

The relationship between the theory of planned behaviour, past exercise behaviour and intention in individuals diagnosed with Type 2 Diabetes

Cally Davies, Central Queensland University, c.davies@cqu.edu.au

Abstract

The purpose of this study was to determine the mediating effect of the theory of planned behaviour (TPB) on past exercise behaviour and intention. Participants were recruited from an existing study within Central Queensland University (CQU) and were made up of 18, Type 2 Diabetics. Participants were required to complete a questionnaire designed to assess exercise characteristics using the measures of the TPB (subjective norm, perceived behavioural control, and attitude) to determine their mediating effect on exercise intention. Hierarchical regression analysis indicated that exercise intention was significantly associated with perceived behavioural control, past exercise behaviour and attitude towards exercise. No significant relationship was found between subjective norm and exercise intention. These results indicate that the majority of constructs within the TPB significantly predict exercise intention in a sample of individuals diagnosed with Type 2 Diabetes.

Key words: Diabetes Mellitus, exercise, perceived behaviour control, subjective norm, attitude

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Introduction

Maintaining a physically active lifestyle has been shown to influence positively the health status of an individual (Hardman & Stensel, 2003). Regular exercise has been shown to be positively related to a number of health benefits. One of these health benefits relates to individuals diagnosed with non-insulin dependent diabetes mellitus (Type 2 Diabetes); in addition a risk factor which is said to contribute to the development of Type 2 Diabetes is leading an inactive lifestyle (Hardman & Stensel, 2003; Pan, et al., 1997). Research has shown that for those who have already been diagnosed with Type 2 Diabetes, exercise positively effects glycemic control providing increased health benefits for Type 2 Diabetics (Boule, Haddad, Kenny, George, & Sigal, 2001). This information has been well publicised yet despite this a large number of the general population and individuals diagnosed with Type 2 Diabetes are continuing to lead an inactive lifestyle (Hardman & Stensel). As such it is important to gain an understanding of the psychological factors which motivate individuals to participate and adhere to sufficient exercise

at a level to provide significant health benefits. This information can then be used to develop strategies specifically aimed at increasing exercise participation and adherence in a population specific target demographic. Therefore the purpose of this study was to determine the effectiveness of the constructs of the Theory of Planned Behaviour (TPB) in mediating the relationship between the effects of past exercise behaviour and intention in a sample of Type 2 Diabetics.

The TPB provided the framework for this study; the TPB has previously been shown to provide strong support for predicting exercise intention in general adult populations (Blue, 1995; Godin, 1993; Godin & Kok, 1996). The TPB was originally developed as the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and was later extended to include perceived behavioural control and renamed TPB (Ajzen, 1988, 1991). The TPB is a social cognitive theory and allows for indirect and direct variables influencing behaviour to be measured. The TPB acknowledges intention as the strongest predictor of actual behaviour (Ajzen, 1988). According to the theory intention is directly influenced by three constructs; subjective norm, perceived behavioural control and attitude towards the behaviour in question. Subjective norm refers to the individuals' normative belief of significant others perceptions that they should perform the behaviour. Perceived behavioural control demonstrates participants' perception or the ease or difficulty in carrying out the behaviour and is thought to be related to the individuals' previous experience, perceived barriers and some environmental factors (Ajzen, 1988). Attitudes are thought to be related to the individuals' belief regarding the likelihood that by performing the behaviour will result in a desired outcome. Previous research has demonstrated the effectiveness of the theory of planned behaviour in predicting exercise intention and behaviour (Ajzen, 1991; Blue, Wilbur, & Marston-Scott, 2001; Brickell, Chatzisarantis, & Pretty, 2006; Conn, Tripp-Reimer, & Mass, 2003; Norman & Conner, 2005). Considerable research has been conducted providing evidence for the TPB as a reliable predictor of exercise intention in younger adults, as evident through a literature review conducted by Blue. Although the research provides strong support for the TPB constructs as a reliable predictor of exercise intention, gaps exist in the research in relation to specific populations. Therefore the purpose of this study was to examine the constructs within the TPB (perceived behavioural control, subjective norm and attitude) in addition to past exercise behaviour and their ability to predict exercise intention among a sample of individuals diagnosed with Type 2 Diabetes.

Method

A cross-sectional study design was utilised to determine the ability of the theory of planned behaviour to mediate the relationship between past exercise behaviour and intention.

