The application of the Theory of Planned Behaviour to diet in carers of people with an intellectual disability

The application of the theory of planned behaviour to diet

Abstract

Background

The utility of the theory of planned behaviour (TPB) in predicting the intentions of care staff to encourage healthy eating behaviour in those they supported was examined.

Method

A quantitative, within-participant, questionnaire based design was used with 112 carers to assess the performance of two TPB models. The first contained the variables: attitude, subjective norm and perceived behavioural control. The second had additional variables of self efficacy and self identity.

Results

Model 1 accounted for 31% of the variance with all three variables being significant predictors. Adding variables increased the overall predictive power of the model by 4%, but resulted in a reduction in the predictive power of the individual variables.

Conclusion

The results suggests the TPB is a useful model for predicting carer intentions in relation to the diet of those they support, with their perceptions of the attitudes of others towards healthy eating being a key influential factor. Ways in which this may inform interventions to improve the overall health of people with learning disabilities are discussed.

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Introduction

Healthy eating is important both for a sense of wellbeing and for the prevention of conditions such as heart disease, diabetes, high blood pressure, stroke, cancer and asthma (The Scottish Office, 2008). An unhealthy diet can contribute to obesity (Butland et al., 2008) which in turn is a risk factor for many health problems as well as having a negative impact on life expectancy, psychological well-being and quality of life (Associate Parliamentary Food and Health Forum, 2008, Carr & Friedman, 2005, World Health Organisation, 2002). In addition, poor diet contributes to being underweight which also has associated health risks, in particular increased vulnerability to infection (World Health Organisation, 2002).

Research has indicated that poor diet and weight control are particular issues for people with an intellectual disability, with a greater proportion being underweight, overweight or obese compared with the general population (Bhaumik et al., 2008; Emerson, 2005). The prevalence of people with an intellectual disability who are underweight varies from 10-68 per cent, with higher rates being related to a greater proportion of people with a profound intellectual disability in the research sample (Bhaumik et al., 2008, The Scottish Executive, 2004) This compares with 4 per cent in the general population (Department of Health, 1998). Levels of obesity are also higher in people with an intellectual disability (Emerson, 2005; Bhaumik et al., 2008) with prevalence rates ranging from 10-73 per cent (The Scottish Executive, 2004, Rimmer et al., 1993) compared with an estimated 20 per cent in the general UK population (Royal College of Physicians, 2004). The range across studies is large and the results have varied due to the methodology used, the subset of the population

examined and the lifestyle of participants (Bhaumik et al., 2008, Melville et al., 2007).

People with an intellectual disability can become overweight and obese for the same reasons as the general population i.e. an excess consumption of calories compared with those used throughout a day (Rotatori et al., 1981). A review by Melville et al., (2007) however, found a number of additional factors which were related to obesity, including age, gender and level of intellectual disability. People with an intellectual disability were more likely to develop obesity at a younger age than people in the general population, women with an intellectual disability were found to be at a higher risk of obesity than men and people with a mild to moderate intellectual disability had a higher prevalence of obesity. The review also found that people who lived in more restrictive environments such as in institutions or in supported group homes, had a lower Body Mass Index (BMI), an estimate of weight based on the ratio between a person's weight and height, than those who lived more autonomously or with their families.

This research indicates that a number of factors can influence weight, however it is acknowledged that diet continues to be very influential (Butland et al., 2008). Research in this area is, however, complicated by the fact that there is no agreed definition for 'healthy' and 'unhealthy' diet. As a result researchers have used a range of indicators including eating a low fat diet (Lloyd et al., 1993), soft drink consumption (Kassem & Lee, 1983), intention to eat particular types of food, e.g. cheese (Sparks et al., 1995) or adherence to guidelines for healthy eating based on a

selection of foods from the four food groups; starchy, dairy, protein and fruit and vegetables (Chambers et al., 2007).

