Correlates of Intergenerational and Personal Physical Activity of Parents

Naomi S. Casiro, Bsc; Ryan E. Rhodes, PhD; Patti Jean Naylor, PhD; Heather A. McKay, PhD

***Objective*: To compare the correlates of personal versus intergenerational leisure-time physical activity of parents using the theory of planned behavior. *Methods*: Participants were parents (n=126) with children between the ages of 2 and 12 years, and they completed a baseline questionnaire exploring intergenerational and personal activity. *Results*: Perceived behavioral control and behavioral frequency were higher in *intergenerational* than personal activity. Affective attitude was higher for personal activity, and subjective norm was more important in intergenerational than personal intention. *Conclusion*: Future interventions may benefit from some specific targeting toward intergenerational or personal activity.**

***Key words*: physical activity, family, intergenerational, theory of planned behavior**

***Am J Health Behav.* 2011;35(1):81-91**

The World Health Organization estimates that on a global scale physical inactivity leads to nearly 2 million premature deaths every year.[1] In an attempt to reverse this trend, Canadian and US guidelines for adult physical activity stress the importance of accumulating 30-60 minutes daily, or 2 hours and 30 minutes per week respectively, of moderate-intensity or higher-intensity physical activity.[2,3] These guidelines are based on research findings that unequivocally identify physical activity as an important factor in both the primary and secondary prevention of over 25 chronic health issues.[3,4]

Despite the efforts of government health organizations, the majority of the Canadian population is not active enough to meet even the minimum recommended guidelines.[4] From survey data, 54% of Canadian women and 48% of Canadian men are inactive, and that inactivity is not equally distributed across the populace.[5] Adulthood is a phase of life with one of the steepest declines in physical activity across the life course.[6-9] The adult populace presents a particularly important physical-activity promotion challenge due to the life expectancy of this group and the direct and indirect effects their physical inactivity may have on their offspring.[10,11] Indeed, recent reviews of the literature on parenthood and physical activity provide evidence for the emergence of parenthood (a critical transition in adulthood) itself as a demographic risk factor for inactivity, particularly among women.[12,13] This may relate to the many unique and significant lifestyle changes

Naomi S. Casiro and Ryan E. Rhodes, Behavioural Medicine Laboratory, Faculty of Education, University of Victoria, Victoria, BC, CANADA. Patti Jean Naylor, School of Exercise Science, Physical and Health Education, Faculty of Education, University of Victoria, Victoria, BC, CANADA.Heather A. McKay, Faculty of Medicine, University of British Columbia, Centre for Hip Health and Mobility Chest Centre, Vancouver, BC, Canada

Address correspondence to Dr Rhodes, Behavioural Medicine Laboratory, Faculty of Education, PO Box 3010 STN CSC, University of Victoria, Victoria, BC, V8W 3N4 CANADA. E-mail: rhodes@uvic.ca

that accompany parenthood; factors such as continuous family obligations and responsibilities during the waking hours, the changing of one's life values to incorporate one's offspring and the family collective, lack of free time, decreased disposable income for leisure pursuits, and fatigue.[14] These lifestyle changes likely contribute not only to the decline in physical activity participation but also to the increase in obesity found among this demographic.[12,15] Thus, there appears to be a need for targeted and carefully planned physical activity interventions for this population, particularly during the early years of family development.

Targeted intervention approaches for increasing physical activity among parents has 2 major potential apertures, workplace and household activities notwithstanding. First, one could attempt to promote the personal physical activity of parents. This could presumably be improved during "off hours" from child care and occupational/household duties. In the early stage of parenthood, this approach could also involve children through the use of strollers or other containments, but this becomes compromised with multiple children in different stages of development and with toddlers. The second approach might be to promote intergenerational physical activities among parents and their children. By *intergenerational physical activity*, we mean physical activities in which both the parent(s) and their child are active together. This could include active play at the park (eg, tag, kicking a ball), at a recreation centre (eg, swimming together, skating as a family), or other forms of movement together (eg, family walk). Although this approach might decrease the intensity of parental physical activity, it has the advantage of fostering physical activity behaviors and healthy family time for all.