Participants

The study was conducted with individuals who had already been recruited for a pre-existing research project within Central Queensland University. Questionnaires were distributed to 21 subjects; three questionnaires were incomplete and were therefore not included in data analysis. A total of 18 questionnaires were included in data analysis. The sample consisted of individuals diagnosed with Type 2 Diabetes aged between 44 and 80 years old ($M = 57.62$, $SD = 10.84$). All 18 participants (11 females = 61.1%, 7 males = 38.9%) had been clinically diagnosed with Type 2 Diabetes. The majority of participants reported their marital status as

married (13 = 72.2%), two participants were single (11.1%), one (5.6%) was partnered, one (5.6%) divorced and one (5.6%) widowed. Participants were recruited from both Rockhampton (13 = 72.2%) and Townsville (5 = 27.8%) in Queensland, Australia.

Measures

The questionnaire consisted of three sections, the first section related to the participants background (age, marital status, gender etc.). The second section included questions relating to participants exercise intention, subjective norm, perceived behavioural control, past exercise behaviour (over previous two weeks). The third section asked questions relating to participants' attitude towards exercise. The definition of exercise for all questions was defined as "exercising for at least 20 minutes, on at least three days of the week." Items relating to the theory of planned behaviour consisted of four questions for each, excluding attitude which consisted of 12 questions. Questions relating to exercise intention, subjective norm and perceived behavioural control were randomised throughout section two of the questionnaire, and a number of questions were reverse-scored to ensure participants would read each question carefully.

Questions were developed based on the recommendations made by Ajzen and Fishbein (1980) and to specifications made by the University of Newcastle, United Kingdom (Francis, et al., 2004). All questions with the exception of background and past exercise behaviour were scored using a 7-point Likert scale.

Intention. An average of the four questions assessing intention was used, to assess participants' intention of undertaking exercise as previously defined. Questions were scored using the scale previously mentioned with *strongly agree* and *strongly disagree* at alternate ends of the scale. Questions were constructed similar to *I will try to exercise for at least 20 minutes each time, for at least three days of the week in this coming fortnight.*

Subjective Norm. The same scale was used for subjective norm with the exception of one question which used the scale of *I should* and *I should not*. Questions were worded similar to *other people expect me to exercise for at least 20 minutes, on at least three days of the week.* The average of the four questions was used to measure subjective norm.

Perceived Behavioural Control. The average of four questions were analysed to assess participants' perception of their ability to meet the exercise criteria described in the questionnaire. Questions were worded similar to *for me to exercise for at least 20 minutes, on at least three days of the week of the coming fortnight is ...* All questions were scaled with the extremes of *strongly agree* and *strongly disagree* with the exception of one which used the scale of *possible to impossible* based on the recommendations by Ajzen and Fishbein.

Past Exercise Behaviour. Four questions were used to address past exercise behaviour, the first questions asked the number of times the participants had exercised for the defined exercise amount over the previous two weeks. The next three questions were used to back up the first question and asked for the actual number of times the participant had undertaken *strenuous*, *moderate* and *mild exercise* over the previous two weeks for a minimum of 20 minutes each time.

Attitude. A semantic differential scale (12 items) was used to access attitude toward exercise. The single question which was used was worded, *for me to exercise for at*

least 20 minutes each time, for at least three days of the week in the coming fortnight is ... answers were constructed using bipolar adjective pairs (e.g., pleasant/unpleasant, interesting/boring, good/bad etc.). The mean of the 12 items were calculated to measure attitude.

All questions which were reverse-scored were recoded to match the structure of the other questions prior to data analysis being undertaken.

Procedure

Data were collected over a two week period; prior to any data being collected participants were required to read and sign an informed consent which provided an overview and requirements of participants. Participants did not receive any incentive to participate within this study. Questionnaires were designed to be self-explanatory to ensure all participants received the same instructions upon data being collected. Participants were required to fill out one questionnaire assessing subjective norm, perceived behavioural control, attitude, exercise intention and exercise.

Results

Statistical analysis was undertaken using SPSS, Version 11.0 (SPSS Inc.). Mean, standard deviation (\pm) and Pearson correlation coefficients for the measures using the TPB are displayed in Table 1. A hierarchical multiple-regression was used to determine the mediating effect of the measures of the TPB in exercise intention. The items of perceived behavioural control and past exercise (past 2-week period) were significantly related to exercise intention at a $p < 0.05$ level with attitude toward exercise having a significant effect at $p < 0.10$.