Diet in people with an intellectual disability

Research into the diet of people with an intellectual disability is limited, however, the results suggest that many may have unhealthy diets. McGuire et al. (2007) surveyed 157 carers and found that those they supported consumed lower levels of fruit and vegetables, carbohydrates, dairy products and protein, and equivalent levels of sugar and fat intake when compared with the general population. In addition, in a study investigating the issue of bowel problems in people with an intellectual disability, Dickson et al. (2002) postulated that unhealthy diet could be a factor in causing the clients' difficulties, although this study had a small sample of only 44 clients.

Melville et al., (2007) summarised the findings of additional studies. In one, no relationship was evident between nutritional intake and BMI, in 332 adults living within institutions (Cunningham et al., 1990). In another, calorie intake and eating behaviour in equal numbers of adults with and without an intellectual disability were compared and found not to differ (Fox & Rotatori, 1982). In the third, a large study of 500 people with an intellectual disability living in a range of residential situations, it was found that 74-84 per cent did not eat the daily recommended intake of five fruit and vegetables per day (Robertson et al., 2000). The last study found that people with an intellectual disability who were obese had a greater nutritional knowledge than non obese people with an intellectual disability and suggested that factors other than knowledge impact upon the development and maintenance of obesity (Golden &

Hatcher, 1997). It could, however, be argued that knowledge does not necessarily equate with understanding (Smyth & Bell, 2006) and that dietary knowledge in and of itself is not enough to incur change in behaviour (Fishbein & Ajzen, 1975).

There are also limitations with some of the other studies reviewed by Melville et al., (2007). For example, the study by Fox and Rotatori (1982) had a small number of participants and the classification system used by Robertson et al., (2000) is open to criticism. Eating chips on more than four days a week was classified as unhealthy eating behaviour, suggesting that eating chips on four days a week, and potentially on more than one instance in a day could be classified as a healthy eating behaviour. Humphries et al. (2008) summarise a number of the difficulties involved in accurately measuring dietary intake, including problems with the accuracy of retrospective measures which rely on memory and the influence that recording the diet at the time can have on the diet itself. They improved the reliability of the recall of participants with an intellectual disability of their dietary intake by utilising photographs that the participants had taken of their food intake over a 24 hour period.

The scarcity of the research in this area and the methodological limitations means that it is difficult to be conclusive about the link between diet and weight in people with an intellectual disability, however, the available evidence suggests that this group of people are more likely to have weight problems and to eat an unhealthy diet when compared with the general population.

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Improving the general health of the population by encouraging the uptake of a healthy diet is a government priority in the UK (The Scottish Office, 2008; Department of Health, 2004) and The World Health Organisation (2000) has particular recommendations for tackling obesity in people with an intellectual disability, including promoting the availability and accessibility of healthy foods, providing training to professional staff and introducing effective weight programmes. There is, however, little focus on care staff who support people with an intellectual disability, despite the influence that they can have on diet (Rimmer & Yamaki, 2006) and the benefits of involving them in tackling the weight problems of those they support (Hamilton et al., 2007, Hogan & Evers, 1997).This suggests that carers may play a key role in introducing behavioural change in relation to the diet of people with an intellectual disability. One influential model which examines change in health behaviours is the Theory of Planned Behaviour (TPB) (Ajzen, 1991, 1988). The ability of this model to predict diet in one group, based on the behaviour of another has also recently been examined, suggesting a methodology which could be applicable to carers of people with an intellectual disability (Chambers et al., 2007; Astrom & Kiwanuka, 2006).

The TPB suggests that an individuals' intentions to carry out a behaviour are affected by attitudes (their attitudes to the behaviour), subjective norms (the attitudes of those around them towards the behaviour) and perceived behavioural control (their perceived ability to have control over the behaviour). Researchers have used TPB to explore some of the factors which lead to poor diet and poor weight management in the general population (Povey et al., 2000), students (Bebetsos et al., 2002) and

children (Chambers et al., 2007). The original model has been adapted by researchers in an attempt to improve its predictive validity (e.g. Armitage & Conner, 1999a; Paisley & Sparks, 1998; Povey et al., 2000) and many studies of both the original and extended TPB models have found attitude to be the most predictive of the variables (Povey et al., 2000; Armitage & Conner, 1999; Arvola et al., 2008). Research suggests that TPB can account for between 39-44% of the variance of intention to carry out a behaviour and 27-32% of the variance of the behaviour itself (Rivis & Sheeran, 2003, Armitage & Conner, 2001). In addition, studies which have used past behaviour as a measure of actual behaviour have found that it correlated highly with future intention and this has been used as evidence for the efficacy of TPB (Ajzen, 1991; Ajzen & Fishbein, 2005).

