Socioeconomic Status, Sense of Coherence and Health in Canadian Women

Joan D. Ing, RN, MN¹
Linda Reutter, RN, PhD¹

ABSTRACT

Objective: The purpose of this study was to explore the role of sense of coherence (SOC) in the relationship between household income and self-rated health among Canadian women. SOC is a global orientation that enables one to perceive events of the world as comprehensible, manageable, and meaningful.

Methods: A secondary data analysis was conducted using the National Population Health Survey 1994-95. Only women between the ages of 20 and 64 (n = 6748) were selected for this study. Data were analysed using multivariate path analyses.

Results: SOC is a psychosocial factor that intervenes in the income and health relationship. It did not function, however, as an interaction buffer to ameliorate the adverse effects of low income on health.

Conclusion: This study lends support for public health interventions that target the socioeconomic conditions that influence health, and for strategies that foster the development of a strong SOC.

Variations in mortality and morbidity have been observed over the centuries to be socially patterned.^{1,2} Evidence of the socioeconomic gradient in health has pushed for explanations that go beyond material deprivations to the role of psychosocial factors, such as stress, social support, and perceptions of control.^{1,3-10} One factor that has received limited attention in the exploration of the relationship between socioeconomic status (SES) and health is sense of coherence (SOC). The health of Canadian women has been found to vary by SES, and women are disproportionately located at the lower end of the scale.¹¹⁻¹⁸ However, the relationship of SES, SOC, and health in Canadian women has not been studied.

Sense of coherence is described by Antonovsky^{19,20} as a global orientation that enables one to perceive events of the world as comprehensible (ordered rather than chaotic), manageable (sufficient resources to meet demands), and meaningful (viewed as challenges and worthy of investment of time and energy). A strong SOC is shaped by repeated life experiences that are characterized by consistency, an underload-overload balance, and participation in socially valued decision making.^{19,20} These experiences can be molded by position in the social structure, i.e., socioeconomic status. Those with inadequate financial resources may experience living and working conditions that are not conducive to the development of a sense of comprehensibility, manageability, and meaningfulness. Antonovsky¹⁹ suggests that SOC is formed in the first few decades of life and is relatively stable but may be modified in adulthood with repeated life experiences. However, there is limited research that has explored the development and stability of SOC.²¹

Antonovsky's salutogenic theory suggests that SOC facilitates movement toward health by enabling individuals to mobilize resources that protect them from stressful events.^{19,22,23} Cross-sectional studies^{20,22-25} and one longitudinal study²⁶ have supported this link between SOC and health. Others suggest that health may also influence the development of SOC.^{19,21,23}

The role of SOC as an *intervening* variable in the relationship between SES and health has received little research attention. A few studies have reported a positive correlation between SES and SOC;²⁷⁻²⁹ other

La traduction du résumé se trouve à la fin de l'article.

1. Health Protection & Prevention, David Thompson Health Region

2. Professor, Faculty of Nursing, University of Alberta, Edmonton, Alberta

Correspondence and reprint requests: Joan Ing, Communicable Disease Control Specialist, Health Protection & Prevention, David Thompson Health Region, 2845 Bremner Avenue, Red Deer, AB T4L 1S2, Tel: 403-341-2475, E-mail: jing@dthr.ab.ca

studies used SES indicators as control variables rather than as variables to be studied.^{30,31}

The role of SOC as a buffer or a moderator of the socioeconomic effects on health has not been empirically studied.³² The term *buffer* or *moderator*, as used in stress research, refers to a resource that reduces the impact of social stressors on health outcomes.^{33,34} Research has found that SOC does not buffer the effects of stress on depression or psychological distress, nor the effects of recent life events on health,^{28,35,36} although SOC has been found to moderate the adverse effects of certain work characteristics on well-being.³²

The purpose of this study was to explore the relationship between income, sense of coherence (SOC), and health in Canadian women. Specifically, the role of SOC as an intervening and moderator variable in the SES and health relationship was examined.

