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PHYSICAL ACTIVITY BEHAVIORS AND MOTIVATIONS IN AN ADULT FIRST NATION POPULATION: A PILOT STUDY

Objectives: To explore the potential utility of the theory of planned behavior in predicting physical activity behaviors and intentions in a sample of First Nation adults and to determine the behaviors and salient beliefs of First Nation adults as they relate to engaging in physical activity.

Design: 35 women and 18 men from the Westbank First Nation community completed a mail-out questionnaire based on the theory of planned behavior. Follow-up focus groups were used to elicit accessible beliefs and to determine actual behaviors ($N=12$).

Results: Intention significantly explained 16% of the variance in behavior. Only affective attitude and perceived behavioral control predicted intention but explained 50% of the variance. Qualitative analyses revealed that despite similarities, First Nation adults may engage in culturally specific activities and may have unique salient beliefs compared with the general population.

Conclusion: To increase intentions, interventions should focus on the affective benefits of being physically active and promote activities perceived as easy to do with facilities that are accessible. (*Ethn Dis.* 2009;19:42–48)

Key Words: First Nation, Physical Activity, Theory of Planned Behavior, Pilot Study

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INTRODUCTION

Despite research showing the benefits of regular physical activity,^{1–3} approximately half of all Canadian adults remain inactive,⁴ and this is true of Aboriginal populations as well.^{5–7} With few exceptions, relatively little physical activity literature exists for Aboriginal populations, despite the fact that Aboriginal health in Canada lags behind that of the national population.⁸ High or increasing rates of obesity,⁹ diabetes,¹⁰ and cardiovascular disease^{11,12} are now commonplace in many Aboriginal communities.¹³ Thus, physical activity promotion based on evidence of the correlates of activity with Aboriginal communities is a public health priority.

Social cognitive theories have been used in physical activity research extensively in an attempt to understand key physical activity correlates to target interventions.^{14,15} Few studies have applied social cognitive theories with Aboriginal populations,⁸ which have tended to favor social-ecological models¹⁶ or the indigenous holistic medicine wheel¹⁷ instead. To our knowledge, the theory of planned behavior (TPB) has not been applied to research with Aboriginal populations, despite meta-analytic reviews^{18,19} reaffirming the theory's predictive utility in the general physical activity research domain. According to the TPB, the immediate influence on performing a given behavior is the strength of a person's

intentions.¹⁴ Intentions generally reflect a readiness to perform a given behavior and are determined by a person's 1) affective and instrumental attitudes toward the behavior, 2) perceived social expectations of performing the behavior, and 3) expectations about their control over performing the behavior. Further, the latter can influence a given behavior independent of intention to the extent that perceived control reflects actual control.

Generally, to predict behavior, direct measures of the TPB will suffice.²⁰ To understand the foundations of TPB constructs, however, underlying belief level constructs should be elicited.^{14,20} These include the specific behavioral (eg, physical activity will help me prevent heart disease), normative (eg, my friends would approve of me being active), or control (eg, I lack the time to be active) beliefs that composite attitudes, subjective norm, and perceived behavioral control, respectively. Furthermore, these beliefs are considered the necessary targets for intervention.²⁰

The purpose of this pilot study was to explore the potential utility of the TPB in predicting physical activity behaviors and intentions in a sample of First Nation adults. Based on general TPB and physical activity literature,¹⁵ we hypothesized that attitudes, particularly affective attitude²¹ and perceived behavioral control, would predict intentions and that intentions would predict physical activity. A secondary purpose of this study was to determine the behaviors and salient physical activity beliefs of First Nation adults using focus group or sharing circle methods.

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The purpose of this pilot study was to explore the potential utility of the theory of planned behavior in predicting physical activity behaviors and intentions in a sample of First Nation adults.

METHODS

Setting

The research setting was the Westbank First Nation (WFN) community. The WFN is located in south central British Columbia adjacent to the city of Kelowna. The WFN has 557 members and is one of seven First Nation communities that make up the Okanagan Nation. WFN leaders expressed an interest and a willingness to collaborate in this research project, and ethical approval was obtained from the university's institutional review board and the WFN community. Questionnaire data were collected during the spring of 2006 via standardized prepaid survey mail-out procedures.²² The mailing included the initial study package and questionnaire followed by a postcard reminder and second questionnaire one month later for those who had not responded. In order to ensure confidentiality and anonymity, all procedures were conducted through a third party (the WFN recreation department). As an incentive, participants were informed that the researcher would donate \$5 to the WFN recreation department for youth-based initiatives for every questionnaire returned. The total mail-out sample was 340 participants.

