

## A B S T R A C T

In spite of the many benefits of regular physical activity, the majority of Canadians are sedentary. This paper examines the relationship between general social support and physical activity levels. An analysis of data on 29,135 individuals from the 1990 Ontario Health Survey was conducted. Hierarchical multiple regression was used to determine the relationship between measures of general social support, derived from factor analysis, and physical activity levels. Socio-demographic and perceived health status measures were included as control variables. The results showed that general social support, in the form of Social Quantity and Social Frequency (number of friends/ family members and frequency of contact), was significantly associated with higher levels of physical activity. Conversely, support in the form of Familial Structure (marital/cohabitation and parental status) was significantly associated with lower levels of physical activity. The findings indicate the types of general social support that facilitate or hinder participation in physical activity.

## A B R É G É

Malgré les nombreux avantages de l'activité physique régulière, la majorité des Canadiens sont sédentaires. L'étude porte sur la relation entre le soutien social global et les niveaux d'activité physique. Nous avons extrait de l'Enquête sur la santé en Ontario de 1990 des données sur 29 135 personnes. Une analyse de régression hiérarchique multiple a permis de déterminer le lien entre les mesures du soutien social global (dérivées d'une analyse factorielle) et les niveaux d'activité physique. Comme variables de contrôle, nous avons inclus des mesures socio-démographiques et des mesures de l'état de santé perçu. Les résultats montrent que le soutien social global, vu sous l'angle de la quantité des contacts sociaux (nombre d'amis/de membres de la famille) et de leur fréquence, présente une corrélation significative avec des niveaux d'activité physique élevés. Réciproquement, le soutien vu sous l'angle de la structure familiale (état matrimonial/cohabitation et qualité parentale) présente une corrélation significative avec de faibles niveaux d'activité physique. Ces constatations permettent de déterminer les types de soutien social global qui favorisent ou entravent l'activité physique.

# General Social Support and Physical Activity: An Analysis of the Ontario Health Survey

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Considerable epidemiological and physiological evidence indicates that regular aerobic physical activity has substantial benefits for the cardiovascular and other systems of the body.<sup>1,2</sup> Specific health benefits of regular physical activity and fitness include reduced risk of all-cause mortality and several specific conditions.<sup>3-5</sup> In addition, physical activity has been shown to be inversely related to depression, anxiety, and stress.<sup>6-8</sup>

Despite the substantial benefits associated with involvement in physical activity, studies have shown that the majority of Canadians are sedentary. It has been estimated that only 11% of Canadians engage in aerobic activity three to four times a week, for 30 minutes or more at 50% or more of individual capacity (requirement for cardiovascular benefit).<sup>9</sup> In Ontario it has been estimated that just over 67% of the population are inactive (those averaging less than 1.5 kcal/kg/day of estimated energy expenditure).<sup>10</sup>

Several theoretical frameworks and concepts have been used to explain and predict physical activity participation, such as: the Theory of Reasoned Action, the Theory of Planned Behavior, the Health Belief Model, the Transtheoretical Model, self-efficacy, social support, and physical activity enjoyment, indicating that the determinants of physical activity are multifaceted.<sup>11,12</sup>

Another approach to understanding the determinants of physical activity is to examine the concept of general social support and its relationship to health behaviour. A substantial amount of research has shown the beneficial effects of general social support in relation to mortality and morbidity.<sup>13-15</sup> Specifically, structural dimensions of support signifying social integration are positively related to mental and physical health. Furthermore, the functional dimension of affective support appears to be most strongly and consistently associated with good health and well-being.<sup>13,16</sup> However, these relationships appear to be at least partly related to age and gender since women over the age of 55 show somewhat less positive effects from receiving and giving support.<sup>13,17</sup>

Existing research that has specifically examined the relationship between general social support (non-exercise specific) and physical activity behaviour, has shown that higher levels of support – such as greater involvement in social organizations, more frequent contact with family and friends, and greater amounts of emotional support from others – are associated with higher levels of physical activity participation.<sup>18-23</sup>

The purpose of the current paper is to examine the relationship between general social support and levels of physical activity among a sample of Ontario adults. We hypothesized that general social support would be related to higher levels of physical activity.