Two studies have also used the TPB model to investigate the intentions of one group (parents) in relation to the eating habits of another (children) (Chambers et al., 2007; Astrom & Kiwanuka, 2006). Both studies found that the TPB was predictive of parental intention with regards to the eating habits of their children, suggesting that the attitudes, subjective norm and perceived behavioural control of significant others can impact on diet. In addition, Chambers et al. (2007) found that an extended model of TPB, with the variables of self identity (how the individual identified themselves with regards to food, e.g. a healthy eater) and self efficacy (belief in their ability to be able to get their children to eat healthily) were most predictive of intention. This research has potential implications for people with an intellectual disability. Studies have already indicated that the attitudes, beliefs and opportunities of carers of people with an intellectual disability impact upon the choices of the person they support

(Rodgers, 1998; Benzeval et al., 1995; Jackson & Jackson, 1998). The TPB model may offer a way of further predicting the role of carers in encouraging a healthy diet in people with an intellectual disability.

Aims of the present study

The study aims to investigate whether TPB can predict the intentions of care staff to encourage healthy eating behaviour in the people with an intellectual disability they support. It is hypothesised that:

1. The TPB will explain a significant amount of variance when predicting the intention of carers of people with an intellectual disability to encourage healthy eating in those they support.

2. The extended model of TPB (including the variables of self efficacy and self identity) will be more predictive of the intentions of carers to encourage healthy eating than the original model

3. Attitude will be the most predictive variable of the intentions of carers of people with an intellectual disability to encourage healthy eating

4. There will be a correlation between carer reports of clients' healthy eating behaviour over the past year and carer intentions to encourage healthy eating.

Method

Ethical clearance for the study was obtained from the local NHS ethics panel.

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Design

The research was a quantitative, within-participant, questionnaire based design.

Power Calculation and Sample size

Most studies using the Theory of Planned Behaviour (TPB) have a medium to large effect size (Armitage & Conner, 2001). The power calculation for the present study was based on a predicted medium effect size. Participant numbers required for a medium effect size, with a power level of 0.8 for a five factor regression analysis is ninety-seven (Cohen, 1992). The present study had 112 participants.

Participants

Participants were care staff from voluntary and charitable organisations in the South East of Scotland. Sixty-six (59%) were female and forty-six (41%) were male. Participants were included if they were the main key-worker for a person with an intellectual disability living either in their own or in a group home. Participants were asked to think of a particular client that they were the keyworker for. In cases where a client had more than one keyworker, the staff member who had the most contact with the individual was deemed to be the main keyworker. Participants were excluded if the person they supported had a diagnosis of Prader-Willi Syndrome or was tube-fed.

Measures: The TPB Questionnaire

Data were collected using an adapted version of the questionnaire devised by Chambers et al. (2007) which was designed to examine parental behaviour in relation

to encouraging healthy diet in children. The original questionnaire had good face validity and good reliability as indicated by Cronbach Alpha scores of 0.96 for attitudes, 0.76 for subjective norms, 0.85 for perceived behaviour control, 0.84 for self identity and 0.83 for self efficacy.

The adapted questionnaire began by giving a definition of a healthy diet based on recommendations from the Food Standards Agency (2008), given in portion sizes. The questionnaire then asked a series of questions to measure the following: past healthy eating behaviour of clients, intention of carers to encourage a healthy diet in the forthcoming year, the original components of TPB i.e. attitude, subjective norm and perceived behavioural control and in addition the extra variables of self efficacy and self identity which were found by Chambers et al. (2007) to increase the predictive ability of their model. Each factor was measured using a Likert scale from 1 – 7 where 7 represented the highest expected value and outcomes, with the exception of perceived behavioural control, where the scale was reversed and 1 represented the highest.

