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Care staff intentions to support adults with an intellectual disability to engage in physical activity: An application of the Theory of Planned Behaviour

Authors:

Emma Martin¹, Karen McKenzie^{2*}, Emily Newman², Keith Bowden³ & Paul Graham Morris²

¹Clinical Psychology, Adult Learning Disability Service, Kirklands Hospital, Fallside Road, BOTHWELL, G71 8BB, UK

²Clinical and Health Psychology, University of Edinburgh, Teviot Place, Edinburgh, EH8 9AG, UK

³NHS Forth Valley, Learning Disabilities Psychology Department, Falkirk Community Hospital, Major's Loan, Falkirk, FK1 5QE, UK

*Corresponding Author Email: kmckenzi@staffmail.ed.ac.uk Tel: +44 (0)131 651 3953 Fax: +44 (0)131 651 3971

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Abstract

Research suggests that people with an intellectual disability (ID) undertake less physical activity than the general population and many rely, to some extent, on others to help them to access activities. The theory of planned behaviour model (TPB) was previously found to significantly predict the intention of care staff to facilitate a healthy diet in those they supported. The present study examined whether the TPB was useful in predicting the intentions of 78 Scottish care staff to support people with ID to engage in physical activity. Regression analyses indicated that perceived behavioural control was the most significant predictor of both care staff intention to facilitate physical activity and reported physical activity levels of the people they supported. Attitudes significantly predicted care staff intention to support physical activity, but this intention was not itself significantly predictive of reported activity levels. Increasing carers' sense of control over their ability to support clients' physical activity may be more effective in increasing physical activity than changing their attitudes towards promoting activity.

1. Introduction

Physical activity is important in reducing the risk of many health difficulties (World Health Organisation, 2002) as well as in improving psychological wellbeing (Dunn, Trivedi, & O'Neal, 2001). A lack of physical activity has been linked with a range of chronic health conditions such as diabetes, cancer, obesity, hypertension and osteoporosis, osteoarthritis and cardiovascular disease (Chakravarthy, Joyner, & Booth, 2002; Warburton, Nicol, & Bredin, 2006).

The World Health Organisation (2002) defines physical activity as 'any force exerted by skeletal muscles that results in energy expenditure above resting level' (pg 2) and covers many types of physical activity as well as exercise and sport. It is recommended that in order to improve and maintain health, adults should undertake 30 minutes or more of physical activity of moderate intensity on at least 5 days a week (Department of Health, 2004; Scottish Executive, 2003).

People with an intellectual disability (ID) have additional and more complex health needs than those of the general population (e.g. Cooper, Morrison, Melville, Finlayson, Allan, Martin, et al., 2006). As well as the positive impact on health, physical activity can have a number of additional benefits for people with ID, including contributing to a reduction in behaviours that challenge (Gabler-Halle, Halle, & Chung, 1993), reducing levels of self-injurious behaviours (Baumeister & MacLean, 1984) and increasing acceptance and integration into the wider community (Rimmer, Braddock, & Fujiura, 1993). Yet despite these benefits and the fact that physical inactivity is a modifiable health risk for most people (Warburton et al., 2006), research suggests that many people with ID do not engage in physical activity on a regular basis (e.g. Messent, Cooke, & Long, 1998).

Unfortunately, however, people with ID have been found to be less active than the general population (e.g. Emerson, 2005; Messent *et al.*, 1998; Robertson, Emerson, Gregory, Hatton, Turner, Kessissoglou, et al., 2000; Temple & Walkey, 2007). Most of these studies have small sample sizes and are restricted to those with less severe intellectual disabilities or those who live in specific supported living environments. The research overall, however, paints a general picture of decreased physical activity in people with ID, with carers playing an important role in facilitating engagement with physical activity (Finlayson, Jackson, Cooper, Morrison, Melville et al., 2009; Hawkins & Look, 2006; Melville, Cooper, Morrison, Allan, Smiley, & Williamson, 2008). Likewise, it has also been suggested that a carer's resistance to change is a significant barrier to promoting healthy lifestyle choices and behaviour in those they support (Lunsky, Bradley, Durbin, Koegl, Canrinus, & Goering, 2003).

