Résumé

L'utilisation de la théorie du comportement axé sur un objectif pour prédire l'intention d'exercice chez les adultes obèses

François Boudreau et Gaston Godin

Cette étude transversale a pour objectif d'utiliser la théorie du comportement axé sur un objectif (TCAO) d'Ajzen comme cadre théorique pour comprendre l'intention d'activité physique chez un groupe d'individus obèses. Des individus (n = 96) identifiés comme obèses (IMC ≥ 30 kg/m^2) ont rempli un questionnaire autoadministré évaluant l'intention d'être physiquement actif et ses variables théoriquement afférentes. L'utilisation de la TCAO a expliqué 66 % de la variance liée aux intentions d'exercice physique. Le contrôle comportemental perçu (β = 0,40) et l'attitude (β = 0,36) constituaient d'importants prédicteurs de comportement indépendants. La prise en compte de comportements antérieurs (β = 0,32) a permis d'expliquer 7 % des variances. Ces conclusions ont appuyé l'idée selon laquelle les infirmières doivent, à l'étape de la conception d'interventions pour individus obèses, mettre l'accent sur l'acquisition d'habiletés qui permettront de surmonter les obstacles à l'activité physique, ainsi que sur le renforcement de ce comportement.

Mots clés : activité physique, intention, théorie du comportement axé sur un objectif

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Using the Theory of Planned Behaviour to Predict Exercise Intention in Obese Adults

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The purpose of this cross-sectional study was to use Ajzen's Theory of Planned Behaviour (TPB) as a theoretical framework for understanding the intention to be physically active among a group of obese individuals. Individuals (n = 96) classified as obese (BMI ≥30 kg/m^2) completed a self-administered questionnaire assessing intention to be physically active and its theoretically related variables. The TPB explained 66% of the variance in physical activity intentions. Significant independent predictors of intention were perceived behavioural control (β = .40) and attitude (β = .36). The consideration of past behaviour (β = .32) explained an additional 7% of the variance. These findings support the idea that, in designing interventions for obese individuals, nurses should focus on developing skills to overcome barriers to physical activity and on developing a positive attitude towards this behaviour.

Keywords: Obesity, physical activity, intention, Theory of Planned Behaviour

Today, regular physical activity must be considered a critical part of the treatment for obesity. In primary care settings, nurses are in a position to assess and manage obesity in patients (Banning, 2005). However, one study found that only 32% of nurses believed they were effective in counselling to promote a change in lifestyle in order to reduce obesity (Steptoe, Doherty, Kendrick, Rink, & Hilton, 1999). According to Hardeman, Griffin, Johnston, Kinmonth, and Wareham (2000), health education interventions addressing the problem of obesity would be more effective if explicitly based on methods of behaviour modification that have shown to be effective in other contexts. For instance, in order to develop theory-based health education interventions to promote leisure-time physical activity in obese individuals, nurses should first identify the key correlates of the behaviour under study in the target population. This would enable nurses to identify the content of the intervention messages, select appropriate methods, and develop material specifically adapted to the characteristics of the target population. Such interventions would have greater likelihood of success.

It is reported in the literature that the Theory of Planned Behaviour (TPB) (Ajzen, 1991) "may have a valuable contribution to make to developing effective interventions aimed at behavior change, especially

among individuals where motivation to act cannot be taken for granted" (Hardeman et al., 2002, p. 151). According to the TPB, the proximal determinant of behaviour is the intention to adopt or not to adopt that behaviour, while the proximate determinants of the intention to adopt a behaviour are the individual's attitude, subjective norm, and perceived behavioural control with respect to adopting the behaviour. Attitude represents one's evaluation of the perceived benefits and drawbacks of adopting a given behaviour (e.g., "My doing physical activities in my free time during the next month would be good/bad"). Subjective norm reflects the perceived expectations of specific individuals or groups regarding one's adoption of a given behaviour (e.g., "In your opinion, are the people who are most important to you in favour or not in favour of your regular participation in one or more physical activities in your free time during the next month?"). Lastly, perceived behavioural control is determined by the individual's perception of the presence or absence of resources and opportunities as well as perceived obstacles and impediments regarding adoption of the target behaviour (e.g., "To me, participating in one or more physical activities in my free time during the next year appears difficult/easy"). Perceived behavioural control can also influence behaviour directly, when it closely approximates actual control.