In relation to attitude, participants were asked to indicate both the likelihood of proposed benefits of healthy eating occurring (e.g. that healthy eating will control their clients' weight) and how important it was to them that they helped their client achieve these benefits (e.g. how important to you is it to control your client's weight?). The global variable was calculated by averaging the products of each specific domain's scores.

Subjective norm was measured by participants' perceptions of the extent to which the clients, the clients' families, management and other care staff would approve of

encouraging a healthy diet. For each domain both the belief of each significant other (e.g. to what extent does your client approve/disapprove of eating a healthy diet?) and the carer's motivation to comply with this was assessed. The product of each score was averaged to create a composite subjective norm score.

In relation to perceived behavioural control, participants were asked to rate how often they felt that particular barriers e.g. time, cost, inconvenience occurred in relation to encouraging a healthy diet in clients and to what extent each barrier impacted on them. The product of each score was averaged to create a composite perceived behavioural control score.

Self identity was measured as: regarding self as a healthy eater, enjoying eating, concerned with healthy eating, concerned about health consequences of eating. The product of each score was averaged to create a composite self identity score.

As past behaviour is known to be a good predictor of future intention, (Ajzen, 1991) this was measured on a Likert scale and used as a proxy measure for 'actual' behaviour. Some of the wording of the questionnaire was also changed e.g. substitution of the word 'child' with 'client' and the inclusion of a question about management opinion. A pilot project was carried out with care staff from the first organisation who became involved. Staff members were asked to complete the questionnaire and to provide feedback about it on a separate sheet. No difficulties or suggested changes arose from the pilot.

The adapted questionnaire had good face validity and good levels of reliability with Cronbach Alpha scores of 0.93 for attitudes, 0.80 for subjective norms, 0.92 for

perceived behaviour control and 0.88 for self identity. As Self efficacy was calculated using a single measure it was not possible to calculate a Cronbach Alpha score for this domain. A copy of the adapted questionnaire is available from the first author.

Procedure

Contact details of care organisations in the research area were obtained via the internet, telephone directory and local intellectual disability services. The managers of local care organisations were initially contacted by telephone and the nature of the study was explained. If an organisation was interested in participating, packs including an information sheet, consent form and the TPB questionnaire were distributed to the care staff, either being delivered directly by the first author or via the service manager. Questionnaires were completed anonymously and returned either by post, using pre-printed and paid envelopes or deposited in a locally placed sealed collection box to be collected by the first author at an appointed date. In total, nineteen separate organisations were approached to take part in the study and 5 agreed to participate. In total 334 questionnaires were distributed and 112 were returned, giving a response rate of 34%.

Data analysis

The data were checked for normal distribution and appropriate power transformations carried out where necessary. Initial histograms and normality testing indicated the data did not meet the requirements for parametric tests. The variables of intention, self efficacy and self identity were found to be negatively skewed and a

second-power (squared) transformation was used to correct this. Perceived behavioural control was found to be positively skewed and was corrected with a square root transformation. After transformation histograms indicated that the data were normally distributed with the exception of self-efficacy, therefore the conclusions drawn about self-efficacy should be interpreted with caution.

Univariate testing was carried out using Pearson correlation to assess individual correlation of the transformed predictive variables with the outcome variable. Multiple linear regression was then used to assess the performance of two separate models. These models were derived from previously published studies in the literature (Chambers et al., 2007). The first model included the original three TPB predictive variables, and the second model included two further suggested predictors i.e. 'self efficacy' and 'self identity' Tolerances greater than 0.2 and Variance Inflation Factors (VIF) less than 2 were accepted as evidence of no mulitcollinearity (Bowerman & O'Connell, 1990; Maynard, 1995). Past behaviour was not included in the multiple regression models, but was examined separately using the Spearman test to determine the correlation between past behaviour and future intention.

Results

Theory of planned behaviour variables

The variables measured in the present study were: attitude, subjective norm, perceived behavioural control, self efficacy and self identity.

Table 1 outlines the mean scores, standard deviations and ranges for the TPB variables.