One model for understanding health behaviours such as exercise is the Theory of Planned Behaviour (TPB, Ajzen 1988, 1991). This theory postulates that the main determinant of behaviour is the person's intention to perform a specific behaviour (e.g. 'I intend to exercise regularly over the next three weeks'). This is a person's motivation to perform behaviour and it is expected that people who have strong intentions will be more likely to exert the effort required in order to achieve their goals. Ajzen (1988, 1991) believes intention is determined by three constructs:

Attitude: This refers to positive or negative evaluations of performing the behaviour and its likely outcomes (e.g. 'Supporting my client's physical activity will be difficult, but may be rewarding and will improve their health and wellbeing')

Subjective Norm: This refers to the perceived social pressure from others who are important to the person to carry out the behaviour (e.g. 'My manager and colleagues would like me to support my client to undertake physical activity and I value their opinions')

Perceived Behavioural Control: This refers to the amount of control the person feels that they have over performing the behaviour. (e.g. ‘I have the ability to support my client with physical activity and resources are available for me to do this’).

The TPB has some limitations related to it being a self-report measure, and having some ambiguity about the concept of perceived behavioural control (Armitage & Conner, 2001). Overall, however, it is a well-researched model that has been shown to explain a significant proportion of the variance in intentions to perform a range of health-related behaviours (e.g. Chambers, Lobb, Butler, & Traill, 2007). In the only study to use the TPB in relation to the health behaviours of people with ID, Jenkins and McKenzie (2010) found that it helped predict carers’ intentions to promote healthy eating amongst people with ID that they supported. In this study, all three TPB variables: attitude, subjective norm and perceived behavioural control were statistically significant predictors of intention, accounting for 31 per cent of the variance for this group.

The present study aimed to extend this work by examining the extent to which the TPB was a predictive model of carers’ intentions to support physical activity. It was further anticipated that the physical activity of individuals with ID would be predicted both by carers’ intentions to support this behaviour and their perceived behavioural control of this supporting behaviour.

2. Method

2.1 Ethics

The research received ethical approval from the Department of Clinical and Health Psychology at the University of Edinburgh, UK

2.2 Design

A cross-sectional, quantitative design was employed in which questionnaire measures were administered to all participants, with key worker participants completing physical activity measures in relation to their clients. Assuming a medium effect size ($f^2=0.15$), with 78 participants and $\alpha=0.05$, the achieved power for prediction of intention was 0.81 and power for prediction of reported physical activity was 0.86.

2.3 Measures

2.3.1. *The Norman & Conner (2005) Theory of Planned Behaviour Questionnaire*

This questionnaire uses a Likert scale from -3 to +3 for all questions. The composite variable score is a mean of the individual scores relating to that factor. The questionnaire has good internal validity (Norman & Connor, 2005). The questionnaire was adapted for the present study to measure the constructs of the TPB in relation to supporting the client with ID to engage in physical activity. For example, “How likely is it that you will exercise at least three times over the next week?” was altered to, “How likely is it that you will support your client to exercise at least three times over the next week?” In the adapted version, a high score in intention indicates a higher intention of supporting physical activity. A high attitude score indicates a more positive attitude towards supporting physical activity and a high subjective norm score indicates that the participants are more influenced by those important to them. A high perceived behavioural control score indicates that the participant feels that they have more control in relation to supporting their client to engage in physical activity. Scores for attitude, subjective norms and perceived behavioural control were obtained from the mean score of all the questions relating to that variable. The adapted questionnaire had Cronbach alpha values as follows: attitude=0.75; subjective norm=0.54; perceived behavioural control= 0.84; and intention = 0.72. Scores above 0.7 are generally considered to

indicate good reliability (Field, 2005). A copy of the adapted questionnaire is available from the first author.

