		-.197 (0.144)	-.195 (0.144)
Sex (Male = 1)		-.298 (0.119)*	-.244 (0.124)*
Political Affiliation	Green	.337 (0.233)	.382 (0.234)
(Ref = Conservative)	Liberal	.290 (0.151)	.238 (0.152)
	NDP	.224 (0.149)	.214 (0.149)
Major	Arts		-.390 (0.159)*
(Ref = Health Sciences)	Science		-.457 (0.183)*
	Engineering		-.297 (0.220)
	Professional Faculties		-.198 (0.201)
Adjusted R^2		.042	.057

Note. $N = 287$. Reported as b (Standard Error), where b = unstandardized regression coefficient.

* $p < 0.05$ (two-tailed tests).

Ref = Reference Group.

($b = 0.31$; $S.E. = 0.14$) than Model 1. Moreover, Health Science students scored significantly higher compared to Arts ($b = -0.54$; $S.E. = 0.16$), Science ($b = -0.54$; $S.E. = 0.18$), Engineering ($b = -0.58$; $S.E. = 0.22$), and Professional Faculty students ($b = -0.50$; $S.E. = 0.20$). Controlling for political affiliation increased the effect of visible minority status on the *Social Status* factor scores to significance from Model 1. Specifically, racial/ethnic minorities scored lower on the *Social Status* factor than non-visible minorities ($b = -0.29$; $S.E. = 0.14$). Mean factor scores (Table 3) did not indicate the significance of visible minority on the *Social Status* factor found in Model 2 of the regression analysis. Thus this effect only emerges once other variables are controlled.

Table 7 shows the regression results for the *Environmental Determinants* factor. While Health Science students generally scored higher than their counterparts on the other three factors, they scored lower than their counterparts on this variable, controlling for other demographic variables. Additionally, men scored lower than women ($b = -0.27$; $S.E. = 0.12$). There was no effect of political affiliation on support for the *Environmental Determinants* factor.

Discussion

The present analysis explored opinions about health among post-secondary students. First, we examined overall support for the social determinants of health perspective. As hypothesized, we found that individual factors were largely favoured over social factors as important determinants of health in this sample. Four of the top five most important health determinants chosen by the respondents—smoking, diet/eating habits, exercise and stress—were individual

Table 6

*Social Status Regression**Demographic Variables (Model 1); Demographic Variables and Academic Major (Model 2)*

		Model 1	Model 2
Age		.033 (0.027)	.011 (0.027)
Highest Parental Education		.038 (0.041)	.022 (0.041)
Visible Minority (Visible Minority = 1)		-.271 (0.143)	-.289 (0.141)*
Sex (Male = 1)		-.164 (0.119)	-.089 (0.122)
Political Affiliation	Green	-.003 (0.232)	.031 (0.230)
(Ref = Conservative)	Liberal	.392 (0.150)*	.306 (0.150)*
	NDP	-.206 (0.148)	-.241 (0.147)
Major	Arts		-.541 (0.157)*
(Ref = Health Sciences)	Science		-.545 (0.180)*
	Engineering		-.575 (0.217)*
	Professional Faculties		-.505 (0.198)*
Adjusted R^2		.046	.085

Note. $N = 287$. Reported as b (Standard Error), where b = unstandardized regression coefficient.

* $p < 0.05$ (two-tailed tests).

Ref = Reference Group.

determinants of health. The *least* important health determinants identified by respondents in the present survey were race/ethnicity and sex. These results were comparable to other national and international studies. Similarly, those studies highlighted the fact that most people acknowledge individual health determinants over social determinants of health (CIHI, 2005; Krewski, 2008; MacIntyre et al., 2005; Robert et al., 2008; Smith et al., 1999).

We further explored the students' opinions about health by conducting a factor analysis on the health determinants items. We found six factors that accounted for most of the variation in opinions: *Social Determinants*, *Community Determinants*, *Social Status*, *Environmental Determinants*, *Health Behaviour*, and *Luck*. The first three factors, *Social Determinants*, *Community Determinants*, and *Social Status*, represented different aspects of the social determinants of health and varied significantly across groups, particularly with regards to political affiliation and academic major. The last three factors, *Environmental Determinants*, *Health Behaviour*, and *Luck*, represented individual determinants of health and showed less variation across the sample with regards to demographic variables or academic major. Out of the individual-level determinants factors, only *Environmental Determinants* varied across academic major.