METHOD

The data set used for this study was the 1994-95 National Population Health Survey (NPHS) (public use file). The multi-stage stratified sampling method utilized by the NPHS resulted in a sample size of 26,430 households. Excluded from this sample were those living on Indian Reserves, Canadian Forces Bases, and in some remote areas. The response rate for the households was 88.7%. A randomly selected household individual was interviewed regarding his/her self-perception of health and health behaviours. Details about the methodology are described elsewhere.^{37,38} Women between the ages of 20 and 64 ($n = 6748$) were selected for this study.

Measures

Self-rated health was selected to measure the health construct. Respondents were asked, "In general would you say that your health is excellent, very good, good, fair or poor?" For this study, the five-point scale was reverse scored (5 = excellent, 1 = poor).

Sense of coherence (SOC) was measured using SOC-13, Antonovsky's shortened version of his original 29-item scale. The 13 questions include items that address manageability (4), comprehensibility (5), and meaningfulness (4). Each item is

TABLE 1

Correlations Between Self-rated Health, SOC, Income, Marital Status and Age

	SOC	Income	Marital Status	Age
Self-rated Health	0.28	0.21	0.05	-0.18
SOC		0.16	0.16	0.11
Income			0.30	0.05
Marital Status				0.15
Age				

Note: $n = 6222$ to 6748 . Sample weights were adjusted so that the mean = 1. All correlations shown are significant at $p < 0.001$.

Self-rated health: (1 = poor to 5 = excellent).

SOC scale: (possible range is 0 – 78).

Household income adequacy: lowest income, lower middle income, middle income, upper middle income, and highest income. (1 = lowest income to 5 = highest income).

Marital status: attached (married/common-law/partner) = 1; unattached

(single/widowed/divorced/separated) = 0.

Age: (Five-year cohorts from 20-24 years to 60-64 years).

Figure 1A. SOC as an intervening variable

Figure 1B. SOC as a moderator

Figure 1. Alternative conceptual models of the relationship of household income adequacy, sense of coherence, and health

scored from 0 to 6; items are then summed to create a total SOC score (range 0-78) with higher SOC score indicating greater SOC.²⁸ The NPHS public release file included only the total SOC score. Previous research has established the reliability and validity of the SOC-13;²³ the NPHS version of SOC-13 reported a Cronbach alpha of 0.83.²⁸

Socioeconomic status was operationalized as household income adequacy. Household income adequacy is derived from the number of people living in the household and the total household income from all sources in the past 12 months. Individuals are classified into one of five household income groups, coded from 1 to 5 with 5 representing the highest household income group.

Age and marital status were used as control variables. The NPHS public use file releases age in five-year cohorts. Marital status was collapsed from the original 3-category variable to a dichotomous variable (see Table I).

Analysis

Analysis was conducted using the SPSS 8 Windows statistical package. Cases were weighted according to Statistics Canada guidelines.³⁷ To identify a relationship between SOC and income, the SOC means were calculated for each income category and examined using one-way ANOVA and Tamhane post-hoc tests.

Path analysis was used to determine if SOC mediates the relationship between income and self-rated health as conceptually

TABLE II

Regressions for Path Analysis

Regression Analysis of SOC on Marital Status, Age, and Income				
	B	SE	β	p
Constant	47.83	0.66		0.000
Marital Status	2.86	0.36	0.11	0.000
Age	0.44	0.07	0.08	0.000
Income	1.43	0.15	0.12	0.000

Regression Analysis of Self-rated Health on Marital Status, Age, Income, and SOC				
	B	SE	β	p
Constant	2.57	0.07		0.000
Marital Status	-0.05	0.03	-0.02	0.062
Age	-0.08	0.01	-0.20	0.000
Income	0.16	0.01	0.18	0.000
SOC	0.02	0.00	0.28	0.000

Adj $R^2=0.05$; $F[3, 6218] = 97.64$; $p<0.001$ Adj $R^2=0.15$; $F[4, 6217] = 266.51$; $p<0.001$

Note: Sample weights were adjusted so that the mean = 1. Standardized coefficient (β) is the path coefficient. Self-rated health (1 = poor to 5 = excellent). SOC scale (possible range is 0–78). Household income adequacy (1 = lowest income to 5 = highest income). Marital status (1 = attached; 0 = unattached). Age (Five-year cohorts from 20–24 years to 60–64 years).