2.3.2 *The International Physical Activity Questionnaire – Short Form (Craig, Marshall, SjÅ–StrÅ, Bauman, Booth, Ainsworth, et al., 2003) (IPAQ-SF)*

The IPAQ-SF is a short form of the IPAQ, an international measure for physical activity. Both versions have had extensive reliability and validity testing across 12 countries and reliability is reported to be between 0.61 and 0.83 (Craig *et al.*, 2003). The IPAQ-SF allows the measurement of physical activity in metabolic equivalent of tasks (MET). This is a physiological concept expressing the energy cost of physical activity (Ainsworth, Haskell, & Leon, 1993). The IPAQ-SF was used to calculate a total MET-minute score for a week using formulae outlined in Ainsworth *et al.* (1993). The wording in this questionnaire was altered so that it referred to the client rather than the respondent. For example, “On how many days do you do vigorous exercise a week?” was altered to read, “On how many days does your client do vigorous exercise in a week?”

2.4 Procedure

Data were collected in two ways: via paper questionnaires and via an online questionnaire. In the former case, care organisations that provided support to people with ID were identified from available information e.g. websites and telephone directory information. The head office of each agency identified was sent a brief written outline of the project which was followed up by a phone call two to three weeks later. This provided an opportunity to provide more detailed information about the project and to answer any questions. Fifteen care organisations in central Scotland were approached to take part in the study and seven participated. The service characteristics of those who did and did not participate did not differ. Questionnaire packs were provided to the head office of organisations that wished to

participate. Each questionnaire pack contained an information sheet, consent form, stamped addressed envelope, the TPB questionnaire and the IPAQ-SF.

The questionnaires were returned anonymously either in a locally placed sealed collection box or by mail. Twenty-seven (77 per cent) were returned by mail. In total, 210 questionnaires were distributed and 35 were returned, a response rate of 17%. Data were also collected using an internet based data collection method (Bristol Online Survey). These on-line measures were identical to the paper versions. The link to these questionnaires was posted on two internet forums:

1. Learning Disability Choice Network (<http://www.ldhealthnetwork.org.uk>) which is open to professionals, families and care staff of people with ID
2. ClinPsy (<http://www.clinpsy.org.uk>) which is a website for aspiring clinical psychologists and has many members who work as support workers.

The post provided information about the study, the inclusion and exclusion criteria, and instructions on how to participate. A month after the initial post, a reminder was posted on the websites for participants to complete the follow up questionnaire.

2.5 Participants

Participants were included if they were the main key worker for a person with ID who lived on their own or in a shared home in the community in Central Scotland. In total 35 people provided data via paper questionnaires. Of these 28 (80%) were female and seven (20%) were male. In addition, 43 online responses were collected. Of these, 29 participants (67.4%) were female and 14 (32.6%) were male. In total, 78 people completed the questionnaires. The participants supported 28 (35.9%) female clients and 50 (64.1%) male clients. The modal age range for participants was between 45 and 54 and between 25-34 and 45-54 for the people they supported.

2.6 Data analysis

Data from the paper and the online questionnaires were collated into a Predictive Analytic Software 17 (PASW 17) file. Exploratory data analysis indicated that there were no significant differences in any of the variables according to the method of data collection (paper-and-pencil or online). Preliminary analyses conducted to evaluate the data against the assumptions of normality revealed that the physical activity scores had significant positive skew ($z=9.75$, $p<0.01$) and one of the predictor variables (subjective norm) had significant negative skew ($z=-4.01$, $p<0.01$). A logarithmic transformation on the physical activity variable resulted in the most improvement in normality and although the transformed data were still significant for skew ($z=-5.98$, $p<0.01$), this provided data that were the closest to normal distribution. For the subjective norm variable, a transformation which involved raising the exponential, e , to the power of each data point was used, resulting in non-significant skew and kurtosis ($p>0.01$). Pearson product-moment correlations were conducted to assess relationships between attitudes, subjective norms perceived behavioural control and intention, and between intention, perceived behaviour control and past physical activity. To test the predictive power of the TPB model, intention was regressed onto attitudes, subjective norms and perceived behavioural control and past exercise behaviour regressed onto intention and perceived behavioural control.