We hypothesized that certain demographic variables of sex, social class, visible minority status, and political affiliation would be correlated with students' views on health determinants. We expected that female students, visible minorities, those of lower socio-economic status, and those with more left-leaning political affiliations would be more likely to support the social determinants of health.

In terms of sex, we found support for our hypothesis with regards to the *Community Determinants* factor. Men scored lower than women on this variable, controlling for all other independent variables. However, men also scored lower than women on the *Environmental*

Table 7

*Environmental Determinants Regression**Demographic Variables (Model 1); Demographic Variables and Academic Major (Model 2)*

		Model 1	Model 2
Age		-.072 (0.027)*	-.048 (0.026)
Highest Parental Education		-.029 (0.042)	-.006 (0.040)
Visible Minority (Visible Minority = 1)		-.139 (0.144)	-.082 (0.138)
Sex (Male = 1)		-.273 (0.120)*	-.266 (0.120)*
Political Affiliation	Green	.180 (0.234)	.224 (0.226)
(Ref = Conservative)	Liberal	-.054 (0.151)	.100 (0.147)
	NDP	-.079 (0.149)	.006 (0.144)
Major	Arts		.527 (0.154)*
(Ref = Health Sciences)	Science		.761 (0.176)*
	Engineering		.181 (0.212)
	Professional Faculties		.912 (0.194)*
Adjusted R^2		.027	.117

Note. $N = 287$. Reported as b (Standard Error), where b = unstandardized regression coefficient.

* $p < 0.05$ (two-tailed tests).

Ref = Reference Group.

Determinants factor (an individual-level determinant), controlling for all other independent variables. There was no effect of sex on support for any of the other variables. In our sample, it appeared that women had stronger feelings than men regarding both social and individual-level determinants of health.

Our findings with regards to social class and visible minority status ran counter to our hypotheses. In terms of social class, we found that those with higher levels of parental education actually scored higher on the *Community Determinants* factor, net of other variables. And we found that visible minorities scored lower on the *Social Status* factor than whites, net of other variables. This could be the result of our unusual sample. Our sample consisted of university students from, generally, higher social class backgrounds. It may be that within this largely upper class sample, those from the most highly educated families were actually more aware of the SDOH perspective. Additionally, it may be that the visible minorities within our sample (most of whom were from highly educated backgrounds) did not feel that their race/ethnicity had an impact on their health.

In terms of political affiliation, we found support for our hypothesis with regards to both the *Social Determinants* and the *Social Status* factors. Students with political affiliations to the NDP and Liberals showed higher support for the *Social Determinants* factor, controlling for age, highest parental education, visible minority status, and academic major. Similarly, those who were affiliated with the Liberals were significantly more likely than those affiliated with the Conservatives to support the *Social Status* factor, controlling for other demographic variables. These findings corroborated findings elsewhere and suggested individuals with left-wing views were more likely to agree with a social determinants of health framework (Gollust et al., 2009; Collins et al., 2007).

Finally, we hypothesized that students' area of study would be related to their views on the determinants of health. Specifically, we hypothesized that students in the Health Sciences would be more likely to have been exposed to the social determinants of health framework during their studies. Thus, students in the Health Sciences would be more likely to take a SDOH perspective. Our data showed support for this hypothesis. We found that Health Science students scored higher than all other students on the *Social Status* factor, controlling for demographic variables. Health Science students also scored higher than Arts, Science, and Engineering students on the *Social Determinants* factor, and higher than Arts and Science students on the *Community Determinants* factor. Additionally, Health Science students scored lower than students from all the other majors on the *Environmental Determinants* factor, a variable representing individual-level health determinants.

These results supported the broad finding that Health Science students were more likely than their counterparts to agree with the SDOH. Overall, the findings from this survey suggested greater support for the SDOH among Health Science students and/or an increase in uptake of the social determinants of health perspective among health-related academic curricula. Health Science students' opinions about the SDOH appeared to reflect a successful integration of prevention and public health competencies, as suggested by the Flexner report in 1910 (Flexner, 1910) and the Association of Faculties of Medicine of Canada in 2010 (Busing et al., 2010).