In short, the TPB could prove useful for identifying the determinants of regular leisure-time physical activity among obese individuals. Identification of these determinants would, in turn, be useful in nursing practice for developing health education interventions aimed at promoting physical activity in these individuals. To the best of our knowledge, the TPB has not been applied in the study of exercise among obese individuals. Thus, the aim of this study was to use the TPB to examine intention to engage in regular physical activity among a group of obese individuals. The main research question was: *Can attitude, subjective norm, and perceived behavioural control explain physical activity intentions?* To address this question, the following hypotheses were formulated: 1. *A significant portion of variance will be explained by a combination of attitude, subjective norm, and perceived behavioural control.* 2. *The relative importance of attitude, subjective norm, and perceived behavioural control will vary.*

Method

Participants and Procedure

This study consisted of the secondary analysis of data from a cross-sectional survey on cardiovascular risk factors among a sample of the population served by a Local Community Health Service Centre in the province of Quebec, Canada. The goal of the survey was to determine the overall prevalence and distribution of cardiovascular risk factors.

Briefly, a sample of 900 randomly selected individuals between the ages of 35 and 64 was identified. These individuals were mailed a package containing a self-administered questionnaire, a return envelope, and a covering letter — signed by the principal investigator and the health coordinator of the Local Community Health Service Centre — describing the purpose of the survey and soliciting the individual's cooperation. The recipients were advised that their responses would be confidential and that no name would appear on the questionnaire. All of the study procedures were approved by an ethics review board. Two follow-up reminders were sent, one after the first week and one after the fourth week. Overall, 558 completed questionnaires were returned, for a participation rate of 63%. Among the 558 respondents, 96 were classified as obese according to their BMI (≥30 kg/m^2).

Measures

The psychosocial variables assessed were intention, attitude, subjective norm, and perceived behavioural control. The chosen time frame of 1 year for measuring the psychosocial variables was the same as that used in a province-wide survey conducted by a Quebec government agency (Daveluy, Pica, Audet, Courtemanche, & Lapointe, 2000). That survey was adapted to make the results comparable to those of the present population survey. In order to standardize the definition of physical activity for all participants, the following two statements were included at the top of each page of the questionnaire: "Physical activity includes all activities, such as sports, outdoor activities, physical fitness, and brisk walking," and "Participation in physical activity is considered regular when done for 20 to 30 minutes per session at least three times a week." Although the determinants of physical activity could vary according to the three components of physical activity (frequency, intensity, and duration) (Courneya & McAuley, 1994), the wording of the questions in this study was oriented towards frequency, as this dimension reflects the behavioural aspect.

Intention. Two items were used to assess intention. The first asked, "Do you intend to participate regularly in one or more physical activities for 20 to 30 minutes per session in your free time during the next year?" The response was recorded on a five-point scale (1 = definitely not, 5 = definitely). The second stated, "I intend to participate regularly in one or more physical activities for 20 to 30 minutes per session in my free time during the next year" (1 = strongly disagree, 5 = strongly agree). The two items correlated at .75 ($p < .01$) and the mean of the sum was taken as the intention score. Test-retest reliability for this question has been verified several times, with the values varying between

.65 (Godin, Valois, Shephard, & Desharnais, 1987) and .77 (Valois, Godin, & Bertrand, 1992).

Attitude. Attitude towards adoption of the behaviour was measured on six five-point items on a semantic differential scale. Each of the six scales appeared following the statement "I think that participating regularly in one or more physical activities in my free time during the next year would be...." The bipolar adjectives used were *unpleasant/pleasant, boring/interesting, useless/useful, tiresome/stimulating, disadvantageous/advantageous,* and *unreasonable/reasonable.* The score for attitude was expressed as the average of the sum of the six pairs of adjectives. Internal consistency was verified using Cronbach's alpha coefficient; an appropriate value of .82 was found. Test-retest reliability for this measure has been reported as .81 (Valois et al., 1992).