Only a few studies evaluated the efficacy of different physical activity promotion approaches. Specifically, we found only 5 studies that assessed the personal physical activity levels of parents.[16-20] All but one of these studies featured small samples of motivated mothers in the very early stages of parenthood and short intervention durations that might be considered pilot work. That being said; these results are promising. These studies generally focused on either a social cognitive theory[21] or transtheoretical model[22] approach to intervention. They provided semi-intensive class sessions (4-6 hours), print material, or phone counseling that focused on the benefits of activity, the creation of behavioral skills to overcome potential barriers, and social support. All reported positive change in physical activity following the intervention and changes in social cognitive constructs such as outcome expectations/decisional balance and self-efficacy**.**

In contrast to interventions that targeted personal physical activity in parents, studies focused on promoting intergenerational physical activity among families have been less successful. Of the 4 studies to intervene with this type of physical activity approach,[6,23-25] none saw significant changes in behavior following the intervention. These studies used relatively similar interventions to those in the personal physical activity condition; thus their null findings may reflect (1) a more difficult aperture for promotion and/or (2) the concept that different correlates need to be targeted for intergenerational versus personal activity, and thus the personal activity approach is not productive in targeting intergenerational activity variables. This highlights the need for a more focused assessment to identify the correlates of personal and intergenerational physical activity behavior that underpin the success or failure of these interventions.

Therefore, this study aimed to determine the relation between correlates of participation in personal physical activity and correlates of participation in intergenerational activity. Ultimately, we aim to use study outcomes to design programs that target the specific factors related to parental or intergenerational activity. Our research was evaluated using Ajzen's[26] theory of planned behavior (TPB) model. This model has widespread implementation in activity research[27] and is able to discriminate between the motives for various activity types.[28-31] However, the TPB is relatively new as applied to physical activity, family, and parenthood. Prior research has focused on social cognitive theory or the transtheoretical model. The application of TPB extends our theoretical understanding of these behaviors by offering a complementary conceptualization of correlates. Specifically, this model suggests that a person's behavior is guided by

summary motivation to act (ie, behavioral intention) and his or her perception of control over the behavior (perceived behavioral control). In turn, affective and instrumental evaluation of the behavior (attitude), consideration of the perceived social pressures to act (ie, subjective norm), and perceived behavioral control form the basis for behavioral intention.[26] The intention, affective, and instrumental attitude and subjective norm constructs are all original to TPB when compared to social cognitive theory or the transtheoretical model. Perceived behavioral control, by contrast, is commensurate with the concept of self-efficacy in the other 2 models.[26]

Based on the TPB concepts, we hypothesized that personal physical activity, intention, and perceived behavioral control would be lower compared to intergenerational activities. This hypothesis is based on the constrained personal leisure-time habits of parents; more time would be spent with family than would be spent in personal leisure pursuits. In theory, this time allocation could manifest itself as differences in behavior, intention, and control. We hypothesized that the role of subjective norm would be a stronger predictor of intergenerational physical activity than of personal activity. This is based on our understanding that intergenerational physical activity is a collective experience, and thus the social considerations of others seem more prudent in this aperture than during personal leisure time.

METHODS

Participants and Procedure

Participants for this study were 2-parent families with at least one child between the ages of 2 and 12 years where parents were married or common-law and where at least one parent felt as though he or she could be more physically active (defined by Canada's physical activity guidelines).[2] This approach was taken so that the results would be representative of those families who could be targeted by physical activity promotion initiatives. Participants were recruited from the Capitol Region District and surrounding areas of British Columbia, Canada. Potential participants were invited to participate in the study by means of flyers and poster advertisements about a family physical activity and health study. A list of all daycares, recreation centers, preschools, and elementary schools in the Capitol Region District was used as the sampling frame for distribution. The study advertisements and removable brochures were placed in the community bulletin boards and/or front desks of these institutions for parents to learn about the study. Interested participants contacted a research assistant via phone or e-mail, where the study purpose and inclusion criteria (2-parent households with one child between 2 and 12 and the perception that the family could be more active) were explained. Recruitment was undertaken from January 2007 until December 2008. One hundred twenty-eight parents contacted our research assistant, and 126 met inclusion criteria. The study was approved by the University of Victoria IRB, and all participants provided informed consent to participate. Participants who met the criteria for entry were given the option of completing the questionnaire package by hand or online. All eligible participants completed the questionnaire. To compensate for their time, they were provided a $10 honorarium upon completion of the questionnaire.