INSERT TABLE 1 ABOUT HERE

Ninety-three carers (83%) had a positive future intention to encourage their client to eat a healthy diet, as indicated by a score of $5 - 7$. Intention was the highest scoring variable, followed by attitude and then self efficacy.

As required by multiple regression, the assumption of linear correlation between the predictor variables and intention was checked. Pearson correlations were calculated (attitude, subjective norm and perceived behavioural control, and the added variables of self efficacy and self identity). All three TPB variables and the two added variables significantly correlated with intention. Table 2 below summarises these results.

INSERT TABLE 2 ABOUT HERE

Multivariate Analysis

Two multivariate analyses were performed, the first one contained the TPB variables of attitude, subjective norm and perceived behavioural control. The second included the additional variables of self efficacy and self identity.

Model One

To address hypothesis 1, that TPB would be applicable to this population and hypothesis 3, that attitude would be the most predictive variable, a multiple regression analysis was performed on intention as outcome, on the basis of three predictors: attitude, subjective norm and perceived behavioural control. In this first model, subjective norm, attitude and perceived behavioural control were found to be significant predictors of intention, as Table 3 outlines.

INSERT TABLE 3 ABOUT HERE

The adjusted R^2 for this model was 0.313 (ANOVA $F_{5,98}$=10.521, $p<0.001$). Subjective norm had the highest standardised co-efficient ($\beta = 0.340$) and perceived behavioural control had the lowest standardised co-efficient ($\beta = -0.164$). The model was checked to ensure there was no multi-colinearity. All Variance Inflation Factors (VIF) for each variable were less than 2 and there were no tolerances below 0.2.

Model Two

To address hypothesis 2, that the inclusion of the additional variables self efficacy and self identity, would improve the predictive validity of the model and hypothesis 3, that attitude would be the most predictive variable, a multiple regression analysis was performed on intention as outcome, on the basis of five predictors: attitude,

subjective norm, perceived behavioural control, self efficacy and self identity (model 2). The outcome is shown in table 4 below.

INSERT TABLE 4 ABOUT HERE

The adjusted R^2 for this model was 0.349 (ANOVA $F_{3,100}$= 16.607, p<0.001). Subjective norm had the highest standardised co-efficient (β = 0.282). Attitude had the next highest co-efficient (β = 0.232). The remaining variables (self efficacy, self identity and perceived behavioural control) were not significant and the standardised co-efficients were lower. The model was checked to ensure there was no multi-colinearity. All VIFs were less than 2 and there were no tolerances below 0.2. As the adjusted R^2 for this model was higher, it suggests this model is more predictive of intention than model one, however it reduces the influence of perceived behavioural control, self efficacy and self identity.

Past Behaviour and Future Intention

The carers' mean intention to encourage clients to eat a healthy diet over the next year was 5.68 (s.d. 1.7). This future intention correlated significantly with carer reports of the past healthy eating behaviour of clients (Spearman's p = 0.504, p<0.001).

Discussion

The present study found that the original model of TPB predicted carer intention to encourage a healthy diet in the clients they supported, with all three variables being significant predictors of intentions. This model accounted for 31% of the variance and the medium effect size was comparable with other studies which have found that the TPB has a medium to large effect size (Armitage & Conner, 2001). Likewise, the results add to and expand the literature base for the use of TPB in both predicting intention of healthy eating behaviours (Paisley & Sparks, 1998; Armitage & Conner, 1999a; Povey et al., 2000) and predicting the influence of one group of people on the healthy eating behaviour of another (Astrom & Kiwanuka, 2006; Chambers et al., 2007).

The additional variables of self efficacy and self identity were added to the original TPB model as previous research has indicated that they may improve the predictive power (Chambers et al., 2007). Whilst there remains debate as to the precise nature of these variables, it is generally believed that self efficacy represents the individual's confidence in their own ability to carry out a behaviour (Bandura, 1986), while self identity pertains to an individual's beliefs about themselves in relation to a behaviour (Armitage & Conner, 1999). The additional variables did increase the overall predictive power of the model by 4%, however this resulted in a reduction in the predictive power of the variables, rendering all but two (attitude and subjective norm) non-significant.