Limitations and Conclusions

This analysis did not employ random sampling methods. For this reason, results of this survey could not be generalized. Moreover, university populations, compared to the general public, were relatively homogenous in terms of age and socio-economic background. Low variability in these two demographic characteristics within the obtained sample could have suppressed the significant effects of these variables on lay opinions about health, (Collins et al., 2007; MacIntyre et al., 2006; Robert & Booske, 2011). Additionally, this survey used a cross-sectional design. For this reason, the present analysis was unable to determine whether individuals who support a SDOH perspective were more likely to select health science fields of study, or whether the curricula of these studies effectively promoted the SDOH perspective

Media and lay beliefs about health are of great importance when considering the application of the social determinants of health framework in Canada and abroad. As Bolaria and Bolaria (2009) suggest, if health problems are framed at the level of the individual, subsequent health policy will target the individual and unhealthy lifestyle behaviours. However, if social and material inequities are implicated in health disparities, then policy intervention will target the precipitating social inequities causing poor health outcomes. As Reutter and colleagues state (1999, p. 13), "public opinion plays an important role in legislated social policy, and the public's view on how poverty [and other health determinants] and health are related will influence their support for different policies and programs." Robert et al. (2008) also note the influence of public opinion on related policy issues. Inattention regarding the SDOH, thus, remains troubling, given that key aspects of living conditions widely recognized as health determinants, employment and income, affordable housing, access to health services, social programs, and family benefits, among others, are shaped by governments' policy decisions at all levels in Canada (Mikkonen & Raphael, 2010).

As discussed in the literature and demonstrated in this analysis, political affiliation is a strong predictor of lay views about determinants of health. However, it is important to note that

this analysis also shows that academic major is a significant predictor of health beliefs among post-secondary students, *independent* of political affiliation. For the purpose of this analysis, the significance of academic major on students' health perceptions, independent of political affiliation, is a unique contribution to academic literature, and establishes worthwhile future questions for longitudinal analysis.

This analysis provides at least some evidence that recommendations for the incorporation of prevention and public health messaging into medical education have been heeded. We fully recognize that the SDOH may appear far beyond the scope of many other academic disciplines. However, action on the SDOH will require multidisciplinary collaboration and action, involving policy makers, the business community, the non-profit sector, etc. Therefore, given that attitudes on the SDOH across multiple disciplines will drive future policy action or inaction, it is worthwhile to evaluate how students from different academic fields understand the proximal causes of health and illness. If medical and health-related fields are alone in their understanding of the SDOH, it will be difficult to engage other disciplines in effectively tackling health disparities.

References

- Bolaria, B. S., & Bolaria, R. (2009). Personal and structural determinants of health and illness: Lifestyles and life chances. In B. S. Bolaria & H. D. Dickinson (Eds.), *Health, illness, and health care in Canada* (4th ed.) (pp. 506-519). Scarborough, ON: Nelson Thomson Learning.
- Busing, N., Slade, S., Rosenfield, J., Gold, I., & Maskill, S. (2010). In the spirit of Flexner: Working toward a collective vision for the future of medical education in Canada. *Academic Medicine*, *85*, 340-348.
- Canada, Parliament, Senate. Senate Subcommittee on Population Health. (2009). *A healthy productive Canada: A determinant of health approach*. Ottawa: Senate of Canada.
- Canadian Institute for Health Information. (2005). *Select highlights on public views of the determinants of health*. Ottawa: Canadian Population Health Initiative.
- Chokshi, D. A. (2010). Teaching about health disparities using a social determinants framework. *Journal of General Internal Medicine*, *25*(suppl 2), 182-185.
- Collins, P. A., Abelson, J., & Eyles, J. D. (2007). Knowledge into action? Understanding ideological barriers to addressing health inequalities at the local level. *Health Policy*, *80*, 158-171.
- Denton, M., & Walters, V. (1999). Gender differences in structural and behavioral determinants of health: An analysis of the social production of health. *Social Science & Medicine*, *48*, 1221-1235.
- Flexner, A. (1910). *Medical education in the United States and Canada: A report to the Carnegie Foundation for the Advancement of Teaching*. Bulletin No. 4. New York: Carnegie Foundation.
- Gollust, S. E., Lantz, P. M., & Ubel, P. A. (2009). The polarizing effect of news media messages about the social determinants of health. *American Journal of Public Health*, *99*(12), 2160-2167.
- Hayes, M., Ross, I. E., Gasher, M., Gutstein, D., Dunn, J. R., & Hackett, R. A. (2007). Telling stories: News media, health literacy and public policy in Canada. *Social Science & Medicine*, *64*, 1842-1852.
- King, J. -O., & Mueller, C. W. (1978). *Introduction to factor analysis: What it is and how to do it*. Newbury Park, CA: Sage.
- Krewski, D., Lemyre, L., Turner, M. C., Lee, J. E. C., Dallaire, C., Bouchard, L., Brand, K., & Mercier, P. (2008). Public perception of the population health risks in Canada: Risk perception beliefs. *Health, Risk & Society*, *10*(2), 167-179.