Table 1: Intercorrelations and Descriptive Statistics for Exercise and Measures from the Theory of Planned Behaviour (N = 18)

	Intention	Attitude	Subjective norm	Perceived behavioural control	Past exercise
Intention	-				
Attitude	0.33*	-			
Subjective norm	0.12	0.36**	-		
Perceived behavioural control	0.53**	0.18	0.28	-	
Past exercise	0.42**	0.05	0.24	0.44**	-
M	5.32	5.56	5.88	5.43	8.72
SD	1.94	0.94	1.15	1.5	9.87

* $p < 0.10$ ** $p < 0.05$

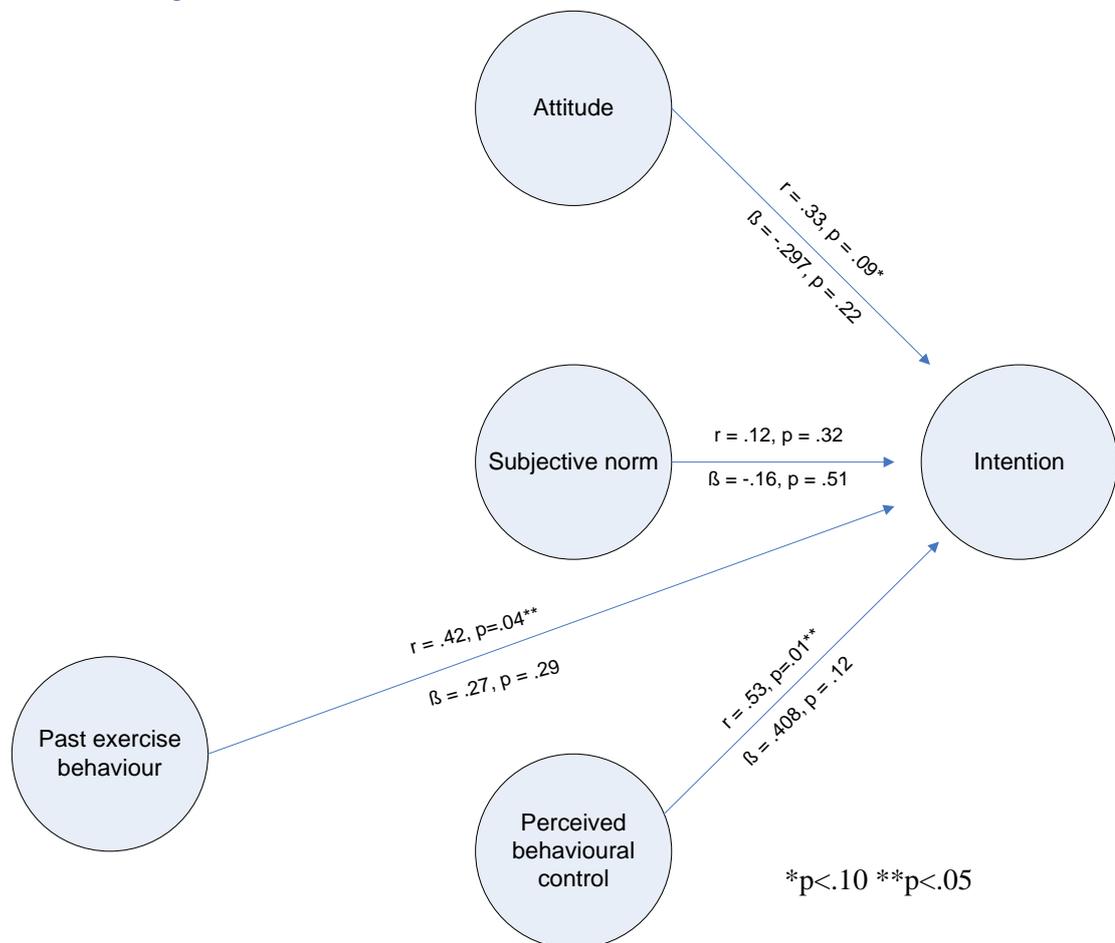
A three-step hierarchical regression analysis was undertaken to examine the effectiveness of using the TPB in predicting exercise intention. The first two steps involved using measures from the TPB with the third step adding in past exercise behaviour. All steps used intention as the dependent variable, with step one using

attitude and subjective norm as a predictor of intention. Step two added in the measure of perceived behavioural control which allowed for the separation of the constructs for the theory of reasoned action and the theory of planned behaviour. Finally step three added in past exercise behaviour. Results are presented in Table 2; however, only the third step incorporating all constructs are supplied as no significant differences were found. An overview of the overall findings in relation to the theory of planned behaviour is displayed in Figure 1.