Instruments

The participant questionnaire contained 2 sections with physical-activity-related questions. The questionnaire asked for a single contact parent to complete all measures on behalf of the family and themselves across the study. In cases where parents had more than one child and parental activities were split between parents, we instructed the contact parent to consider their physical activity engagement with the youngest child (4 to 10 years). The contact parents did not serve as a proxy for their spouse nor did they report on an older child's physical activity if they were not present. This was deemed necessary for consistency across measurement although it may bias (downward) the estimates of total family physical activity. For contact parents, we provided Canada's adult physical activity guidelines[2] and asked them to refer to these guidelines to answer the questions regarding their personal physical activity. The guidelines suggest that physical activity be performed at a moderate intensity or higher at least 4 times per week and accumulating at least 30 minutes each time.

All parents were provided with Canada's family physical activity for children guidelines to aid their response to questions related to family physical activity.[2] The guidelines for children recommended that 90 minutes of physical activity daily be accumulated in bouts from 5 to 10 minutes. There is no preset definition for intergenerational family activity. However, it would be expected that many children get physical activity outside of intergenerational family movement, so the definition for our study was considered at less volume. For consistency, *family physical activity* was defined as at least one parent and one child being active together, accumulating at least 30 minutes of activity 4 times per week or more. Intensity of physical activity was not considered given the collective nature of the physical activity; further, physical activity intensity does not moderate the relationship between social cognition and behavior, so the omission is unlikely to confound the results.[32-34]

Physical Activity

Leisure-time physical activity. Contact-parent personal leisure-time physical activity (PA) was measured using the Godin Leisure-Time Exercise Questionnaire (GLTEQ).[35] The GLTEQ contains 3 open-ended questions regarding the frequency of mild (eg, easy walking), moderate (eg, fast walking), and vigorous (eg, jogging) PA. Duration was adapted from 15 minutes to greater than or equal to 30 minutes per session based on current public health guidelines for adults. We used only moderate and vigorous PA intensity in the aggregate variable based on our definition of physical activity.[2] Thus, the dependent variable represented the weekly frequency of moderate and vigorous physical activity at or above 30 min per session.

To our knowledge when the study was undertaken, there was no self-report instrument available that would capture collective (ie, intergenerational) family physical activity. Thus we created a measure for this study by integrating aspects of the GLTEQ, the International Physical Activity Questionnaire,[36] and the Behavioral Risk Factor Surveillance Survey.[37] The final instrument included an open estimate of frequency (times per week) and duration (mins) that the family unit (one parent, one child) engaged in PA during a typical week. Canada's guide for family physical activity highlights structured (parent-child swimming lessons, skating, kindergym, or parent and tot gymnastics) and unstructured (family walks, bike rides, playing at parks or in the backyard) physical activities. Thus, we defined physical activity as unstructured to coincide with the nature of intergenerational activity. The family activity variable was coded as frequency of activity meeting or exceeding 30 minutes per week. This is consistent with the measure we used for personal activity and matches our definition of family physical activity in the social cognitive measures.

Attitude

Attitude was measured using a 7-point semantic differential scale recommended by Ajzen for use with the TPB.[38] Two items were used to measure affective attitude (enjoyable-unenjoyable, boring-exciting). Similarly, 2 items were used to measure instrumental attitude (wise-unwise, harmful-beneficial). Participants recorded 2 responses within the questionnaire based on 2 different prompts for family activity ("For me regular Family-Based physical activity over the next month would be ...") and personal activity ("For me, regular activity over the next month would be... .") These aggregations formed the overall instrumental attitude, (interitem r =.20 for family; interitem r= .25 for personal) and overall affective attitude (reliability interitem r =.44 for family; reliability interitem r = .30 for personal) constructs.

Subjective Norm

Subjective norm was measured using 3 items recommended by Ajzen for measuring this construct in the TPB.[38] Two of these items were combined to reflect the injunctive norm; the third reflected the descriptive norm.[38] Similar to attitude measurements, participants recorded 2 responses within the questionnaire; one related to family activity and the other to personal activity. All 3 items were measured on a 7-point scale that ranged from strongly disagree to strongly agree. The injunctive-norm prompts for family activity included "most people who are important to me want me to engage in regular Family-Based physical activity over the next month" and "most people whose opin-

ions I value would approve of me engaging in regular Family-Based physical activity over the next month." With respect to personal activity the injunctive prompts were "most people who are important to me want me to engage in regular physical activity over the next month" and "most people whose opinions I value would approve of me engaging in regular physical activity over the next month." The descriptive-norm scales were preceded by the sentences "most people who are important to me will engage in family based physical activity themselves over the next month" for family activity and "most people who are important to me will engage in regular physical activity themselves over the next month" for personal activity. The 3 subjective-norm items were aggregated to form an inclusive subjective-norm construct (family =.76, personal =.69).