- MacIntyre, S., McKay, L., & Ellaway, A. (2005). Are rich people or poor people more likely to be ill? Lay perceptions, by social class and neighbourhood, of inequalities in health. *Social Science & Medicine*, *60*, 313-317.
- MacIntyre, S., McKay, L., & Ellaway, A. (2006). Lay concepts of the relative importance of different influences on health: Are there major socio-demographic variations? *Health Education Research*, *21*(5), 731-739.
- Maeshiro, R., Johnson, I., Koo, D., Parboosingh, J., Carney, J. K., Gesundheit, N., Ho, E. T., Butler-Jones, D., Donovan, D., Finkelstein, J. A., Bennett, N. M., Shore, B., McCurdy, S. A., Novick, L. F., Velarde, L. D., Dent, M. M., Banchoff, A., & Cohen, L. (2010). Medical education for a healthier population: Reflection on the Flexner report from a public health perspective. *Academic Medicine*, *85*(2), 211-219.
- McIntosh, C. N., Finès, P., Wilkins, R., & Wolfson, M. C. (2009). Income disparities in health-adjusted life expectancy for Canadian adults, 1991 to 2001. *Health Reports*, *20*, 55-64.
- Mikkonen, J., & Raphael, D. (2010). *Social determinants of health: The Canadian facts*. Toronto: York University School of Health Policy and Management.
- Niederdeppe, J., Bu, Q. L., Borah, P., Kindig, D. A., & Robert, S. A. (2008). Message design strategies to raise public awareness of social determinants of health and population health disparities. *Milbank Quarterly*, *86*(3), 481-513.
- Public Health Agency of Canada. (2008). *The chief public health officer's report on the state of public health in Canada, 2008: Addressing health inequalities*. Retrieved from <http://www.phac-aspc.gc.ca/cphorsphc-respcacsp/2008/fr-rc/index-eng.php>
- Raphael, D. (2006). Social determinants of health: Present status, unanswered questions, and future directions. *International Journal of Health Services: Planning, Administration, Evaluation*, *36*(4), 651-677.
- Raphael, D. (2009). Escaping from the phantom zone: Social determinants of health, public health units and public policy in Canada. *Health Promotion International*, *24*, 193-198.
- Reutter L., Neufeld, A., & Harrison, M. J. (1999). Public perceptions of the relationship between poverty and health. *Canadian Journal of Public Health*, *90*(1), 13-18.
- Robert, S. A., & Booske, B. C. (2011). US opinions on health determinants and social policy as health policy. *American Journal of Public Health*, *101*(9), 1655-1663.
- Robert, S. A., Booske, B. C., Rigby, E., & Rohan, A. (2008). Public views on determinants of health, interventions to improve health, and priorities for government. *Wisconsin Medical Journal*, *107*(3), 124-130.
- Senate Subcommittee on Population Health. (2009). *A healthy productive Canada: A determinant of health approach*. Ottawa: Senate of Canada.
- Smith, B., Sullivan, E., Bauman, A., Powell-Davies, G., & Mitchell, J. (1999). Lay beliefs about the preventability of major health conditions. *Health Education Research*, *14*(3), 315-325.
- Williams, D. R. (1999). Race, socioeconomic status, and health: The added effects of racism and discrimination. *Annals of the New York Academy of Sciences*, *896*(1), 173-188.
- William, D. R., & Sternthal, M. (2010). Understanding racial-ethnic disparities in health: Sociological contributions. *Journal of Health and Social Behavior*, *51*(S), S15-S27.
- Willson, A. E. (2009). 'Fundamental causes' of health disparities: A comparative analysis of Canada and the United States. *International Sociology*, *24*(1), 93-113.
- World Health Organization. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health*. Geneva: World Health Organization.

Notes

- ¹ It could be argued that two of the items in the Environmental Determinants factor, air and water quality and second-hand smoke, were more *social* determinants of health. However, this study followed the CIHI (2005) and considered them *individual-level* determinants. They were grouped with *stress* in this analysis.

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