Figure 2. Mean of sense of coherence within household income adequacy categories

Note: $F[4, 6216] = 47.06$, $p<0.001$. The SOC mean of the lowest-income adequacy group (53.23, $SD = 14.08$) was significantly lower than that of all other groups ($p<0.001$) except the lower middle-income group (53.43, $SD = 14.63$). The SOC mean of the highest-income group (60.04, $SD = 11.00$) was significantly higher than the means of all other income categories ($p<0.01$). The difference between the middle income (57.69, $SD = 12.31$) and the upper-middle income group (58.59, $SD = 11.83$), was insignificant. Sample weights were adjusted so that the mean = 1.

modelled in Figure 1a. A sequence of regressions tested for direct effects of income on health and indirect effects through SOC. SOC was first regressed on age, marital status, and income. Self-rated health was then regressed on marital status, age, income, and SOC. These path coefficients represented the direct effects on the dependent variables. Indirect effects were computed as the product of the coefficients in the chain of effects that leads from the independent variables to

health through SOC. The total effects were calculated as the sum of the direct effects plus the indirect effects.

The conceptual model of SOC as a moderator of income and health is depicted in Figure 1b. To test this model, hierarchical regression analysis was employed adding a multiplicative interaction term (Income $\times$ SOC) to the regression of health on SOC, income and the control variables.^{33,39}

RESULTS

Almost two thirds (64%) of women reported *very good* or *excellent* health with an overall mean of 3.78 (out of a possible 5). Women in the lowest income group were about five times more likely to report *poor* or *fair* health (19%) than those in the highest income group (4%). The mean SOC score was 57.7 (out of a possible 78). Correlations between the variables are depicted in Table I. SOC was positively related to self-rated health ($r=0.28$; $p<0.001$). As expected, those with higher incomes were more likely to report better health ($r=0.21$; $p<0.001$). There was also a small but positive relationship between income and SOC ($r=0.16$; $p<0.001$). This relationship was also explored using analysis of variance (Figure 2). The mean of the SOC variable increased with each increment in the household income adequacy scale ($F[4, 6216] = 47.06$, $p<0.001$).

The results of the regression analysis to determine whether SOC is a mediator variable are displayed in Table II. Figure 3 presents the path diagram of the model derived from the regressions. Income exerts a direct effect on self-rated health ($\beta=0.18$; $p<0.001$), as well as an indirect effect [$\beta=0.03$ (0.12×0.28)] through SOC when controlling for age and marital status. The total effect of income on self-rated health was $\beta=0.21$. The indirect effect of income on health through SOC represented 14% (calculated as *indirect effect / total effect* or $0.03/0.21$) of the total effect of income on health, and provides evidence for SOC as a mediating or intervening variable.

Table III presents the results of the regressions to determine whether SOC moderates the income-health relationship. In the hierarchical regression of self-rated health on marital status, age, income, SOC and the cross-product term (Income $\times$ SOC), the Income $\times$ SOC term was statistically insignificant and there was no change in the amount of explained variance ($R^2\Delta=0.000$, $p=0.734$). Therefore, it may be concluded that SOC does not appear to moderate or buffer the relationship between SES and health.

DISCUSSION

This cross-sectional study has added to the knowledge of the determinants of health in

Canadian women aged 20–64. The positive but relatively small relationship between income and SOC lends support to the hypothesis that SES shapes SOC. Compared to the few other studies that have described a SOC and income relationship with inconsistent results,^{29,40,41} this study had a larger sample size. The finding of a link between income and SOC is consistent with studies that have found a relationship between economic hardship and low sense of control, a construct that shares some similarities with the SOC component of manageability.^{10,19,42,43} Financial resources may provide opportunities that allow more predictability in life experiences (sense of comprehensibility), and greater participation in meaningful pursuits (sense of meaningfulness). Adequate household income also may contribute to the perception that there are resources at one's disposal to meet demands, thereby enhancing a sense of control and manageability.