This contrasts with other studies (Chambers et al., 2007; Armitage & Conner, 1999a; Bebetsos et al., 2002) that have found the additional variables to be significant predictors. This may be due to different methodologies being employed in different

studies. For example, while Chambers et al. (2007) found that the addition of self efficacy improved the predictive power of the model, this was in conjunction with the separation of the subjective norm variable into 3 variables (child, partner and friends). It is, therefore, unclear to what extent the increased power of the model was due to the addition of the self efficacy variable, rather than the separation of the subjective norm variable into three. In addition, while Chambers et al. (2007) found the self-identity variable increased the predictive power of the TPB model in relation to adults considering their own healthy eating, this factor was measured, but not reported in relation to parents considering their children's behaviour. This may indicate that it was not a helpful variable when asking one population to consider their behaviour in relation to another, which would be consistent with the results of the current study. This may be because both parents and paid carers are influenced more by their sense of responsibility for those they support than their own perceptions.

It was also hypothesised that attitude would be the strongest predictor in relation to encouraging healthy eating in people with an intellectual disability. Contrary to prior research (Povey et al., 2000; Ajzen, 1991; Armitage & Conner, 1999a; Chambers et al., 2007) this was not found to be the case. The present study used four indicators of subjective norm (participants' perceptions of client, client's family, management, and colleague approval of encouraging a healthy diet) which, in line with Armitage & Connor's (2001) suppositions, may have increased its predictive power by ensuring that it encapsulates important influences.

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The present study was unable to identify the respective influence of each component of the subjective norm variable, however, previous research in relation to challenging behaviour has found that it is often the informal staff culture and norms passed from staff member to staff member that influences staff behaviour rather than the formal culture of the organisation (Emerson & Emerson, 1987). While this latter study is now somewhat dated and relates to institutional settings, it may be that a similar process may also be taking place in relation to healthy eating, with colleague approval being more powerful than management approval. Research has, however, also indicated that supporting staff by providing supervision and training can have a positive impact on the staff and the care they provide to the person with an intellectual disability (Hamilton et al., 2007) suggesting that the attitudes of managers, which are likely to reflect both the ethos and values of the organisation, could play an important role in shaping the diet of people with an intellectual disability.

This study provides a basis from which to begin the construction of interventions. The present study indicates that increasing the positive attitude of those around carers (subjective norm) towards encouraging a healthy diet for people with an intellectual disability, could be a crucial first step as this may also influence carers' own attitude. Staff training may be an important way in which to achieve this, as it will potentially influence the opinions of staff at all levels as well as contributing to a positive cultural norm (Hamilton et al., 2007). With regards to increasing the positive attitudes of clients towards healthy eating, past strategies have included attempting to increase knowledge and awareness of healthy eating, and teaching self-regulation

skills such as calorie counting and reading food labels (Bechtel & Schreck, 2003). The present study indicates that client approval of healthy eating is a potentially important influence on staff's own attitudes and therefore, interventions for clients may also have a positive impact on carers.

The current study found that the majority of carers, 93 in total (83%), had positive intentions to encourage a healthy diet for their clients and that carers whose client's past eating behaviour had been healthy were likely to have a high intention to encourage the client to eat healthily over the following year. Past behaviour has been shown to be a good predictor of future outcome (Ajzen & Fishbein, 2005) and to correlate highly with intention (Daigle et al., 2002). Yet despite the stated intentions of participants, research has indicated a high prevalence of obesity in people with an intellectual disability (Bhaumik et al., 2008; Emerson, 2005). This disparity may be due to a number of factors. Firstly, while the correlation between past behaviour and intention in the current study was taken as an indicator that intention, as measured by TPB, would predict actual behavioural outcome, it is acknowledged that reported behaviour is not the same as actual behaviour or future behaviour. Indeed, research indicates that subjective self reports generally overestimate actual behaviour (Armitage & Conner, 2001). It may be that this was the case in the present study, with staff responding in a manner which they felt was sociably acceptable, despite their responses being anonymous.