3. Results

3.1 Descriptive Data

Past physical activity was measured using the IPAQ-SF, which recommends using the median and interquartile range when reporting the results as it tends not to be normally distributed. Table 1 shows the median, interquartile range and range of MET-minutes/week

as measured by IPAQ-SF for walking, moderate activities, vigorous activities and total physical activity. Table 1 also shows the mean, standard deviation and ranges for the variables measured by the TPB questionnaire.

INSERT TABLE 1 ABOUT HERE

3.2 Bivariate Correlations

Pearson product moment correlations were conducted to examine the relationships between the TPB measures and physical activity. Table 2 shows the correlation matrix, which shows a significant positive relationship between clients' past physical activity and carers' intention to support physical activity ($r = 0.34, p < .01$). Intention was significantly positively related to attitudes, subjective norms and perceived behavioural control, while physical activity was significantly positively associated with attitudes, intentions and perceived behavioural control (all $p < .01$), but not with subjective norms.

INSERT TABLE 2 ABOUT HERE

3.3 Regression analyses

Two regression models were tested. In the first model, intention was regressed onto attitudes, subjective norms and perceived behavioural control. All predictors were entered simultaneously and coefficients are shown in Table 3. The model was significant ($F(3,74)=20.93, p < .001$), with R^2 value of .459. Attitude and perceived behavioural control were significant predictors of carers' intentions to support their client to undertake physical activity, where perceived behavioural control had the highest standardised coefficient, showing it contributed most to intention. Subjective norm was a marginally significant predictor of intention to support physical activity with the client. In the second model, past

physical activity was regressed onto intention and perceived behavioural control. The two predictors were entered simultaneously and coefficients are also shown in Table 3. The overall model was significant ($F(2,75)=8.71$, with R^2 value of .188). Carers' perceived behavioural control over their ability to support physical activity was a significant predictor of clients' physical activity, whereas carers' intention to support physical activity was not significantly predictive of physical activity.

INSERT TABLE 3 ABOUT HERE

4. Discussion

The study investigated whether the TPB was a viable model for predicting the intentions of care staff to support people with ID to take part in physical activity. It was hypothesised that carers' intentions to support physical activity in those they supported would be predicted by their attitudes, subjective norms and perceived behavioural control i.e. that the TPB would be a viable predictive model. The research supported this and found that the TPB model explained a significant proportion of the variance of carers' intentions to support people with ID to undertake physical activity.

In line with previous studies (e.g. Blue, 1995; Hagger, Chatzisarantis, & Biddle, 2002), perceived behavioural control and attitude were the most predictive variables of intention. Subjective norms score was marginally predictive of intention, but the effect did not reach significance. This, however, differs from Jenkins and McKenzie's (2010) finding that subjective norm was the most predictive variable of carer intention to facilitate a healthy diet in people with ID. It should be acknowledged that within the present study, the internal reliability of the subjective norms measure was lower than for the other TPB measures. However, the discrepancy between the present findings and those of Jenkins and McKenzie

may also exist because support services in Scotland, where both studies were carried out, are required to adhere to care standards about diet and access to healthy and nutritious food, but not about required levels of physical activity. These standards are likely to be reflected in individual care plans and to be reviewed by service managers, making them more likely to impact on the subjective norms of carers in relation to diet than physical activity. The lack of explicit care standards may also be a factor in the finding that only 56.4 per cent of carers in the present study intended to support their clients to engage in physical activity, despite higher numbers having a positive attitude to physical activity. This suggests a need for specific service targets in relation to promoting physical activity for people with ID.

The study also hypothesised that the physical activity of individuals with ID would be predicted both by carers' intentions to support this behaviour and their sense of perceived behavioural control in relation to supporting this physical activity. While the variables of perceived behavioural control and intention explained 18.8 per cent of the variance in the TPB model in relation to people with ID undertaking physical activity, the analysis indicated that carers' intentions to support physical activity did not significantly predict the physical activity of the people whom they supported, independent from perceived behavioural control. By contrast, carers' perceived behavioural control of their ability to support physical activity significantly predicted physical activity of the client, independently of intention.