Perceived Behavioral Control

Perceived behavioral control was measured using 2 items each evaluated on a scale from 1(extremely uncontrollable, extremely unconfident) to 7 (extremely controllable, extremely confident) as suggested by Ajzen.[39] These items were evaluated with respect to both family activity and personal activity and were asked using the questions "If you were really motivated, how controllable would it be for you to participate in regular family-based physical activity over the next month?" and "If you were really motivated how confident are you that you could participate in regular family-based physical activity over the next month?" With regard to personal activity the same questions were modified to replace "participate in family-based physical activity." The measure had an acceptable reliability (interitem r = .43 for family; interitem r = .45 for personal).

Exercise Intention

Exercise intention was assessed using 2 items. The first item used a 7-point scale (extremely uncommitted – extremely committed) and asked, "How committed are you to regularly participating in family-based physical activity over the next month?" as suggested by Rhodes and colleagues for measuring the motivational domain of intention.[40] With respect to personal activity; we modified the family activity question and asked, "How committed are you exercising regularly over the next month?" The second question that assessed intention required that participants complete the statement "I intend to engage in regular (family-based) physical activity ____ times per week over the next month" based on validation by Courneya.[41] The 2 intention questions were aggregated separately for family activity and personal activity (interitem r =.48 for family; interitem r = .52 for personal).

Analysis

Statistical analyses for the study were performed using the Statistical Package for the Social Sciences (SPSS) version 17.0. Mean values were determined for family and personal activity in relation to the TPB constructs. Dependent sample t-tests were completed and used to assess these values. We report correlations using Hotelling's t-tests for dependent sample to compare family and personal physical activity in terms of TPB intention and behavior construct correlations. Given that TPB is a multivariate model, R was also compared across the types of activities, whereby attitude, subjective norm, and perceived behavioral control were used to predict intention; and intention and perceived behavioral control were used to predict behavior. Probability alpha was set at P<.05 and Cohen's effect sizes (*d, q*) were used to aid in the interpretation of results.[42] Effect size *d* was used to assess mean comparisons whereas *q* was used to measure correlation comparisons.

RESULTS

A total of 126 families completed the questionnaires. Baseline characteristics of the family and the contact parent are provided (Table 1). Contact parents were in their late 30s, typically the mother of the household, and most had completed a college degree. Families reported having 2 children between 4 and 10 years old, on average. Most had some form of child care (school or daycare) during the working day. Of the contact parents, 54% reported activity levels below Canada's recommended guidelines and a mean BMI in the overweight category (ie, BMI score of 25 or higher).[2]

Mean differences between personal activity and family physical activity among TPB constructs and behaviors are provided (Table 2). Perceived behavioral con-

Table 1
Baseline Demographic, Family, and Parental Physical Activity Profile (N=126)

Characteristic		
Parent Demographic Profile		
Age Median (SD)	37.35	(5.88)
% Female	84.0	
% Visible Minority	12.6	
% Married/Common-Law	100.0	
% Completed University	74.8	
% > $75,000 Income	52.9	
% Currently Employed	52.0	
Family Profile		
# of children	1.89	(0.63)
% Children in Formal Care	68.5	
Hours per Day in Care	3.71	(3.28)
% Meeting Health Canada's Guidelines	45.6	
BMI	25.0	(5.56)

trol (t_{126} = 2.65, P<0.01; d= -0.20) and frequency of physical activity (t_{126} = 6.87, P<0.01; d= -0.69) were higher for intergenerational activity as compared with personal activity. We found no other significant mean differences in TPB constructs.

Correlations of TPB-behavior constructs and TPB-intention constructs for both intergenerational and personal physical activity are provided in Table 3. Affective attitude (r=.44 for personal; r=.30 for intergenerational), instrumental attitude (r=.20 for personal; r=.25 for intergenerational), and perceived behavioral control (r=.43 for personal; r = .45 for intergenerational) were significantly correlated with intention across both behaviors. Subjective norm, however, differed significantly between the 2 activity categories. The correlations between subjective norm and intention were higher for intergenerational physical activity compared with personal physical activity (t_{126} = -4.15, P<0.01; q= -0.27). We observed no other significant differences with intention including the multivariate model (ie, multiple correlation coefficients).