Participants

Participants were 53 adults aged ≥ 18 years from the WFN (16% response rate). The mean age of the

participants was 43.3 years (standard deviation 13.0), 66% were female and living with a partner, and most participants (68%) reported a household income $> \$20,000$. Further, 87% of the sample reported that they were currently employed, and the mean body mass index (calculated from reported height and weight) was 25.5 kg/m^2 (standard deviation 4.4).

Several participants indicated on the survey that they were interested in further volunteering their time for focus groups. A total of 12 WFN members participated in the focus group discussion to elicit TPB beliefs. Discussions took place within the WFN community to provide comfortable, familiar, and easily accessible surroundings. Personal identifiers were removed and anonymity maintained for reporting of the results. Interview responses were recorded via audiotape with the permission of the participants. Any data that were gathered and any knowledge generated were subject to the Aboriginal research principles of ownership, control, access and possession.²³

Instrumentation

Physical activity was defined as per the Public Health Agency of Canada, which recommends that at a moderate intensity, persons should engage in physical activity on four or more days per week for ≥ 30 minutes each time.²⁴ Participants were asked to use this definition when answering the physical activity questions.

Physical activity was measured by using the Godin Leisure Time Exercise Questionnaire (GLTEQ).²⁵ Participant responses were scored to reflect the total weekly frequency of physical activity at moderate and strenuous intensities of ≥ 30 minutes to be congruent with national recommended guidelines.²⁶ The GLTEQ demonstrated a one month test-retest reliability of .62 and concurrent validity coefficients of .32 with an objective activity indicator (CALTRAC accelerometer), .56 with

maximal oxygen consumption ($\text{VO}_{2\text{max}}$, as measured by expired gases), and $-.43$ with percentage of body fat (as measured by hydrostatic weighing).²⁷

Intention, defined as the readiness to act, was assessed by three items.²⁸ An example item was "I intend to engage in regular physical activity over the next month" (from 1, extremely untrue, to 7, extremely true). The reliability for these three items was $\alpha = .94$, which is similar to published reliabilities with this measure.²⁸

Perceived behavioral control, defined as the ability to perform the behavior, was assessed by six items that tap the capability and controllability aspects of the construct.²⁸ An example item was "If you were really motivated, how controllable would it be for you to engage in regular physical activity over the next month?" (1, extremely uncontrollable, to 7, extremely controllable). Exploratory factor analysis with oblique rotation suggested a single factor solution for these items similar to previous research.²⁸ The reliability was $\alpha = .91$.

Attitude, defined as the overall affective and instrumental evaluations of a behavior, was assessed by using a seven-point semantic differential format with three items for affective attitude (extremely unenjoyable to extremely enjoyable) and instrumental attitude (extremely harmful to extremely beneficial). Exploratory factor analysis with oblique rotation suggested a clean two-factor solution for these constructs. The reliability for instrumental attitude was $\alpha = .76$ and the reliability for affective attitude was $\alpha = .80$, which is similar to prior research.²⁸

Subjective norm was assessed by six items with injunctive (perceived pressure to act) and descriptive content (perceived actions of others) on seven-point scales from previously validated items.²⁸ An example item was "I think that if I were to engage in regular physical activity over the next month, most people who are important to me would be" (1, extremely disapproving, to 7, extremely approving). Exploratory

factor analysis with oblique rotation suggested a clean two-factor solution for these two constructs. The reliability for the injunctive norm items was $\alpha=.92$ and the reliability for the descriptive norm items was $\alpha=.86$.

Focus Group Questions

Participants were asked questions that elicited responses related to the meanings of physical activity as a WFN adult. They were then asked to describe the types of activities WFN members engaged in. Finally, questions as per the TPB²⁰ designed to elicit the salient beliefs of the participants related to engaging in physical activity were posed: "What do you believe are the advantages of engaging in physical activity?" Some of the questions were modified to ensure a First Nation perspective was captured. For example, "Are there any factors or circumstances related to your culture, ways of living, or history that would allow you to do physical activity?"