Table 2. Hierarchical regression of exercise intentions on theory of planned behaviour (N = 18)

Variables	Beta
Attitude	0.3
Subjective norm	-0.16
Perceived behavioural control	0.41
Past exercise	0.27

Figure 1. Final theory of planned behaviour structural model displaying hierarchal regressions and intercorrelations



Discussion

Leading an inactive lifestyle has been identified as a major modifiable lifestyle factor associated with the onset of Type 2 Diabetes (Hardman & Stensel, 2003). As

previously stated a vast amount of research has been conducted on the role of the TPB in predicting exercise intention and behaviour in the general population. However, a limited amount of research has investigated the role of the TPB in predicting exercise intention and behaviour specifically among individuals diagnosed with Type 2 Diabetes. It is for this reason that gaining a greater understanding of cognitive factors which influence exercise behaviour is imperative. The TPB was chosen as the framework for the present study as the behavioural aspects acknowledged within the TPB have been shown previously to be a reliable predictor of health-related behaviours among specific populations (Armitage, Norman, & Conner, 2002).

The results of the study indicate that perceived behavioural control, past exercise behaviour and attitude significantly predicts exercise intention among Type 2 Diabetics. These findings partially support applying the TPB to exercise intention in Type 2 Diabetics. The results also provide support for the use of the theory of planned behaviour as a superior predictor of exercise intention as opposed to the theory of reasoned action, originally proposed by Ajzen and Fishbein (1975). This is demonstrated through the effect of perceived behavioural control on exercise intention and is consistent with previous research reviewing the two theories (Blue, 1995; Hausenblas et al., 1997). Two factors of the theory of planned behaviour and past exercise behaviour were found to be significant contributors to predicting exercise intention. The population who most positively perceived that they had control over their exercise behaviour formed stronger intentions to engage in exercise (defined as at least 20 minutes, on at least three days of the week of the coming fortnight); this finding is consistent with previous research (Dzewaltowski, Noble, & Shaw, 1990; Godin, Valois, & Lepage, 1993). Additionally, participants who reported participating in exercise over the previous two weeks for the frequency and duration explained above were more likely to form stronger exercise intentions. Finally, those who had a more positive attitude towards exercise were again more likely to form a stronger intention to exercise. The only construct found not to be significantly related to increasing exercise intention was subjective norm, which relates to the individual's perception of other people's thoughts on the importance for them to engage in exercise. This result is similar to the finding of Blue, Wilbur, and Marston-Scott (2001) on a study assessing blue-collar workers. Results of the hierarchical regression analysis when testing the beta value showed perceived behavioural control (β .408) as the highest unique contributor to predicting exercise intention followed by past exercise behaviour (β .265) and attitude (β .297), although none of the items were found to be significant contributors. It is acknowledged that factors not accounted for in the theory of planned behaviour can and will most likely have an effect on predicting intention. The lack of predictive value of subjective norm on exercise intention may relate to the participants believing that exercise was their own responsibility. The practical application of this finding may relate to a health care setting and could indicate that the content of information provided on the behaviour is more important than who delivers/provides the information.

The present study had limitations which warrant mention; the study was limited to a pre-selected sample of diabetics who were already participating within an intervention project within CQU. The study also relied exclusively on self-reported measures including past exercise behaviour. A stronger study design may have been achieved by incorporating a measure of actual exercise behaviour in the two weeks after completing the questionnaire and assessed by a follow up questionnaire. Additionally the study was limited to 18 participants, which is a small sample size, especially when undertaking a cross-sectional study design as utilised within this study. A more relevant scale (such as current exercise

guidelines) to determine exercise participation may have been beneficial in transferring the results to a real world setting. Finally, a pilot study was not undertaken on a similar sample of participants to ensure the relevance of the questions in relation to the specific population being measured. Recommendations for future research would include undertaking a pilot study prior to data collection and measuring exercise behaviour over the two-week period after data collection to assess the effect of intention on actual behaviour in Type 2 Diabetics.

The TPB is identified as being useful in gaining an understanding of the fundamental beliefs about a particular behaviour. Identifying and gaining an understanding of these beliefs enable health educators to design appropriate and effective interventions to positively influence behaviour (Ajzen & Fishbein, 1980). The purpose of this study was to examine the TPB as a mediator of past exercise behaviour and intention in a sample of individuals diagnosed with Type 2 Diabetes. The results partially support applying the TPB to exercise intention amongst individuals diagnosed with Type 2 Diabetes. The results emphasise the importance of perceived control over exercise participation and indicate that interventions addressing exercise intention amongst individuals diagnosed with Type 2 Diabetes should address factors which potentially inhibit participants' perceived control over exercise.

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