With respect to correlations between TPB and behavior, subjective norm (r=.20 for personal; r=.25 for intergenerational), perceived behavioral control (r=.35 for personal; r=.24 for intergenerational), intention (r=.48 for personal; r=.52 for intergenerational) and the multivariate model were significant for both groups. Correlations with affective attitude were higher for personal physical activity (r=.35) compared with intergenerational physical activity (r=.15) (t_{126} =2.59, P<0.05; q=0.22). We observed no other differences across behaviors.

DISCUSSION

Physical activity promotion among parents with young children is a population health priority. When considering the lives of parents, 2 leisure-time physical activity promotion apertures are apparent: personal physical activity and family intergenerational activity. Research attention until now has been limited for both types of activity.[12,43] Understanding the correlates of these 2 behaviors should allow us to better create targeted intervention campaigns. The purpose of this study was to determine the correlates of both personal and intergenerational family activity and the differences in the activity types using the TPB. Several interesting findings emerged that may help to design future interventions.

Our first hypothesis considered mean differences among TPB constructs and behavior for the 2 activity types. Means highlight the absolute value of a particular construct and can be very useful for understanding whether there is room for improvements on a construct in intervention.[44] Differences between means are also useful because they can highlight the distinction between physical activities or cognitions. It was hypothesized that intention and perceived behavioral control would be lower for personal physical activity than for intergenerational activity. This hypothesis was partially supported. Personal physical activity frequency was considerably less than intergenerational physical activity. The difference could be considered a medium to large effect size.[42] In turn, perceived behavioral control was also significantly lower for personal physical activity compared to intergenerational physical activity. These findings support prior reviews on parental physical activity where considerable control barriers and low physical activity were prevalent.[12,15]

Table 2
Mean Differences Between Personal and Intergenerational Physical Activity (N=126)

	Personal	Intergenerational	t	*d*
Construct	**Mean (SD)**	**Mean (SD)**		
Affective Attitude	5.43 (1.19)	5.37 (1.29)	-0.66	0.05
Instrumental Attitude	6.45 (0.94)	6.44 (0.89)	-0.24	0.01
Subjective Norm	5.85 (0.91)	5.72 (1.01)	-2.11*	0.14
Perceived Control	5.32 (1.17)	5.55 (1.19)	2.65**	-0.20
Intention	4.57 (1.13)	4.61 (1.12)	0.35	-0.04
Frequency of Activity	1.74 (1.35)	2.93 (2.10)	6.87**	-0.69

Note.
t = student's t for dependent samples
d* = Cohen's (1992) effect size *d

*** P < 0.05, **P<0.01**

These results highlight the room for change in intervention programs focusing on personal physical activity, but show that low control over leisure time is present. On average, personal physical activity bouts were completed only 1.74 times per week. This low frequency of personal activity reveals a potentially large opportunity for improvement. These results reveal that perceived behavioral control might be a beneficial target variable for both family and personal activity interventions. Although speculative at present, we suggest that interventions may need to target participant barriers of time and cost. Tactics such as home-based programs and/or subsidized program rates could be implemented to potentially increase perceived behavioral control. Further research exploring the details of home-based activity programs would be useful in the development of productive interventions.

Our second analysis focused on the differences among TPB correlations between the 2 types of physical activities. This set of analyses represents a formal moderation test; thus, any differences among constructs suggest that some form of targeting by behavior may be prudent in future interventions. We hypothesized that the role of subjective norm would be more prominent in intergenerational physical activity than in personal physical activity and that this would manifest through larger correlations with intention and behavior. We found support for this hypothesis in its correlation with intention, but the difference did not continue to behavior; indeed both were correlated with behavior suggesting family considerations may have some relationship with norms among parents. This is conceivable because even personal physical activity has to be negotiated with one's spouse as time spent away from the family.[12,15,45]

The medium-sized correlation between subjective norm and intention compared to the small-sized correlation with personal activity also remains interesting and supports our initial hypothesis. Family physical activity is a collective experience, and thus the social considerations of others seem more prudent in this aperture than during personal leisure time. Clearly, the motivation to engage in family physical activity is associated more

Table 3
Correlation Differences Between Personal Physical Activity and Intergenerational Physical Activity N=126

	Intention				Behavior			
	Personal r	Intergenerational r	t	*q*	Personal r	Intergenerational r	t	*q*
Affective Attitude	.44**	.30 **	1.89	.16	.35**	.15	2.59*	.22
Instrumental Attitude	.20*	.25**	-0.92	-.05	.15	.19*	-0.73	-.04
Subjective Norm	.10	.35**	-4.15**	-.27	.20*	.25**	-0.78	-.06
Perceived Control	.43**	.45**	-0.30	-.03	.35**	.24**	1.56	.12
Intention					.48**	.52**	-0.51	-.06
Multivariate R	.52**	.53**	-0.33	-.01	.52**	.52**	0	0

Note.
t = Hotelling's t for dependent correlations
q* = Cohen's (1992) effect size *q
Multivariate R represents the multiple correlation coefficient for the TPB model.