Data Analysis Plan

Descriptive statistics and correlations between behavior and the TPB constructs were analyzed, followed by multiple hierarchical regression analyses based on the tenets of TPB.¹⁴ The first regression analysis involved the prediction of physical activity and the second involved the prediction of intention. Including variables in mediation models depends on the strength of their bivariate correlations to the dependent variable.²⁹ Including constructs that predict intention but do not initially correlate with physical activity would only lead to spurious regression results. Thus, only those TPB variables that significantly correlated with physical activity to at least the $P<.10$ level were entered into the regression equation.²⁹

Responses to the focus group questions were transcribed verbatim. The transcription and audiotape were cross-referenced for accuracy. Initially, each transcript was reviewed independently, and the TPB provided the initial con-

ceptual and orientational framework for data analysis.³⁰ Using an editing analysis approach,³¹ open coding of behavioral, normative, and control beliefs were highlighted and subsequently classified as nodes. Using axial coding analysis techniques, patterns and themes were identified advancing the analytical process from the categorical to the thematic.³² In order to use the information to compare WFN beliefs to those of non-First Nation populations¹⁹ and do more than report on the emergent themes, the data were recontextualized in terms of the literature and TPB.³²

RESULTS

Quantitative Results

Of the demographic correlates, sex (women were less active) was significantly correlated with physical activity but not the TPB variables, while income and job status were significantly correlated with instrumental attitude (Table 1). Only affective attitude, perceived behavioral control (PBC), and intention were correlated with physical activity. Therefore, these constructs were the only ones entered into the regression equations to predict physical activity.

Results of the prediction analysis indicated that intention alone explained 16% of the variance in physical activity behavior (Table 2). The additions of PBC and affective attitude in subsequent steps did not contribute anything further to the prediction of physical activity. Thus, intention mediated the relationship between affective attitude and PBC with physical activity.²⁹ For the prediction of physical activity intention, affective attitude and PBC explained 50% ($P<.01$) of the variance with independent contributions.

Qualitative Results

WFN adults described participation in both culturally and non-culturally oriented activities. Participants described activities that could be catego-

rized as sport (eg, softball), leisure-time physical activity (eg, jogging), non-leisure-time physical activity (eg, occupational activity), and First Nation traditional activities (eg, fishing and hunting). Table 3 presents the types of physical activities in which WFN adults reported their involvement.

When commenting on their behavioral beliefs, focus group participants spoke of holistic realms that encompassed mind, body, and community and described both advantageous and disadvantageous outcomes of physical activity: "I think you can take a look at the community and the people who are physically active and you can see that they are healthy mind-wise as well as physically."

Other members' comments characterized the benefits of physical activity in more general terms like living longer, looking good, and preventing disease. The negative consequences of physical activity on the body were also noted. Several comments suggested that physical activity could lead to injury, which in turn leads to missing work, taking away from family priorities and paying for rehabilitation and physical therapy.

Focus group participants also recognized the social advantages of meeting others and connecting when engaging in an active lifestyle at the community level: "We can go and play ball with other ladies and it's a chance to get together as women. Now it gives us a chance for companionship."

Normative beliefs are those about who in a person's social network would approve of a given behavior.¹⁴ When reflecting on normative beliefs, focus group participants cited proximal and distal social networks, as well as general social figures, perceived as approving or disapproving of involvement in physical activity. Proximal family members who would approve were grandchildren and daughters, whereas spousal partners were thought to both approve and disapprove of activity. In their distal social network, community coaches,

Table 1. Descriptive statistics and correlations (r) for demographic variables, theory of planned behavior constructs, and physical activity among Westbank First Nation members, British Columbia