## METHODS

The 1990 OHS is a provincial survey of households and individuals.<sup>24</sup> The sample (N= 29,135) for the current analysis includes those respondents: 18 to 59 years of age, not pregnant, not bed-ridden for 1 or more days of the past 14, and having no

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mental or physical limitations. The mean age for the sample was 37 years (SD = 11.25). The analytic sample was comprised of 51.4% females and 48.6% males. Eighty percent of the sample had a total household income of \$30,000 or more, while 70% had completed at least secondary level education, and 94% perceived their health as good, very good or excellent in comparison to individuals of the same age.

The dependent variable is represented by the derived continuous variable, energy expenditure. This variable was derived from the answers respondents gave to questions concerning the type and level of specific forms of physical activity. This measure is a version of the Minnesota Leisure Time Activity Questionnaire,<sup>25</sup> which has shown acceptable levels of reliability and validity.<sup>26</sup>

Respondents answered yes or no to the question, "Have you participated in the following physical activities during the last month?" A list of 19 activities included such items as: walking for exercise, bicycling, running or jogging, ice skating, golf, weight training, dancing, and others. Respondents were instructed to record the exact number of times they participated in each activity during the last month, to determine frequency; and how much time they usually spend on each occasion from: 1-15 minutes; 16-30 minutes; 31-60 minutes; more than 1 hour, to determine duration. Intensity of physical activity was based on an estimate of average MET values for each of the types of physical activity listed.<sup>27</sup>

This measure of physical activity does not include non-leisure activities (i.e., activities of daily living, work). However, an earlier analysis of the OHS indicated that the inclusion of non-leisure physical activity (daily activities) did not diminish the effects of original predictor variables on energy expenditure.<sup>10</sup>

#### Independent variables

Eight general social support items utilized from the OHS include both structural/quantity (number of close friends and family, frequency of contact with family and close friends, social contact during leisure, marital status, parental status and organization membership) and function-

al/quality (ability to confide in others, instrumental aid, social satisfaction) domains.

A factor analysis conducted by the authors resulted in four factors of general social support: Familial Structure (primarily composed of two items: parental and marital status), Social Quantity (two items: number of close relatives and number of close friends), Functional Support (two items: emotional and instrumental support), and Social Frequency (two items: frequency of meeting close friends and relatives).

The alpha reliabilities for scales comprised of the items loading most heavily on each of the four factors were as follows: Familial Structure = 0.74, Social Quantity = 0.54, Functional Support = 0.52 and Social Frequency = 0.31.

Additional variables included in the analysis were as follows: gender, age (18 to 59), household income (ranging from no income to \$80,000 or more), education (primary or less to completed post-secondary), and perceived health status compared to others (poor to excellent). These variables have been previously shown to be significant predictors of physical activity behaviour.<sup>10</sup>

#### Analysis

The first step in the analysis provided descriptive statistics for the unweighted sample. Hierarchical multiple regression was then used to examine the relationship between social support and physical activity when controlling for a number of possible additional variables. In order to correct for the design effect of the sample, the weighted effective sample size ( $n = 9,944$ ) was used as the basis for determining the statistical significance of the multiple regression results. The method of entry was determined by the hierarchy of variables found to predict energy expenditure; those with a probability (from correlation results) of explaining greater variance were entered first.

#### RESULTS

The mean energy expenditure was 1.38, with a standard deviation of 2.07. According to Campbell's Survey of Well-

Being,<sup>28</sup> this represents a level of physical activity just below the amount that provides benefit to cardiovascular health. The minimal requirement for experiencing some cardiovascular benefit was given as the range of 1.5 to 2.9 kcal/kg/day.<sup>28</sup> Above 2.9 is the desired level of physical activity required for cardiovascular benefit.<sup>24</sup>

#### Hierarchical multiple regression analysis

Logged Energy Expenditure was regressed on nine independent variables entered in the following blocks: 1) age and gender; 2) education and income; 3) health status compared to peers; and 4) the four social support factor scores representing Functional Support, Social Frequency, Social Quantity and Familial Structure. Regression models indicating the sequence of changes for each block of variables entered are shown in Table I.