*** P < 0.05, **P<0.01**

with the collective approval of the family than motivation for personal physical activity. The finding has 2 novel implications. First, subjective norm typically does not perform well when explaining intention,[27] even with bivariate relationships. Collective behaviors like family physical activity might highlight a better role for subjective norm. To our knowledge, this represents the first focus on collective behavior with the application of the TPB. The second implication from this finding suggests that interventions that attempt to increase intention for family activity may benefit from targeting subjective norms. Essentially it can be surmised that involving more people in family and friend networks to indicate their approval of physical activity would accomplish this task. Although this strategy was discounted with respect to personal activity, these results suggest that the effect may be different when the attempt to intervene is focused specifically on family physical activity. It should be noted, however, that the differences in intention did not extend to behavior that is discrepant with TPB structure[38] and highlights the importance of observing both intention and behavior correlations.

Although not hypothesized, personal affective attitude for physical activity had a larger correlation with behavior than intergenerational affective attitude. The result was in the same direction when correlated with intention. It may be that personal activity is considered a luxury of having leisure time, whereas intergenerational activity is seen as a more obligatory commitment aimed at contributing to children's health. During leisure time, hedonic properties of behaviors are likely very important, and thus those who enjoy physical activity, perform it during personal time. The heightened effect of affective as compared to instrumental attitude on personal behavior supports this notion and has been identified previously.[40,47,48] Although this is speculation, further research would be useful in order to properly distinguish the specific constructs behind these potentially different values. When applied to intervention techniques for personal activity, this result implies a large focus on affective attitude would be desirable. Little is understood about affective attitude manipulation, although experiential interventions (aesthetics, music, sense of competence, engagement) have been shown to be more effective than informational persuasion.[46]

Finally, it should be noted that both

types of behavior were explained in a similar capacity by the TPB. Indeed, the model explained 27% of the variance for both physical activities, which is very similar to prior meta-analyses.[49] Thus, the TPB is an appropriate model for understanding parental physical activity even if different constructs are more predictive across different behaviors.

The findings of this study contribute to the current limited research on physical activity within families but must be considered with the awareness of the limitations involved. First, the study used a cross-sectional design that does not reveal a cause and effect relationship between variables. Differences, between cross-sectional designs and passive prospective designs are negligible:[50,27] thus, moving to experimental designs seems the more prudent course of action. Second, the behavioral recall measures were self-report, the GLTEQ was modified slightly from its original version, and family physical activity was a measure created for this study. These measures also do not capture time spent in occupational or household activities, so total energy expenditure could not be assessed. The parental proxy/contact measure may not generalize well to the total intergenerational physical activity of the family, and the intensity of the activity was not estimated. Direct assessment of activity in future research would add to the veracity of these findings. Lastly although techniques for this survey aimed to recruit a diverse group of families, the actual number of eligible participants, the true response rate, is unknown. In terms of sample generalizability to the CRD sampling frame, our sample matched ethnicity, income, and occupational demographics well[9] but reported a higher level of education; thus our sampling may be a limitation to the findings within the study.

In summary the results of this study indicate that perceived behavioral control and behavioral frequency are both higher in intergenerational physical activity as compared to personal physical activity during leisure time. The analyses also show that affective attitude is higher for personal than intergen-erational physical activity behavior and that subjective norm is more important in intergenerational intention than personal intention. These conclusions support the probability that future interventions aimed at increasing physical activity should be specific to the type of activity in question (intergenerational or personal). This information could be applied to further enhance interventions aimed at helping families become more active. ■