Variable*	2	3	4	5	6	7	8	9	10	11	12	13	Mean (SD)
1. Age	.11	-.28	.05	-.19	-.03	-.11	-.15	-.05	.12	-.20	-.03	-.07	43.3 (13.0)
2. Sex		.15	-.01	-.16	-.13	.05	.27	.12	.27	.01	.12	-.30†	
3. Income			.18	.26	-.01	.09	.30‡	.24	.05	.15	.20	.14	
4. Marital status				.07	.08	.04	.01	-.11	-.07	.24	.05	.20	
5. Employment status					-.06	.27	.33‡	.03	.08	.20	.23	.11	
6. Body mass index						-.08	.23	.24	.08	.16	.14	.14	
7. Affective attitude							.46§	.16	.32‡	.43§	.63§	.26†	5.37 (1.12)
8. Instrumental attitude								.35‡	.42§	.41§	.52§	.15	6.25 (.74)
9. Injunctive norm									.53§	.35‡	.27‡	.05	5.79 (.94)
10. Descriptive norm										.46§	.46§	.17	5.01 (1.03)
11. PBC											.59§	.32‡	5.58 (1.18)
12. Intention												.40§	5.25 (1.42)
13. Physical activity frequency													3.65 (3.79)

SD = standard deviation, PBC = perceived behavioral control.

* Employment status was coded 1 = employed, 2 = unemployed; sex was coded 1 = male, 2 = female; marital status was coded 1 = not living with a partner, 2 = living with a partner.

† Correlation is significant at the $P < .10$ level.

‡ Correlation is significant at the $P < .05$ level.

§ Correlation is significant at the $P < .01$ level.

diabetes coordinators, and physicians were identified as approving figures, while some non-familial acquaintances were viewed as disapproving.

Finally, WFN adults' control beliefs were focused on personal, environmental, and cultural barriers/facilitators. Many of the comments from the participants were indicative of the idea that personal factors affected their choices to be physically active. Indeed, focus group participants described more personal barriers (lack of "money," "transportation," "being too shy," and use of "drug and alcohol") than facilitators ("my job") to being active.

Personal factors were categorized as those things that related to and stemmed from the self and their life situations such as single parenthood, personal health, money or even lack of equipment. Such factors were primarily reflected upon as barriers to being physically active. While personal factors appeared to act only as barriers, physical environmental factors such as access to facilities and social environmental factors such as social support were perceived as both facilitators and barriers to physical activity. In their community environment, the aesthetics of the natural environment, access to a wide

variety of facilities, and support groups enabled their activity: "Well, we have the gym, we have the ball parks, we have golf courses, we have, what else do we have? I mean even in the surrounding areas we have tennis courts, everything is available in a do-able vicinity so that you can get there if you have to."

Despite having a recreation center available, one participant wished she had greater access to equipment, including borrowing equipment to use at home. Another participant noted that she found gyms to be intimidating environments, which she chose to avoid. The issue of lack of safety was also

Table 2. Hierarchical multiple regression analysis of theory of planned behavior constructs predicting physical activity intention and behavior among Westbank First Nation members, British Columbia

Step/Predictor	F	F change	df	R ² change	β ₁	β ₂	β ₃
<u>Physical Activity</u>							
1. Intention	9.31‡	9.31	1,48	.16	.40‡	.33†	.38*
2. PBC	4.10‡	.73	1,47	.01		.17	.14
3. Affective Attitude	3.26	.00	1,46	.00			-.01
<u>Intention</u>							
Affective attitude	23.34‡	NA	2,47	.50			
PBC					.36‡		
					.48‡		

df = degrees of freedom, β = standardized regression coefficient, PBC = perceived behavioral control, NA = not applicable.

* Correlation is significant at the $P < .10$ level.

† Correlation is significant at the $P < .05$ level.

‡ Correlation is significant at the $P < .01$ level.

Table 3. Types of physical activities mentioned by Westbank First Nation adults in group discussions

Organized Sport	Leisure-Time Physical Activity	Non-Leisure-time Physical Activity	Traditional Activities
Softball	Jogging	Yard work	Fishing
Basketball	Weight lifting	Occupational activity	Hunting
Golf	Aerobics	Housework	Skinning
Rodeos	Fitness gym	Stairs at work	Native dancing
Ice Hockey	Swiss ball	Walking at work	Trapping
	Pilates	Gardening	Horseback riding
	Walking		Chopping wood
	Biking		Berry picking
	Hiking		Canoeing
	General dancing		Lacrosse
	Snowboarding		Vision quest
	Tobogganing		
	Snow sledding swimming		
	Playing with children		
	Aqua exercise		
	Walking the dog		
	Horseshoes		

brought up by a few of the participants: “loose dogs and too many crazy people” and the absence of bike paths inhibited exercise.