Subjective norm. The participants were asked the following question: "In your opinion, are the people who are most important to you in favour or not in favour of your participating regularly in one or more physical activities in your free time during the next year?" This item was measured on a five-point scale (1 = strongly not in favour, 5 = strongly in favour). Test-retest reliability for a measure similar to that used in this study produced a value of .66 (Courneya & McAuley, 1995).

Perceived behavioural control. Three items adapted from Nguyen, Potvin, and Otis (1997) were used to assess perceived behavioural control in the following format: "To me, participating in one or more physical activities in my free time during the next year appears..." *very difficult/very easy, complicated/straightforward, unachievable/achievable;* five-point scales were used. The mean of the three scales was taken as a composite score for PBC. Cronbach's alpha coefficient indicated an appropriate value of .92. Test-retest reliability of such a measure of perceived behavioural control is reported as .63 (Valois et al., 1992).

Past behaviour. The role of past behaviour in the TPB as discussed by Conner and Armitage (1998) was retained on the basis of a meta-analytic review indicating that it may play an important role in predicting intention to be physically active (Hagger, Chatzisarantis, & Biddle, 2002). Past behaviour was assessed using a simple self-report question: "How often have you participated in one or more physical activities for 20 to 30 minutes per session during your free time in the last 3 months?" (1 = never, 2 = less than once a month, 3 = two or three times a month, 4 = once a week, 5 = twice a week, 6 = three times a week, 7 = four times a week). This method of assessing behaviour is based on previous validated studies (Gionet & Godin, 1989; Godin, Jobin, & Bouillon, 1986). Test-retest reliability for this scale was .64 (Godin et al., 1986). In the previous studies, concurrent validity was established against measures

of maximum oxygen intake (VO2 max), body fat, and muscular endurance.

Age, gender, and BMI were also assessed. Based on respondents' self-reported weight (kg) and height (m),[2] BMI was calculated as weight (kg)/height (m).[2] The weight classification recommended by the WHO Expert Consultation on Obesity was used; thus, BMI between 25.0 kg/m^2 and 29.9 kg/m^2 denoted "overweight" and BMI of 30.0 kg/m^2 or greater represented "obesity" (World Health Organization, 2000).

Statistical Analysis

The data were analyzed using the SPSS statistical package (Version 10.0). The hypotheses concerning TPB were tested according to Ajzen's (1991) recommendations. First, Pearson product-moment correlations were calculated to examine the interrelationships between the TPB variables and additional variables. Then, a hierarchical regression analysis was conducted to predict intention to be physically active based on the TPB variables and additional variables.

Results

A total of 96 individuals were classified as obese based on their BMI ≥30). Four questionnaires were excluded because of missing data on the TPB variables. Thus, data analysis was based on the responses of 92 participants (49% female). The average age of the participants was 47.7 years (SD = 7); 29% of participants had completed postsecondary education, 58% had completed high school, and 13% had not completed high school. The measure of past behaviour indicated that 47.8% of respondents had not participated in any leisure-time physical activity during the previous 3 months, whereas 21.8% had been physically active three or more times per week.

Intercorrelations, mean scores, and standard deviations of the variables are presented in Table 1. The correlation matrix of the variables revealed positive correlations between intention and attitude (r = .65, p <.01), perceived behavioural control (r = .72, p <.01), and past behaviour (r = .62, p <.01). Subjective norm was weakly positively correlated with intention (r = .25, p <.05). No correlation was observed between intention and age (r = .11, p > .05), gender (r = -.18, p > .05), or BMI (r = .14, p >.05).

The results of the hierarchical regression analysis are presented in Table 2. In the first step, attitude and perceived behavioural control accounted for 66% of the variance in intention (F(3,88) = 56.01, p < .0001). In the second step, the addition of past behaviour added 7% of the explained variance in intention (F(1,87) = 25.55, p < .0001). In order

Table 1 *Intercorrelations, Mean Scores, and Standard Deviations of the Theoretical Model and Additional Variables*

	1	2	3	4	5	6	7	8	*M*	*SD*
1. Intention[a]	_	.65**	.25*	.72**	.62**	.11	-.18	.14	3.94	0.86
2. Attitude[a]		_	.33**	.44**	.31**	.04	-.11	.12	4.19	0.58
3. Subjective norm[a]			_	.19	.02	.01	.11	.02	4.25	0.82
4. Perceived behavioural control[a]				_	.46**	.06	-.16	.17	3.58	0.87
5. Past behaviour[b]					_	.18	-.14	.12	3.22	2.22
6. Age						_	-.24*	.07	47.74	6.97
7. Gender[c]							_	-.20	.51	0.50
8. BMI								_	33.89	4.33

[a] Mean score varying from 1 to 5.
[b] Mean score varying from 0 to 16 times per month.
[c] 0 = female; 1 = male.
*$p < .05$; **$p < .01$.