The largest amount of variance (5.7%) explained was due to age and gender. The next largest amount of variance explained (3.1%) was made by the four measures of social support. Perceived health contributed the next largest amount of explained variance (2.3%). The variables education and income contributed the least amount of explained variance (1.4%). The complete model explained 12.5% of the variance in energy expenditure.

The individual predictors with the strongest effects on energy expenditure were the social support variable, Familial Structure ( $\beta = -0.169$ ) and the control variable, Perceived Health ( $\beta = 0.139$ ). The control variables age and gender had the next largest effects ( $\beta = -0.114$  and  $\beta = 0.114$ , respectively). Weaker effects were shown for the two social support variables, Social Quantity ( $\beta = 0.083$ ) and Social Frequency ( $\beta = 0.052$ ); and two control variables: education ( $\beta = 0.070$ ) and household income ( $\beta = 0.061$ ). Functional Support ( $\beta = -0.010$ ) was not significant.

In summary, the results indicate that Familial Structure (being married and having children) was significantly predictive of lower levels of physical activity. However, other social support factors, including Social Quantity and Social Frequency, were predictive of higher levels of physical activity. Although the effects of three out

**TABLE I**  
**Hierarchical Multiple Regression of Energy Expenditure (log)**  
**on Independent Variables**

Model	Variable	Standardized Coefficients	Adjusted R Square
1	Age	-0.200	0.057
	Gender (male)	0.130	
2	Age	-0.198	0.071
	Gender (male)	0.125	
	Education	0.086	
	Household Income	0.066	
3	Age	-0.193	0.094
	Gender (male)	0.124	
	Education	0.066	
	Household Income	0.057	
	Perceived Health	0.154	
4	Age	-0.193	0.125
	Gender (male)	0.124	
	Education	0.066	
	Household Income	0.057	
	Perceived Health	0.154	
	Functional Support*	-0.010	
	Social Frequency	0.052	
	Social Quantity	0.083	
	Familial Structure	-0.169	

All values significant at  $p < 0.001$ , except for Functional Support\* which is not significant.

of four social support factors were significant, they were not particularly large (Betas all below 0.17). As expected, older respondents (from this 18 to 59 year-old group) were more likely to engage in lower levels of activity. Those who perceived themselves to be more healthy compared to their peers, those who were male, those who had higher levels of education and income, and those with larger numbers of friends and family they saw frequently, engaged in higher levels of physical activity.

## DISCUSSION

Although causality cannot be inferred due to the cross-sectional data, a number of processes may explain the positive association of Social Quantity and Social Frequency with physical activity. Frequently interacting within a large social support network (signified by Social Quantity and Social Frequency) may provide an individual with information on such issues as the benefits of participation and opportunities available.<sup>15,29</sup> Network members may also provide assistance, such as child care, while the parent engages in physical activity. Involvement in a large social network can also influence an individual's identity and self-esteem through

positive interaction (e.g., companionship, love, assistance), and this may lead to increased motivation to care for one's self, and engage in beneficial health behaviours such as physical activity.<sup>15</sup> The social network can also influence the individual through attitudes, values and models of the behaviour.<sup>29</sup> An alternative view is that engaging in a program of regular physical activity may expose the individual to opportunities of social contact, which could increase levels of social frequency and quantity.

While additional structural dimensions of social support were expected to be positively related to physical activity, this was not the case for Familial Structure. Familial Structure, comprised of being married (or cohabiting) and/or having children, is associated with lower levels of physical activity.