This suggests that interventions aimed at increasing physical activity in clients with ID who are supported by carers may best be targeted at enhancing carers' perceived behavioural control over their ability to support such activity. Ajzen's (1991) conceptualisation of perceived behavioural control may be understood as anticipated barriers to conducting the behaviour, which could be internal (e.g. perceived personal physical or emotional barriers) or external (e.g. perceived lack of physical resources or opportunities). The barriers to carers supporting people with ID undertaking physical activity may include issues such as health difficulties, older age, incontinence, lack of daytime activity (Scottish Executive, 2003)

access to transport and finance (Hawkins & Look, 2006) and beliefs about the choices of the person with an ID (Messent et al., 1999). Some of these perceived barriers may be genuine barriers that are out with the control of carers, however, other perceived barriers, such as issues relating to choice and duty of care (McKenzie, Murray, Higgon, & Matheson 1999; Messent & Cooke, 1999) might be addressed via staff training. Given the apparent importance of perceived behavioural control in predicting clients' physical activity, future studies might usefully focus upon identifying common perceived barriers to supporting physical activity with a view to subsequently developing interventions aimed at reducing these barriers.

Staff training may need to target different factors depending on which aspect of a healthy lifestyle is being addressed. The present study suggests that perceived behavioural control may be most relevant in relation to promoting physical activity, whereas other research suggests that subjective norm should be the target when encouraging carers to promote a healthy diet in people with ID (Jenkins and McKenzie, 2010). At present, it is likely that diet and exercise are targeted together under the umbrella term of healthy lifestyles (Robertson *et al.*, 2000). The study highlights the need for barriers to supporting physical activity for people with ID to be addressed at a wider societal and policy level. Unfortunately, many policy documents in the UK do not currently address the specific needs of people with ID (e.g., Scottish Executive, 2003).

A limitation of the study is that clients' physical activity was based upon proxy (carer) reports rather than being measured directly. Research by Armitage and Conner (2001) indicates that TPB models can account for more variance when behaviour is self-reported rather than objectively measured, indicating a potential bias. Proxy respondents are subject to the same errors in measurement (Sirard & Pate, 2001) and may respond in a socially desirable manner when completing questionnaires about the people with whom they work (Schwartz & Rabinovitz, 2003). In line with previous research (Ajzen, 1991; Ajzen & Fishbein, 2005),

past behaviour was used as a proxy measure for actual behaviour; however, it is acknowledged that this was not a measure of future behaviour, or of the extent to which carers supported clients to engage in physical activity. A further limitation is that the overall response rate was fairly low, as is typical for such studies. It is possible that there was a respondent bias, with those carers who did not support clients to engage in physical activity potentially being less likely to participate in the study, which would have implications for the generalisability of findings.

5. Conclusions

Despite people with ID being at increased risk of health conditions that are affected by levels of physical activity (Warburton *et al.*, 2006), the present study found that only 56.4% of carers intended to encourage those they supported to undertake physical activity, as indicated by a positive overall intention score. It was found that the TPB model explained a significant proportion of the variance of carers' intentions to support people with ID to undertake physical activity, with perceived behavioural control and attitude being the most predictive variables of intention. This suggests that interventions to increase the physical activity of people with ID might usefully focus on identifying and overcoming barriers to carers' sense of control over their ability to support clients' physical activity. The attitude of carers towards supporting physical activity was also a significant predictor of intention to support physical activity, highlighting the need for carer interventions that emphasise the benefits of physical activity for people with ID.