Table 2 ***Hierarchical Regression Analysis of Intention from Theoretical Model and Additional Variable***

Predictor	*R*	R^2	ΔR^2	*F* for Change	β^1	β^2
Step 1	.81	.66	.66	56.01★		
Attitude					.42★	.36★
Subjective norm					.01	.04
Perceived behavioural control					.53★	.40★
Step 2	.86	.73	.07	25.55★		
Past behaviour						.32★

R^2 = .73; ★ $p < .0001$.
β^1: standardized regression coefficients for first step.
β^2: final standardized regression coefficient.

of relative importance, the standardized regression coefficients indicated that perceived behavioural control ($\beta = .40$, $p < .0001$), attitude ($\beta = .36$, $p < .0001$), and past behaviour ($\beta = .32$, $p < .0001$) were the most important variables in predicting intention to be physically active.

Discussion

The goal of this study was to verify the utility of the Theory of Planned Behaviour to predict the intention of obese people to participate in free-time physical activity on a regular basis. The results indicate that intention is associated firstly with perceived behavioural control and secondly with having a favourable attitude towards this behaviour. A third determinant, past behaviour (which is not part of the TPB), also helped to explain intention. Thus, the results of this study suggest that the TPB is an appropriate theoretical framework for understanding the determinants of motivation to be physically active with respect to obese individuals. Also, though secondary to the main goal of the study, self-reports of recent physical activity indicate that nearly half of the respondents had a sedentary lifestyle. Only one person out of five reported participating in physical exercise on a regular basis.

Regarding the first hypothesis, a significant portion of the variance in intention ($R^2 = 66\%$) was explained by the TPB variables. This was higher than the average reported by Godin and Kok (1996) for prediction of exercise among different segments of the population; indeed, a value of 42% was derived from 21 applications regarding prediction of

exercise intention. However, the regression values from individual studies varied from 13% to 66%. For instance, Biddle, Goudas, and Page (1994) (R^2 of .62), Ajzen and Driver (1992) (R^2 of .66), and Kimiecik (1994) (R^2 of .66) report values in the same range as that found in the present study. Therefore, the present observed value in terms of explained variance is not unusual.

Concerning the second hypothesis, it was observed that attitude (β = .36) and perceived behaviour (β = .40) had similar standardized regression coefficients. These results are consistent with those observed by Godin and Kok (1996) and Hagger et al. (2002) for application of the TPB in the context of physical activity. Subjective norm was not a significant determinant of intention to engage in leisure-time physical activity on a regular basis. Therefore, perceived social norm can be considered of little importance to obese individuals regarding intention to exercise. This observation is congruent with several reviews of the scientific literature showing a weak correlation between subjective norm and intention to adopt various behaviours (Armitage & Conner, 2001; Godin & Kok), including participation in physical activity (Hausenblas, Carron, & Mack, 1997).

Perceived behavioural control can be viewed as the combined influence of two components: self-efficacy (ease or difficulty of adopting a behaviour), and controllability (the extent to which engagement is up to the person) (see Ajzen, 2002, for a review). Therefore, the perception of ease or difficulty of adopting a behaviour depends on the individual's evaluation of (1) available opportunities, and (2) the presence or absence of the necessary time, money, or ability. For the obese person, there is true difficulty in moving, because of body weight. Thus, nurses working with obese clients should have them begin slowly, with light exercise, and to slowly add frequency, intensity, and duration as the person's physical abilities improve.