The negative effect of Familial Structure on physical activity appears to be something other than a simple age effect (age was entered before social support in the multiple regression analysis). The association may be something inherent to maintaining a program of physical activity itself (i.e., time commitment) and/or the demands placed on the individual from family responsibilities. Perceived or real barriers to physical activity have been

shown to be significant negative influences on physical activity adherence.<sup>30-32</sup> The negative impact of Familial Structure on physical activity may be due to the structural barrier of family responsibilities. The change to one's life from marriage and having children likely decreases the amount of discretionary time individuals have for themselves to engage in leisure pursuits, such as physical activity.<sup>33,34</sup> As one anonymous reviewer noted, it may also explain why those who have more frequent contact with significant others, may simply have more time to do so, and also have more time to engage in leisure pursuits such as physical activity.

## LIMITATIONS

Due to the cross-sectional design of the study, causality cannot be inferred, therefore further research is needed using different designs (e.g., longitudinal) to determine the specific relationship and direction between physical activity and general social support. It should also be remembered that general social support is only one of many factors that influence physical activity behaviour – further research should include general social support with other known determinants of physical activity in more comprehensive designs.

## IMPLICATIONS FOR POLICY AND PROGRAMS

The results of this analysis have implications for policy and programs. One finding was that general social support, as measured by Social Frequency and Social Quantity, was predictive of physical activity. It follows that, in constructing programs of physical activity, attention should be paid to fostering social relations. One possibility in developing social relationships might be to focus on the task of physical activity and provide an opportunity for participants to share the experience together in a partner or group format, which has been shown to increase physical activity adherence levels.<sup>35</sup> Furthermore, social aspects can be targeted for program participants that do not involve physical activity directly. Social interaction might involve outings where participants experi-

ence and share different leisure activities, such that personal relationships may strengthen and foster greater involvement in physical activity.

Since the current analysis showed that Familial Structure was a negative predictor of physical activity, attention should be paid to those individuals who find it difficult to participate due to family obligations. Some fitness centres have responded to this concern through the establishment of day care services for children of parents who participate, and also offering physical activity programs that incorporate dual participation of child and parent in the same physical activity routine.

In summary, the findings provide additional impetus for programs and policies that enhance physical activity through social support by enhancing social interaction of participants and providing program support for those whose family circumstances make participation in physical activity difficult. Further research is needed to bring about a greater understanding of the relationship between physical activity, general social support and other determinants of physical activity.

#### ACKNOWLEDGEMENTS

We thank Dr. Edward Adlaf of the Centres for Addiction and Mental Health and Dr. Larry Leith of the Faculty of Physical Education and Health, University of Toronto, and two anonymous reviewers for comments.