6. References

- Ainsworth, B.E., Haskell, W.L., Leon, A.S. (1993). Compendium of physical activities: classification of energy costs of human physical activities. *Medicine and Science in Sports and Exercise*, 25, 71–80.
- Ajzen, I. (1988). *Attitudes, Personality and Behaviour*, Milton Keynes: U.K.: Open University Press.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179 - 211.
- Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracín, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 173-221). Mahwah, NJ: Erlbaum.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40, 471-499.
- Baumeister, A.A. & MacLean, W.E. (1984). Deceleration of self-injurious and stereotypic responding by exercise. *Applied Research in Mental Retardation*, 5, 385–393.
- Blue, C. L. (1995). The predictive capacity of the theory of reasoned action and the theory of planned behavior in exercise research: An integrated literature review. *Research in Nursing & Health*, 18(2), 105-121.
- Chakravarthy, M.V., Joyner, M.J., & Booth, F.W. (2002). An obligation for primary care physical activity to sedentary patients to reduce the risk of chronic health conditions. *Mayo Clinic Proceedings*, 77(2), 109-13.
- Chambers, S. A., Lobb, A. E., Butler, L., & Traill, W. B. (2007). Predicting Healthy Eating Behaviour. *Implications of a nutrition driven food policy for land use and the rural environment*. Reading, University of Reading.
- Cooper, S. A., Morrison, J., Melville, C., Finlayson, J., Allan, L., Martin, G., et al. (2006). Improving the health of people with intellectual disabilities: outcomes of a health screening programme after 1 year. *Journal of Intellectual Disability Research*, 50, 667-677.

- Craig, C. L., Marshall, A. L., SjÅ–StrÅ–M, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., et al. (2003). International Physical Activity Questionnaire: 12-Country Reliability and Validity. *Medicine & Science in Sports & Exercise*, 35(8), 1381-1395.
- Department of Health (2004). *At Least Five a Week: Evidence on the impact of physical activity and its relationship to health. A Report from the Chief Medical Officer*. London: Department of Health Publications.
- Dunn, A. L., Trivedi, M. H., & O'Neal, H. A. (2001). Physical activity dose-response effects on outcomes of depression and anxiety. *Medicine & Science in Sports & Exercise*, 33(6), 587-597.
- Emerson, E. (2005). Underweight, obesity and exercise among adults with intellectual disabilities in supported accommodation in Northern England. *Journal of Intellectual Disability Research*, 49(2), 134-143.
- Field, A. (2005). *Discovering statistics using SPSS (2nd ed.)*. London: Sage.
- Finlayson, J., Jackson, A., Cooper, S-A., Morrison, J., Melville, C., Smiley, E., Allen, L., & Mantry, D. (2009). Understanding Predictors of Low Physical Activity in Adults with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities*, 22, 236 - 247.
- Gabler-Halle, D., Halle, J. W., & Chung, Y. B. (1993). The effects of aerobic exercise on psychological and behavioral variables of individuals with developmental disabilities: A critical review. *Research in Developmental Disabilities*, 14(5), 359-386.
- Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology*, 24(1), 3 - 32.
- Hawkins, A., & Look, R. (2006). Levels of engagement and barriers to physical activity in a population of adults with learning disabilities. *British Journal of Learning Disabilities*, 34, 220-226.
- Jenkins, C. M. & McKenzie, K. (2011), The application of the Theory of Planned Behaviour to diet in carers of people with an intellectual disability. *Journal of Applied Research in Intellectual Disabilities*, 24, 237–246. doi: 10.1111/j.1468-3148.2010.00594.x