Evidence was found for a direct effect of income on self-rated health in women as well as a small indirect effect (14% of total effect) through SOC. This study, then, provided empirical support for another psychosocial variable, SOC, that may explain the relationship between SES and health. This intervening variable, along with other psychosocial variables such as sense of control, stress, and social ties, provides a greater understanding of how SES exerts its influence on health.^{7,9,10,42,44}

This study found that SOC did not moderate or buffer the adverse effect of low SES on health, as the nature of the relationship between income and health did not vary according to SOC level. These findings support other studies that SOC does not buffer the effects of adverse events and stress on health.^{28,35,36,45} Antonovsky¹⁹ hypothesized that SOC was integral to managing stress; perhaps a buffer effect would be detected if more proximal measures of financial or material insecurity were used, such as job insecurity or the subjective experience of financial stress, rather than income.⁸

A major limitation of this correlational study is the use of a cross-sectional survey and the inability to identify causal ordering. Future studies with other NPHS cycles could examine the relationship of SOC and health over time as well as the

TABLE III

Hierarchical Regression Analysis of Self-rated Health on Marital Status, Age, Income, SOC, and Income x SOC

Variable	B	SE	β	p
Step 1				
Constant	2.57	0.07		0.000
Marital Status	-0.05	0.03	-0.02	0.064
Age	-0.08	0.01	-0.20	0.000
Income	0.16	0.01	0.18	0.000
SOC	0.02	0.00	0.28	0.000
Step 2				
Constant	2.57	0.07		0.000
Marital Status	-0.05	0.03	-0.02	0.066
Age	-0.08	0.01	-0.20	0.000
Income	0.16	0.01	0.18	0.000
SOC	0.02	0.00	0.28	0.000
Income x SOC	0.00	0.00	0.00	0.734

Note: Step 1: $F[4, 6217] = 266.51$; $p < 0.001$. Adj $R^2 = 0.15$; Step 2: $F[5, 6216] = 213.20$; $p < 0.001$. Adj $R^2 = 0.15$. Sample weights were adjusted so that the mean = 1.

Self-rated health: (1 = poor to 5 = excellent). SOC scale: (possible range is 0–78).

Household income adequacy: (1 = lowest income to 5 = highest income).

Marital status: (1 = attached; 0 = unattached). Age: (Five-year cohorts from 20–24 years to 60–64 years).

Figure 3. Path Model of self-rated health, SOC, income, age, and marital status

Note: $n = 6222$. Standardized path coefficients (β) are reported. Unexplained variance = e . All reported path coefficients are significant at $p < 0.001$. Indirect effects calculated as the product of each variable's direct effect on SOC and SOC's direct effect on health. Net effects calculated as sum of direct and indirect effects. Sample weights were adjusted so that the mean = 1.

effects of changing household income on SOC.²⁶ Longitudinal studies could also determine if SOC in adult women is malleable to public health interventions. Another limitation of the study is the exclusion of some Canadian women, notably Aboriginal women living on reserves, many of whom experience low-income situations.

This study supports the need for public health interventions that target the socio-

economic conditions that influence health, and for strategies that foster the development of a strong sense of coherence. For example, the fostering of experiences that provide consistency, underload-overload balance, and participation in socially valued decision-making for individuals should be considered. During the early years of life, this support could include early intervention programs that assist families who experience personal and economic crisis. Public

health professionals should also advocate for adequate incomes and working conditions that allow meaningful participation in community life.⁴⁶ Community development projects, which foster participation in socially valued decision-making, may be particularly 'SOC-enhancing.' The inherent danger in the identification of another psychosocial construct that intervenes in the SES/health relationship, however, is that it may give undue emphasis to this factor rather than to the fundamental cause of the health inequities (i.e., SES).^{1,8} The recognition that salutogenic factors, such as SOC, are patterned by social, political, and economic forces should only underscore the importance of a socioenvironmental approach to health promotion that focuses on changing health inhibiting social and environmental contexts rather than focusing on individuals' responses to these contexts.^{1-3,6,15,47,48}