REFERENCES

1. World Health Organization. 30 minutes for a healthy life span. Press release (online). Available at: http://www.euro.who.int/mediacentre/PR/2002/20020327_1. Accessed February 3, 2009.
2. Health Canada 2002 .Health Canada's physical activity guide (online). Available at: http://www.phac-aspc.gc.ca/pau-uap/paguide/index.html. Accessed September 25, 2008.
3. U.S. Department of Health and Human Services 2008. Physical Activity Guidelines for Americans (online). Available at: http://www.health.gov/paguidelines/guidelines/default.aspx. Accessed June 10, 2009.
4. Warburton DE, Katzmarzyk P, Rhodes RE, Shephard R. Evidence-informed physical activity guidelines for Canadian adults. *Can J Public Health.* 2007;98(Suppl 2):S16-S68.
5. Canadian Fitness and Lifestyle Research Institute (CFLRI) 2005. Physical Activity Monitor: Physical activity levels among Canadian adults (online). Available at: http://www.cflri.ca/eng/statistics/surveys/pam2005.php. Accessed February 3, 2009.
6. Baranowski T, Simmons-Morton B, Hooks P, et al. A center- based program for exercise change among black American families. *Health Educ Q.* 1990;17(2):179-196.
7. Caspersen C, Pereira MA, Curran KM. Changes in physical activity patterns in the United States, by sex and cross-sectional age. *Med Sci Sports Exerc.* 2000;32(9):1601-1609.
8. Jedwab, J. Part 1-Actively Canadian: Who's the Most Active of Us All? (on-line). Available at: http://www.acs-aec.ca/oldsite/Polls/PhysicalActivityandObesity.pdf. Accessed February 3, 2009.
9. Statistics Canada. 2006 Census (online). Available at: http://www.statcan.ca/start.html Accessed September 24, 2007.
10. Gustafson SL, Rhodes RE. Parental correlates of physical activity in children and early adolescents. *Sports Med.* 2006;36(1):79-97.
11. Sallis JF, Prochaska JJ, Taylor WC. A review of correlates of physical activity of children and adolescents. *Med Sci Sports Exerc.* 2000;32(5):963-975.
12. Bellows-Riecken KH, Rhodes RE. A birth of inactivity? A review of physical activity and parenthood. *Prev Med.* 2008;46(2):99-110.
13. Rhodes RE, Symons Downs D, Bellows-Riecken KH. Delivering inactivity: a review of physical activity and the transition to motherhood. In: Allerton LT, Rutherfode GP, Eds.