Finally, it was suggested that there was a lack of exercise support and education on the benefits of physical activity for adults in spite of the existence of a full time recreation coordinator. There were programs for youth and there were programs for elders, but there were not that many programs offered by the community for younger to middle aged people.

Just as the environment in which the community members lived acted as a facilitator and barrier, so too was the effect of First Nation culture. As one participant reflected, “First Nation people are so absorbed into European culture that they have lost some of the traditions that were, in and of themselves, physically active.” The persistence of some traditions, although not as prevalent as they once were, have functioned to facilitate physical activity, such as pow wows, hunting, fishing and trapping. There was also a consensus among several of the participants that more activities needed to be planned that were cultural in nature, a sort of resurgence in First Nation tradition that would facilitate physical activity.

DISCUSSION

Scant research has applied social cognitive models to understand physical activity behaviors in First Nation populations, and no research to date had used the TPB. The results of this pilot study partially supported the utility of the TPB for understanding physical activity behavior in WFN adults.

Specifically, intention explained 16% of the variance in physical activity behavior, and no other TPB constructs made independent contributions; this is similar to meta-analyses results,^{18,15} yet it is evident that considerable variability in physical activity behavior is unexplained and thus other factors outside of the TPB may help to explain such behavior in this population. Sex had a moderate and significant association with physical activity unrelated to the TPB. Sex roles or cultural expectations of sex may affect physical activity levels regardless of social cognition. Other studies have emphasized this potential,³³⁻³⁵ and sustained research is needed to evaluate this possibility in more detail.

As for predicting intention, affective attitude and PBC explained 50% of the variance; both constructs made significant contributions to the prediction

equation. The findings here are comparable to those of previous research¹⁸ and suggest that the primary determinants of intent are affective evaluations of physical activity and a sense of control over the behavior. From an applied perspective, these results suggest that physical activity initiatives that focus on the enjoyment and controllable qualities of physical activity may be most useful. Outdoor activities improve enjoyment,³⁶ and First Nations’ traditional activities, many with close association to the outdoors, may be an excellent blend. Perceptions of control are often tied to physical activity access¹⁹ so it seems prudent that initiatives also focus on the types of activities that are easy to perform and conveniently located. When taken on its own, the quantitative data indicate that motivations to be active are not dissimilar to those in the general population. Understanding cultural or other differences, however, may not be easily captured with Likert-type scales.³⁴ Thus, the second purpose of this study was to determine the behaviors and salient beliefs of WFN adults.

The responses indicate that WFN adults engage in various types of physical activities, culturally relevant (eg, pow wow dancing) or otherwise

...it is evident that considerable variability in physical activity behavior is unexplained and thus other factors outside of the TPB may help to explain such behavior in this population.

(eg, softball). Although not all participated in cultural activities, there were consistent reflections that these activities were still being performed in the community, and that more would be welcome. First Nations' participation in a broad spectrum of physical activities is not unique to this study^{33,37} and confirms the call for physical activity surveys to include a myriad activities that are culturally specific. Surveys such as the GLTEQ²⁵ are conducive to modifications and should be modified accordingly.

From this qualitative analysis, it is evident that WFN adults have a holistic view of the advantages and disadvantages of physical activity as per the behavioral belief construct. For example, responses indicated that not only did physical activity result in positive physical/cognitive health states, such as self-confidence, but also improvements in social and community relations. This holistic perception is not uncommon in First Nation health literature,³⁸⁻⁴⁰ particularly the emphasis on cultural or traditional activities^{17,16} that connect WFN adults with nature and their history. Social and environmental barriers to being active for focus group participants in this study are also mirrored in the literature, particularly related to social support and unattended dogs.¹⁶

WFN members' control beliefs are similar to findings in other studies with First Nation populations.^{37,41-43} For WFN adults, personal, environmental

and cultural factors appeared to be associated with physical activity.³ Taken together, the quantitative and qualitative findings support the return of First Nations' physical activity behaviors to traditional roots and culture, which may best serve perceptions of affect and control.