REFERENCES

- Link BC, Phelan J. Social conditions as fundamental causes of disease. *J Health Soc Behav* 1995;Extra Issue:80-94.
- Reutter LI. Socioeconomic determinants of health. In: Stewart MJ (Ed.), *Community Nursing. Promoting Canadians' Health*, 2nd ed. Toronto, ON: W.B. Saunders, 2000.
- Labonte R. Health promotion and empowerment: Practice frameworks. Toronto, ON: Centre for Health Promotion University of Toronto & ParticipAction, 1993.
- MacIntyre S. Understanding the social patterning of health: The role of the social sciences. *J Public Health Med* 1994;16(1):53-59.
- MacIntyre S. The Black report and beyond. What are the issues? *Soc Sci Med* 1997;44(6):723-45.
- Raphael D. Inequality is bad for our hearts: Why low income and social exclusion are major causes of heart disease, 2001. Available on-line at: <http://www.yorku.ca/wellness/heart.pdf>.
- Williams DR. Socioeconomic differentials in health: A review and redirection. *Soc Psychol Q* 1990;53(2):81-99.
- Wilkinson RG. *Unhealthy Societies: The Afflictions of Inequality*. London: Routledge, 1996.
- Adler NE, Boyce T, Chesney MA, Cohen S, Folkman S, Kahn RL, Syme SL. Socioeconomic status and health: The challenge of the gradient. *Am Psychologist* 1994;49(1):15-24.
- Lachman ME, Weaver SL. The sense of control as a moderator of social class differences in health and well-being. *J Personality Soc Psychol* 1998;3:763-73.
- Cohen M. Impact of poverty on women's health. *Can Fam Phys* 1994;40(May):949-57.
- Kaufert P. Gender as a determinant of health, 1996. Available on-line at: <http://www.hc-sc.gc.ca/canusa/papers/canada/english/gender.htm>.
- Love R, Jackson L, Edwards R, Pederson A. Gender and other social determinants, 1996. Available on-line at: <http://www.hc-sc.gc.ca/canusa/papers/canada/english/gender.htm>.
- Morris HM, Kerr JCR, Wood MJ, Haughey M. Health promotion and senior women with limited incomes. *J Community Health Nurs* 2000;17(2):115-26.
- Reutter L, Neufeld A, Harrison MJ. A review of the research on the health of low-income Canadian women. *Can J Nursing Res* 2000;32(1):21-26.
- Denton M, Walters V. Gender differences in structural and behavioural determinants of health: An analysis of the social production of health. *Soc Sci Med* 1999;48(9):1221-35.
- Clarke JN. *Health, Illness, and Medicine in Canada*, 2nd ed. Toronto, ON: Oxford University Press, 1996.
- Statistics Canada, Health Statistics Division. *National Population Health Survey Overview 1994-1995* (Catalogue 82-567). Ottawa: Statistics Canada, 1995.
- Antonovsky A. *Unravelling the Mystery of Health: How People Manage Stress and Stay Well*. San Francisco: Jossey-Bass, 1987.
- Antonovsky A. The salutogenic model as a theory to guide health promotion. *Health Prom Int* 1996;11(1):11-18.
- Geyer S. Some conceptual considerations on the sense of coherence. *Soc Sci Med* 1997;44(12):1771-79.
- Antonovsky A. The sense of coherence: An historical and future perspective. *Israeli J Med Sci* 1996;32:170-78.
- Antonovsky A. The structure and properties of the sense of coherence scale. *Soc Sci Med* 1993;36(6):725-33.
- Coe RM, Romeis JC, Tang B, Wolinsky FD. Correlates of a measure of coping in older veterans: A preliminary report. *J Community Health* 1990;15(5):287-96.
- Nyamathi AM. Relationship of resources to emotional distress, somatic complaints, and high-risk behaviors in drug recovery and homeless minority women. *Res Nursing Health* 1991;14:269-77.
- Kivimäki M, Feldt T, Vahtera J, Nurmi J. Sense of coherence and health: Evidence from two cross-lagged longitudinal samples. *Soc Sci Med* 2000;50(4):583-97.
- George VD. Field-workers' sense of coherence and perception of risk when making home visits. *Public Health Nursing* 1996;13(4):244-52.
- Hood SC, Beaudet MP, Catlin G. A healthy outlook. *Health Reports* 1996;7(4):25-32.
- Coward DD. Self-transcendence and correlates in a healthy population. *Nursing Res* 1996;34(2):115-21.