- Lunsky, Y., Bradley, E., Durbin, J., Koegl, C., Canrinus, M., & Goering, P. (2006). The Clinical Profile and Service Needs of Hospitalized Adults With Mental Retardation and a Psychiatric Diagnosis. *Psychiatric Services, 57*(1), 77-83.
- McKenzie, K., Murray, G.C., Higgon, J. & Matheson, E (1999) Knowledge of learning disability: the relationship with choice, duty of care and non-aversive approaches. *Journal of Learning Disabilities for Nursing, Health and Social Care. 3*(1), 27-33.
- Melville, C. A., Cooper, S. A., Morrison, J., Allan, L., Smiley, E., & Williamson, A. (2008). The Prevalence and Determinants of Obesity in Adults with Intellectual Disabilities. *Journal of Applied Research in Intellectual Disabilities, 21*(5), 425-437.
- Messent, P. R., Cooke, C.B., & Long, J. (1998). Daily physical activities in adults with mild and moderate learning disabilities: is there enough? *Disability and Rehabilitation, 20*(11), 424 - 427.
- Messent, P. R., Cooke, C. B., & Long, J. (1999). What Choice: A Consideration of the Level of Opportunity for People with Mild and Moderate Learning Disabilities to Lead a Physically Active Healthy Lifestyle. *British Journal of Learning Disabilities, 27*(2), 73-77.
- Norman, P., & Conner, M. (2005). The theory of planned behavior and exercise: Evidence for the mediating and moderating roles of planning on intention-behavior relations. *Journal of Sport and Exercise Psychology, 27*, 488-504.
- Rimmer, J. H., Braddock, D., & Fujiura, G. (1993). *Prevalence of obesity in adults with mental retardation: implications for health promotion and disease prevention* (Vol. 31). Washington, DC, United States: American Association on Mental Retardation.
- Robertson, J., Emerson, E., Gregory, N., Hatton, C., Turner, S., Kessissoglou, S., *et al.* (2000). Lifestyle related risk factors for poor health in residential settings for people with intellectual disabilities. *Research in Developmental Disabilities, 21*, 469 - 486.
- Schwartz, C., & Rabinovitz, S. (2003). Life satisfaction of people with intellectual disability living in community residences: perceptions of the residents, their parents and staff members. *Journal of Intellectual Disability Research, 47*(2), 75.
- Sirard, J. R., & Pate, R. R. (2001). Physical Activity Assessment in Children and Adolescents. *Sports Medicine, 31*, 439-454.

Temple, V. A., & Walkley, J. W. (2007). Perspectives of constraining and enabling factors for health promoting physical activity by adults with intellectual disability. *Journal of Intellectual and Developmental Disability, 32(1)*, 28-38.

The Scottish Executive (2003) *Let's Make Scotland More Active: A strategy for physical activity*. Edinburgh, Scottish Executive.

Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: the evidence. *Canadian Medical Association Journal, 174(6)*, 801-809.

World Health Organisation (2002) *Physical Activity and Health in Europe: Evidence for Action*. Europe, World Health Organisation.

Table 1: Means and standard deviations for theory of planned behaviour variables and the median, interquartile range and range for the IPAQ.

Questionnaire	Variable	Mean (Standard Deviation)	Positive scores (%)
Theory of Planned Behaviour Questionnaire	Intention (INT)	0.49 (1.69)	56.41
	Attitude (ATT)	1.99 (1.06)	92.31
	Subjective Norm (SN)	0.68 (1.29)	69.23
	Perceived Behavioural Control (PBC)	-0.48 (1.59)	35.90
Physical Activity over the preceding two weeks Met-Minutes per week (IPAQ-SF)		Median (interquartile range)	Range
Walking		31.3 (561)	0-13860
Moderate		240 (720)	0-6720
Vigorous		0 (540)	0-13860
Total		1066 (1670.25)	0-13860

Table 2: Correlations between the TPB variables and physical activity behaviour

		Theory of Planned Behaviour				Physical Activity
		Intention	Attitude	Subjective Norm	Perceived Behavioural Control	
Theory of planned Behaviour	Intention	1	0.47*	0.43*	0.60*	0.34*
	Attitude		1	0.35*	0.33*	0.36*
	Subjective Norm			1	0.39*	0.17
	Perceived Behavioural Control				1	0.42*

*Significant at $p < .01$ (one-tailed)

Table 3: Regression coefficients for prediction of intention and exercise behaviour (as measured by past physical activity)

Outcome Variable	Predictor Variable	Unstandardised coefficient (B)	S Error (B)	Standardised coefficient (β)	t	P Value
1. Intention to Support Physical Activity	ATT	0.413	0.150	0.259	2.76	0.007*
	SN	0.217	0.126	0.166	1.73	0.088
	PBC	0.475	0.101	0.447	4.69	<0.001*
2. Past Physical Activity	INT	0.080	0.071	0.146	1.13	0.263
	PBC	0.193	0.076	0.331	2.55	0.013*

*significant at $p < 0.01$; ATT: Attitude towards supporting physical activity; SN: Subjective Norm regarding supporting physical activity; PBC: Perceived Behavioural Control regarding supporting physical activity; INT: Intention to Support Physical Activi