Exercise and Women's Health Research. Hauppauge, NY: Earthlink Science Press; 2008:105-127.
14. Darcell P, Scharff A, Homan S, et al. Factors associated with physical activity in women across the life span: Implications for program development. *Women Health.*1999;29:115-134.
15. McIntyre CA, Rhodes RE. Correlates of leisure-time physical activity during transitions to motherhood. *Women Health.* 2009;49(1):66-83.
16. Cody R, Lee C. Development and evaluation of a pilot program to promote exercise among mothers of preschool children. *Int J Behav Med.* 1999;6(1):13-29.
17. Miller Y, Trost SG, Brown WJ. Mediators of physical activity behaviour change among women with young children. *Am J Prev Med.* 2002;23(Suppl 2):S98-S103.
18. Fahrenwald NL, Atwood JR, Noble Walker S, et al. A randomized pilot test of "Moms on the Move": a physical activity intervention for WIC mothers. *Ann Behav Med.* 2004;27(2):82-90.
19. Urizar GG, Hurtz SQ, Ahn DK, et al. Influence of maternal stress on successful participation in a physical activity intervention: The IMPACT project. *Women Health.* 2005;42(4):63-82.
20. Cramp AG, Brawley LR. Moms in motion: A group-mediated cognitive-behavioral physical activity intervention. *Int J Behav Nutr Phys Act.* 2006;3:23-31.
21. Bandura A. Self-efficacy, the Exercise of Control. New York: Freeman 1997.
22. Prochaska JO, DiClemente CC . Transtheoretical therapy: toward a more integrative model of change. *Psychother: Theory Res Practice.* 1982;19:276-288.
23. Nader PR, Sallis JF, Patterson TL, et al. A family approach to cardiovascular risk reduction: results from the San Diego family health project. *Health Educ Q.* 1989;16(2):229-244.
24. Randsell LB, Eastep E, Taylor A, et al. Daughters and mothers exercising together (DAMET): effects of home-and university- based interventions on physical activity behaviour and family relations. *American Journal of Health Education.* 2003;34(1):19-29.
25. Ornes LL, Randsell LB, Robertson L, et al. A 6-month pilot study of effects of a physical activity intervention on life satisfaction with a sample of three generations of women. *Percept Motor Skills.* 2005;100(3 Pt 1):579-591.
26. Ajzen I. The theory of planned behavior. *Organizat Behav Human Decision Processes.* 1991;50:179-211.
27. Symons Downs D, Hausenblas HA. Elicitation studies and the theory of planned behavior: a systematic review of exercise beliefs. *Psychol Sport Exerc.* 2005;6:1-31.
28. Bellows-Riecken KH, Rhodes RE, Hoffert KM. Motives for lifestyle and exercise activities: a comparison using the theory of planned behaviour. *Eur J Sport Sci.* 2008;8(5):305-313.
29. Bryan AD, Rocheleau CA. Predicting aerobic versus resistance exercise using the theory of planned behavior. *Am J Health Behav.* 2002;26(2):83-94.
30. Eves F, Hoppe R, McLauren U. Prediction of specific types of physical activity using the theory of planned behavior. *J Appl Biobehav Res.* 2003;8:77-95.
31. Rhodes RE, Blanchard CM, Matheson DH. A multi-component model of the theory of planned behaviour. *Br JHealth Psychol.* 2006;11(Pt 1):119-137.
32. Burton NW, Turrell G, Oldenburg B, Sallis JF. The relative contributions of psychological, social, and environmental variables to explain participation in walking, moderate-, and vigorous-intensity leisure-time physical activity. *J Phys Activ Health.* 2005;2(2):181-196.
33. Rhodes RE, Warburton DER, Murray H. Characteristics of physical activity guidelines and their effect on adherence: a review of randomized trials. *Sports Med.* 2009;39(5):355-375.
34. Scott F, Rhodes RE, Symons Downs D. Does physical activity intensity moderate social cognition and behavior relationships? *J Am College Health.* 2009; 58(3):213-222.
35. Godin J, Jobin J, Bouillon J. Assessment of leisure time exercise behavior by self-report: a concurrent validity study. *Can J Public Health.* 1986;77(5):359-361.
36. Craig CL, Marshall AL Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003;35(8):1381-1395.
37. CDC Behavioral Risk Factor Surveillance System Survey Questionnaire. Atlanta, GA:U.S. Department of Health and Human Services 2001.
38. Ajzen I. Constructing a TPB questionnaire: conceptual and methodological considerations (online). Available at: http://www.-unix.oit.umass.edu/~aizen/. Accessed April 21, 2009.
39. 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(5):557-570.
40. Rhodes RE, Blanchard CM, Matheson DH, Coble J. Disentangling motivation, intention, and planning in the physical activity domain. *Psychol Sport Exerc.* 2006;7(1):15-27.
41. Courneya KS. Predicting repeated behavior from intention: the issue of scale correspondence. *J App Social Psychol.*1994;24(7):580-594.
42. Cohen J. A power primer. *Psychol Bull.* 1992;112(1):155-159.
43. Van Sluijs EMF, McMinn AM, Griffin SJ. Effectiveness of interventions to promote physical activity in children and adolescents: systematic review of controlled trials. *BJ* 2007;335(7622):703-707.
44. Fishbein M, Von Haeften I, Appleyard J. The

role of theory in developing effective interventions: implications from Project Safer. *Psychol Health Med.* 2001;6(2):223-238.
45. Brown PR, Brown WJ, Miller YM, Hansen V. Perceived constraints and social support for active leisure among mothers with young children. *Leisure Sci.* 2001;23(3):131-144.
46. Rhodes RE, Fiala B, Conner M. Affective judgments of physical activity among adults: areview and meta-analysis. *Ann Behav Med.* 2009;38:180-204.
47. Lowe R, Eves F, Carroll D. The influence of affective and instrumental beliefs on exercise intentions and behavior: a longitudinal analysis. *J Appl Soc Psychol.* 2002;32(6)1241-1252.
48. French DP, Sutton S, Hennings SJ, et al. The importance of affective beliefs and attitudes in the theory of planned behavior: predicting intention to increase physical activity. *J Appl Soc Psychol.* 2005;35(9):1824-1848.
49. Hagger M, 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):1-12.
50. Rhodes RE, Plotnikoff RC. Can current physical activity act as a reasonable proxy measure of future physical activity? Evaluating cross-sectional and passive prospective designs with the use of social cognition models. *Prev Med.* 2005;40(5):547-555.