- Anson O, Rosenzweig A, Schwarzmans P. The health of women married to men in regular army service: Women who cannot afford to be ill. *Women & Health* 1993;20(1):33-45.
- Midanik LT, Soghikian K, Ransom LJ, Polen MR. Alcohol problems and sense of coherence among older adults. *Soc Sci Med* 1992;34(1):43-48.
- Feldt T. The role of sense of coherence in well-being at work: Analysis of main and moderator effects. *Work & Stress* 1997;11(2):134-47.
- Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Am Psychological Association* 1985;98(2):310-57.
- Wheaton B. Models for the stress-buffering functions of coping resources. *J Health Soc Behav* 1985;26:352-64.
- Carmel S, Anson O, Levenson A, Bonneh D, Maoz B. Life events, sense of coherence and health: Gender differences on the kibbutz. *Soc Sci Med* 1991;32(10):1089-96.
- Flannery RB, Flannery GJ. Sense of coherence, life stress, and psychological distress: A prospective methodological inquiry. *J Clin Psychol* 1990;46(4):415-20.
- Statistics Canada. *NPHS Public Use Microdata Documentation*. Ottawa, ON: National Population Health Survey, 1995.
- Tambay JL, Catlin G. Sample design of the National Population Health Survey. *Health Reports* 1995;7(1):29-38.
- Hayduk LA, Wonnacott YH. "Effect equations" or "effect coefficients": A note on the visual and verbal presentation of multiple regression interactions. *Can J Sociol* 1980;5(4):399-404.
- Horsburgh ME, Rice VH, Matuk L. Sense of coherence and life satisfaction: Patient and spousal adaptation to home dialysis. *ANNA Journal* 1998;25:219-28.
- Horsburgh ME. Salutogenesis: "Origins of health" and sense of coherence. In: Rice VH (Ed.), *Handbook of Stress, Coping and Health: Implications for Nursing Research, Theory and Practice*. Thousand Oaks, CA: Sage Publications, 2000.
- Ross CE, Wu CL. The links between education and health. *Am Sociological Rev* 1995;60:719-45.
- Sullivan GC. Towards clarification of convergent concepts: Sense of coherence, will to meaning, locus of control, learned helplessness and hardiness. *J Advanced Nursing* 1993;18:1772-78.
- Marmot M, Theorell T. Social class and cardiovascular disease: The contribution of work. *Int J Health Services* 1988;18(4):659-74.
- Kivimäki M, Kalimo R, Toppinen S. Sense of coherence as a modifier of occupational stress exposure, stress perception and experienced strain: A study of industrial managers. *Psychological Reports* 1998;82:971-81.
- Canadian Public Health Association. *Health Impacts of Social and Economic Conditions: Implications for Public Policy*. Ottawa, ON: Author, 1997.
- World Health Organization. *Ottawa Charter for Health Promotion*. Ottawa, ON: Canadian Public Health Association, 1986.
- Sword WA. Enabling health promotion for low-income single mothers: An integrated perspective. *Clinical Excellence for Nurse Practitioners* 1997;1(5):324-32.

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RÉSUMÉ

Objectif : Cette étude porte sur le rôle de la sensation de cohérence (SDC) dans la relation entre le revenu du ménage et l'état de santé auto-évalué chez les Canadiennes. La SDC est une orientation globale qui permet à l'individu de percevoir les événements du monde comme étant compréhensibles, contrôlables et significatifs.

Méthode : Nous avons analysé des données secondaires de l'Enquête nationale sur la santé de la population (1994-1995) en ne sélectionnant que les femmes de 20 à 64 ans (n=6 748). Les données ont fait l'objet d'analyses causales multivariées.

Résultats : La SDC est un facteur psychosocial qui intervient dans la relation entre le revenu et la santé. Elle ne joue toutefois pas un rôle de régulation des interactions susceptible d'atténuer les effets indésirables des faibles niveaux de revenu sur la santé.

Conclusion : L'étude confirme la validité des mesures de santé publique axées sur les conditions socio-économiques qui influencent la santé, et celle des stratégies favorisant le développement d'une SDC solide.