A second possibility is that the current study had a non-representative sample and that the clients who were supported by the participating care organisations did not experience high levels of obesity. As the present study did not measure levels of

client obesity, this possibility cannot be discounted. While this would not undermine the relevance of the TPB, further research would be required before the results could be generalised more widely. A third possibility relates to the fact that multiple factors influence weight and diet including the clients' level of autonomy and living situation (Melville et al., 2007). Research has indicated that people with an intellectual disability who live with family carers often have a more unhealthy diet and are more likely to be obese than those who have support from care staff (Bhaumik et al., 2008). Future research into the TPB which takes account of these factors, could give a clearer idea of the extent to which each might influence the diet of people with an intellectual disability.

The study had a number of additional limitations. The application of the theory of planned behaviour to one group to help predict their behaviour in relation to a second group is very new and only two previous studies have used this approach (Chambers et al., 2007; Astrom & Kiwanuka, 2006). Additional research in this area would be helpful to increase confidence that the theoretical extension is both useful and justified. Related to this point, the questionnaire used in the present study was adapted from one developed for use with parents and children by Chambers et al. (2007). It may be that a questionnaire which was specifically developed for carers of people with an intellectual disability would have resulted in a more powerful predictive model.

In conclusion, the current study indicated that the original TPB model, consisting of the variables of attitude, subjective norm and perceived behavioural control is a useful predictive model to use with care staff in order to predict intention to

encourage healthy eating in clients. The original TPB model accounted for 31 per cent of the variance, with a medium effect size, in line with many previous findings. The extension of the model to include the variables of self efficacy and self identity increased the predictive power of the model slightly but rendered three of the variables non-predictive. Past behaviour as a proxy for actual behaviour was found to correlate with intention. As past behaviour is a well known predictor of future behaviour, this gave some indication of the efficacy of the model as predictive of outcome behaviour in addition to intention. In this study, attitude was not found to be the most predictive variable. The study found that carers' perceptions of the attitudes of clients, clients' families, other staff and management towards healthy eating had an important impact, suggesting possible interventions. Future research could determine whether the model is equally predictive with family carers and could begin to explore if additional variables such as individual autonomy can improve the predictive power of the model. It is, however, important to note that a healthy diet is just one factor which contributes towards health and factors such as levels of activity should not be ignored.

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TABLES

Table 1: The mean scores, standard deviations and ranges for the TPB variables

Variable	Mean (SD)	Range	Proportion of positive responses(%)*
Intention	5.68 (1.19)	2-7	83%
Attitude	5.58 (1.12)	2-7	76%
Subjective Norm	5.45 (1.04)	3-7	70%
Perceived behavioural control	2.93 (1.35)	1-7	54%
Self Efficacy	5.50 (1.63)	1-7	78%
Self Identity	5.25 (1.33)	2-7	64%

* 1-3 on the likert scale for perceived behavioural control; 5 – 7 on the likert scale for others

Table 2: The correlation values and p values of the TPB variables with Intention

Variable	Pearson r	P Value
Attitude	0.471	<0.001
Subjective Norm	0.461	<0.001
Perceived Behavioural Control	-0.219	0.024
Self Efficacy	0.464	<0.001
Self Identity	0.194	0.03

Table 3: Multivariate analysis: Model 1

Variable	B (95% confidence interval)	β	P value
Constant	19.101 (7.243 – 30.958)		0.002
Attitude	0.335(0.110 – 0.559)	0.281	0.004
Subjective norm	0.395 (0.177 – 0.612)	0.340	<0.001
Perceived behavioural control	-5.208 (-10.390 – 0.026)	-0.164	0.049

Table 4: Multivariate analysis: Model 2

Variable	B (95% confidence interval)	β	P value
Constant	15.207(2.386 – 28.028)		0.021
Attitude	0.277 (0.040 – 0.513)	0.232	0.022
Subjective norm	0.328 (0.095 – 0.561)	0.282	0.006
Perceived behavioural control	-3.526 (-9.148 – 2.097)	-0.111	0.216
Self efficacy	0.131 (-0.43 – 0.306)	0.160	0.139
Self identity	0.026 (-0.137 – 0.189)	0.027	0.755