#### REFERENCES

1. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General*, 1996.
2. Qinney H, Gauvin L, Wall E (Eds.). *Toward Active Living: Proceedings of the International Conference on Physical Activity, Fitness, and Health*. Windsor, ON: Human Kinetics, 1994.
3. Powell K, Thompson P, Casperson C, Kendrick J. Physical activity and the incidence of coronary heart disease. *Annu Rev Public Health* 1987;8:253-87.
4. Powell K, Kreuter M, Stephens T, et al. The dimensions of health promotion applied to physical activity. *J Public Health Policy* 1991;12:492-509.
5. Blair S, Kohl H, Paffenbarger R, et al. Physical fitness and all cause mortality: A prospective study of healthy men and women. *JAMA* 1989;262:2395-401.
6. Shephard R. *Aerobic Fitness and Health*. Windsor, ON: Human Kinetics, 1994.
7. Stephens T. Physical activity and mental health in the United States and Canada: Evidence from four population surveys. *Prev Med* 1988;17:35-47.
8. Leith L. *Foundations of Exercise and Mental Health*. Morgantown, WV: Fitness Information Technology, Inc., 1994.
9. Gauthier P, Haman A. *Canadian Social Trends: Physical Fitness*. Statistics Canada, 1992.
10. Allison K. Predictors of inactivity: An analysis of the Ontario Health Survey. *Can J Public Health* 1996;87:354-58.
11. Willis J, Campbell L. *Exercise Psychology*. Champaign, IL: Human Kinetics, 1992.
12. Godin G, Shephard R. Use of attitude-behavior models in exercise promotion. *Sports Med* 1990;10:103-21.
13. Glanz K, Marcus-Lewis F, Rimer B. *Health Behavior and Health Education: Theory Research, and Practice*, 2<sup>nd</sup> ed. San Francisco: Jossey-Bass Inc, 1997.
14. House J, Landis K, Umberson D. Social relationships and health. *Science* 1988;241:540-45.
15. Cohen S. Psychosocial models of the role of social support in the etiology of physical disease. *Health Psychol* 1988;7:269-97.
16. Thoits P. Stress, coping, and social support processes: Where are we? What next? *J Health Soc Behav* 1995;53-79.
17. Shumaker S, Hill D. Gender differences in social support and physical health. *Health Psychol* 1991;10:102-11.
18. Gottlieb N, Green L. Life events, social network, life-style, and health: An analysis of the 1979 National Survey of Personal Health Practices and Consequences. *Health Educ Q* 1984;11:91-105.
19. Potts M, Hurwicz M, Goldstein M, Berkanovic E. Social support, health-promotive beliefs, and preventive health behaviours among the elderly. *J Appl Gerontol* 1992;11:425-40.
20. Eaton C, Reynes J, Assaf A, et al. Predicting physical activity change in men and women in two New England communities. *Am J Prev Med* 1993;9:209-19.
21. Krause N, Goldenhar L, Liang J, et al. Stress and exercise among the Japanese elderly. *Soc Sci Med* 1993;36:1429-41.
22. McDonough P, Rootman I, Corey P, Ferrence R. Working paper No. 4: Interrelations among health behaviours. *Ontario Health Survey 1990: Working Papers*. Toronto: Ontario Ministry of Health, 1993.
23. Osler M. Social network and lifestyle in Danish adults. *J Epidemiol Community Health* 1995;49:327-28.
24. Ontario Ministry of Health. *Ontario Health Survey 1990: Users Guide Vol. 1, Documentation, and Vol. 2, Microdata Manual*. Toronto: Ontario Ministry of Health, 1992.
25. Taylor H, Jacobs D, Shucker B, et al. Questionnaire for the assessment of leisure-time physical activities. *J Chron Dis* 1978;31:741-55.
26. American College of Sports Medicine. A collection of physical activity questionnaires for health-related research. *Med Sci Sports Exerc* 1997;29:62-63.
27. Canada Fitness Survey. *Fitness and Lifestyle in Canada*. Ottawa, ON: Canadian Fitness and Lifestyle Institute, 1983.
28. Stephens T, Craig C. *The Well Being of Canadians: Highlights of the 1988 Campbell's Survey*. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute, 1990.
29. Gottlieb B. The meaning and importance of social support. In: Quinney H, Gauvin L, Wall E (Eds.). *Toward Active Living: Proceedings of the International Conference on Physical Activity, Fitness, and Health*. Windsor, ON: Human Kinetics, 1994; 227-32.
30. Sallis J, Hovell M, Hofstetter C, et al. A multivariate study of the determinants of vigorous exercise in a community sample. *Prev Med* 1989;18:20-34.
31. Frankish C, Milligam C, Reid C. A review of relationships between active living and determinants of health. *Soc Sci Med* 1998;47:287-301.
32. Allison K, Dwyer J, Makin S. Perceived barriers to vigorous physical activity among high school students. *Prev Med* 1999;28:608-15.
33. Schmitz K, French S, Jeffery R. Correlates of changes in leisure time physical activity over 2 years: The healthy worker project. *Prev Med* 1997;26:570-79.
34. Sternfeld B, Ainsworth B, Quesenberry C. Physical activity patterns in a diverse population of women. *Prev Med* 1999;28:313-23.
35. Wankel L. The importance of enjoyment to adherence and psychological benefits from physical activity. *Int J Sport Psychol* 1993;24:151-69.

Received: November 25, 1999

Accepted: November 16, 2000