Although the results of this pilot study are unique, limitations are evident. Most notable, the response rate was poor and the small sample size prevented our ability to detect small correlational effect sizes between variables. As such, we cannot surmise accurately whether the sample was truly representative of the total WFN population. However, although the opportunity for non-response bias may increase due to low response rates for mail-out surveys, response rates are not necessarily related to bias.⁴⁴ Second, response bias can be introduced when using self-report methods therefore research using objective measures is desirable. Finally, the cross sectional design negates our ability to make causal inferences.

REFERENCES

1. Pate R, Pratt M, Blair SN, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA*. 1995;273(5):402-407.
2. United States Department of Health and Human Services. *Physical Activity and Health: a Report of the Surgeon General Executive Summary*. Atlanta, Ga: Centers for Disease Control and Prevention; 1996.
3. Wharf Higgins J, Rickert T, Naylor PJ. The determinants of physical activity: why are some people active and others not? In Saylor C ed. *Weight Loss, Exercise and Health Research*. New York, NY: Nova Science; 2006. p. 99-152.
4. Canadian Fitness and Lifestyle Research Institute. 2004 physical activity monitor and sport. Available at: <http://www.cflri.ca/eng/statistics/surveys/pam2004.php>. Accessed March 7, 2005.
5. Statistics Canada. Aboriginal peoples survey. Ottawa, Ontario; 2001.
6. National Aboriginal Health Organization. Preliminary findings of the First Nations Regional Longitudinal Health Survey (RHS) 2002-03: children's survey. 2005.
7. Bryan SN, Tremblay MS, Perez CE, Ardern CI, Katzmaryzk PT. Physical activity and ethnicity: evidence from the Canadian Community Health Survey. *Can J Publ Health*. 2006;97(4):271-276.
8. Coble JD, Rhodes RE. Physical activity and Native Americans: a review. *Am J Prev Med*. 2006;31(1):36-46.
9. Story M, Evans M, Fabsitz RR, Clay TE, Holy Rock B, Broussard B. The epidemic of obesity in American Indian communities and the need for childhood obesity-prevention programs. *Am J Clin Nutr*. 1999;69(4 Suppl):747S-754S.
10. Centers for Disease Control and Prevention. Diabetes prevalence among American Indians and Alaska Natives and the overall population—United States, 1994-2002. *MMWR Surveill Summ*. 2003;52(30):702-704.
11. Anand S, Yusuf S, Jacobs R, et al. Risk factors, atherosclerosis, and cardiovascular disease among Aboriginal People in Canada: the Study of Health Assessment and Risk Evaluation in Aboriginal Peoples (SHARE-AP). *Lancet*. 2001;358(9288):1147-1153.
12. Harwell TS, Moore K, McDowall JM, Helgerson SD, Gohdes D. Cardiovascular risk factors in Montana American Indians with and without diabetes. *Am J Prev Med*. 2003;24(3):265-269.
13. Liu J, Young TK, Zinman B, Harris SB, Connelly PW, Hanley AJ. Lifestyle variables, non-traditional cardiovascular risk factors, and the metabolic syndrome in an Aboriginal Canadian population. *Obesity*. 2006;14(3):500-508.
14. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process*. 1991;50:179-211.
15. Downs DS, Hausenblas HA. The theories of reasoned action and planned behavior applied to exercise: a meta-analytic update. *J Phys Act Health*. 2005;2(1):76-97.
16. Kirby A, Levesque L, Wabano V. A qualitative investigation of physical activity challenges and opportunities in a northern-rural Aboriginal community: voices from within. *Pimatisiwin*. 2007;5(1):6-24.
17. Lavallee L. Physical activity and healing through the medicine wheel. *Pimatisiwin*. 2007;5(1):127-153.
18. Hagger MS, Chatzisarantis NLD, Biddle SJH. A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *J Sport Exerc Psychol*. 2002;24(1):3-32.
19. Downs DS, Hausenblas HA. Elicitation studies and the theory of planned behavior: a systematic review of exercise beliefs. *Psychol Sport Exerc*. 2005;6(1):1-31.