The intention of obese individuals to engage in regular physical activity was also explained by attitude. This suggests that respondents who expressed an intention to be physically active perceived more advantages than disadvantages to engaging in regular physical exercise. This finding is congruent with that of Sarkin, Johnson, Prochaska, and Prochaska (2001), who also found that for individuals with excess weight (BMI $\geq$ 25 kg/m^2), intention to engage in moderate physical activity was associated with the perceived advantages of exercising. Thus, in designing health education interventions, nurses should provide exercise-related information stressing the benefits of participating in some form of physical activity (Jones, Sinclair, & Courneya, 2003).

The additional contribution of past behaviour was in the same range as the values reported by Conner and Armitage (1998) following their

TPB meta-analysis. These authors found that, after taking into account the TPB determinants, past behaviour explained a further 7.2%, on average, of the variance in intention. The role of past behaviour as a predictor of exercise intention has also been documented for various population subgroups (Blanchard, Courneya, Rodgers, Daub, & Knapik, 2002; Godin, Vezina, & Leclerc, 1989). The results of the present study with a group of obese individuals are in line with these observations. Although past exercise behaviour does not provide any insights into intervention strategies, as discussed by Ajzen (1991), it does suggest that it is important for nurses to find ways of increasing obese individuals' number of active days so that these persons may strengthen their intention to adopt an active lifestyle. Indeed, in the present study the respondents who were physically active during the previous few months exhibited the strongest intention to exercise during the next year.

Limitations

This study has a number of limitations. Firstly, the classification of obese was based on self-reported height and weight. This may have underestimated the actual number of obese people. Indeed, it has been documented that height and weight are often overestimated and underestimated by respondents (Newell, Girgis, Sanson-Fisher, & Savolainen, 1999; Niedhammer, Bugel, Bonenfant, Goldberg, & Leclerc, 2000). Secondly, the assessment of physical activity was based on self-reported leisure-time physical activity. Even though the questionnaire that was used has been validated in several studies (e.g., Godin et al., 1986), an objective measure may be more appropriate for use with obese individuals (Westerterp, 1999). Thirdly, according to the TPB (Ajzen, 1991) the main constructs of attitude, subjective norm, and perceived behavioural control are determined by underlying beliefs (i.e., behavioural, normative, and control). Ultimately, these are the beliefs that guide the development of educational interventions. However, they were not elicited in this study, thus limiting the identification of the content of an intervention. Future studies should provide this important information. A final limitation was the cross-sectional design of the study and reliance on intention measure as the dependent variable. The scientific literature recognizes, however, that intention is a reliable predictor of future exercise behaviour. In fact, based on several applications of Ajzen's theory in the field of exercise behaviour, the explained variance of exercise by intention only was 27% (Godin & Kok, 1996). Consequently, an intention measure is an acceptable proxy for exercise behaviour.

Implications for Nursing Practice

Overall, the results of this study suggest that, in designing effective health education interventions to promote regular leisure-time physical activity in obese individuals, nurses should favour the development of a sense of control over behaviour. In other words, nurses should help obese individuals to develop the skills needed to overcome barriers. Nurses should also support the development of a positive attitude towards exercise. In this regard, a health education intervention that highlights positive outcomes and minimizes negative outcomes could be an appropriate approach. Also, from a public health perspective, nurses should endeavour not to place the overall responsibility exclusively on the obese person but to take his or her environment and social context into account.

Finally, in order to motivate obese individuals to initiate regular leisure-time physical activity, nurses should use innovative strategies for delivering health education messages. Telecommunication and computer technologies can be an ideal medium for promoting leisure-time physical activity (Marcus, Nigg, Riebe, & Forsyth, 2000). In this regard, a promising and relatively new approach in health education is computerized tailoring. According to Kreuter and Skinner (2000), tailoring can be defined as "any combination of information or change strategies intended to reach one specific person, based on characteristics that are unique to that person, related to outcome of interest, and have been derived from an individual assessment" (p. 1). It is interesting to note that this definition is congruent with the nursing process — that is, individualization of interventions based on the client's needs (Bakken, 2001). The results of a recent systematic review confirm the conclusions drawn in earlier reviews and position papers: tailoring is a promising means of promoting a healthy diet and possibly physical activity as well (Kroeze, Werkman, & Brug, 2006).

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