20. Ajzen I. Constructing a TPB questionnaire: conceptual and methodological considerations. Available at: <http://www.people.umass.edu/ajzen/tpb.html>. Accessed March 12, 2005.
21. Rhodes RE, Courneya K. Investigating multiple components of attitude, subjective norm, and perceived control: an examination of the theory of planned behavior in the exercise domain. *Br J Soc Psychol*. 2003;42(1):129–146.
22. Dillman DA. Mail and self-administered surveys. In: Wright JD, Rossi PH, Anderson AB, eds. *Handbook of Survey Research: Qualitative Studies in Social Relations*. New York, NY: Academic Press; 1978. p. 359–357.
23. Schnarch B. Ownership, control, access, and possession (OCAP) or self-determination applied to research: a critical analysis of contemporary First Nations research and some options for First Nation communities. *J Aboriginal Health*. 2004;1(1):80–95.
24. Public Health Agency of Canada. Helpful definitions. Available at: <http://www.phac-aspc.gc.ca/pau-uap/fitness/definitions.html>. Accessed February 18, 2004.
25. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci*. 1985;10(3):141–146.
26. Public Health Agency of Canada. Canada's physical activity guide. Available at: <http://www.phac-aspc.gc.ca/pau-uap/fitness/downloads.html>. Accessed April 15, 2004.
27. Jacobs DR, Ainsworth BE, Hartman TJ, Leon AS. A simultaneous evaluation of ten commonly used physical activity questionnaires. *Med Sci Sports Exerc*. 1993;25:81–91.
28. Courneya KS, Conner M, Rhodes RE. Effects of different measurement scales on the variability and predictive validity of the “two-component” model of the theory of planned behavior in the exercise domain. *Psychol Health*. 2006;21:557–570.
29. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *J Pers Social Psychol*. 1986;51(6):1173–1182.
30. Patton MQ. *Qualitative Evaluation and Research Methods*. Newbury Park, Calif: Sage; 1990.
31. Crabtree BF, Miller WL. *Doing Qualitative Research*. Newbury Park, Calif: Sage; 1992.
32. Morse J. Emerging from the data: the cognitive processes of analysis in qualitative inquiry. In: Morse J ed. *Critical Issues in Qualitative Research Methods*. Thousand Oaks, Calif: Sage; 1994. p. 23–43.
33. Henderson KA, Ainsworth BE. Sociocultural perspectives on physical activity in the lives of older African American and American Indian women: a cross-cultural activity participation study. *Womens Health*. 2000;31(1):1–20.
34. Henderson KA, Ainsworth BE. Researching leisure and physical activity with women of color: issues and emerging questions. *Leisure Sciences*. 2001;23:21–34.
35. Juarbe TC, Lipson JG, Turok X. Physical activity beliefs, behaviors, and cardiovascular fitness of Mexican immigrant women. *J Transcult Nurs*. 2003;14(2):108–116.
36. Plante TG, Gores C, Brecht C, Carrow J, Imbs A, Willemsen E. Does exercise environment enhance the psychological benefits of exercise for women? *Int J Stress Management*. 2007;14:88–98.
37. Henderson KA, Ainsworth BE. Physical activity and human development among older Native American women. *J Aging Phys Act*. 2001;9(3):285–299.
38. Buehler JA. Traditional Crow Indian health beliefs and practices: toward a grounded theory. *J Holist Nurs*. 1992;10(1):18–33.
39. Sanchez TR, Plawewski JA, Plawewski HM. The delivery of culturally sensitive health care to Native Americans. *J Holist Nurs*. 1996;14(4):295–307.
40. Brunet S, Plotnikoff RC, Raine K, et al. Physical activity of Aboriginals with type 2 diabetes: an exploratory study. *Ethn Dis*. 2005;15(2):256–266.
41. Henderson KA, Ainsworth BE. Enablers and constraints to walking for older African American and American Indian women: the Cross-Cultural Activity Participation Study. *Res Q Exerc Sport*. 2000;71(4):313–321.
42. Thompson JL, Allen P, Cunningham-Sabo L, Yazzie DA, Curtis M, Davis SM. Environmental, policy and cultural factors related to physical activity in sedentary American Indian women. *Womens Health*. 2002;36(2):59–74.
43. Henderson KA, Ainsworth BE. A synthesis of perceptions about physical activity among older African American and American Indian women. *Am J Pub Health*. 2003;93(2):313–317.
44. Asch DA, Jedrzewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol*. 1997;50(10):1129–1136.

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