



Research report

Application of the Theory of Planned Behaviour to weight control in an overweight cohort. Results from a pan-European dietary intervention trial (DiOGenes)[☆]

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ABSTRACT

Using the Theory of Planned Behaviour (TPB), this study investigates weight control in overweight and obese participants ($27 \text{ kg/m}^2 \leq \text{BMI} < 45 \text{ kg/m}^2$) taking part in a dietary intervention trial targeted at weight loss maintenance ($n = 932$). Respondents completed TPB measures investigating “weight gain prevention” at three time points. Correlation and regression analyses were used to investigate the relationship between TPB variables and weight regain. The TPB explained up to 27% variance in expectation, 14% in intention and 20% in desire scores. No relationship was established between intention, expectation or desire and behaviour at Time 1 or Time 2. Perceived need and subjective norm were found to be significantly related to weight regain, however, the model explained a maximum of 11% of the variation in weight regain. Better understanding of overweight individuals’ trajectories of weight control is needed to help inform studies investigating people’s weight regain behaviours. Future research using the TPB model to explain weight control should consider the likely behaviours being sought by individuals.

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Introduction

Overweight is believed to affect 30–80% of adults in Europe with the prevalence of obesity rising rapidly (Branca, Nikogosian, & Lobstein, 2007). Obesity is understood to be the result of long-term energy intake greater than energy expenditure, resulting in positive energy imbalance. This disequilibrium can arise from an excess in calorie intake and/or a deficit in calorie expenditure (lack of physical activity). However, obesity is recognised as a heterogeneous condition and it is accepted that large individual differences in people’s ability to control their body weight exist (Schifter & Ajzen, 1985; Teixeira, Goings, Sardinha, & Lohman, 2005). Individual differences in behaviours closely related to energy balance or weight

control, determine the development of overweight and obesity. The benefits of weight loss and weight loss maintenance have been well documented (Vidal, 2002). However, current approaches to overweight and obesity management have shown limited effectiveness, especially over the long term, with weight loss maintenance presenting a particularly difficult challenge (Elfhag & Rössner, 2005; Garcia Ulen, Huizinga, Beech, & Elasy, 2008; Wadden, Brownell, & Foster, 2002; Wing & Hill, 2001). Better understanding of individuals’ behaviours and the differences in behaviours of those who are successful and unsuccessful at weight control will enable development of more targeted treatment options.

A number of behavioural models for understanding health behaviours, such as weight control exist, one of which is the Theory of Planned Behaviour (TPB). The TPB was first developed by Ajzen in the 1980s (Schifter & Ajzen, 1985; Ajzen, 1991) and is one of the most widely used theoretical frameworks for explaining health behaviours (Godin & Kok, 1996). The TPB has been applied to a range of diet and weight related behaviours including fat intake (de Bruijn, Kroeze, Oenema, & Brug, 2008; Paisley & Sparks, 1998) and fruit and vegetable consumption (Bogers, Brug, Van Assema,

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& Dagnelie, 2004; Kellar & Abraham, 2005; Lien, Lytle, & Komro, 2002; Perugini & Bagozzi, 2004); healthy eating behaviour (Conner, Norman, & Bell, 2002; Povey, Conner, Sparks, James, & Shepherd, 2000c) and weight control (Netemeyer, Burton, & Johnston, 1991; Palmeira et al., 2007; Schiffer & Ajzen, 1985). The TPB suggests that the best predictor of actual behaviour is a person's intention to perform the behaviour. Intention is in turn determined by three independent constructs: attitude, subjective norms and perceived behavioural control (PBC). Attitudes relate to the individual's evaluation of the behaviour, subjective norms reflect an individual's perception that important others expect them to perform the behaviour, and PBC is an individual's perception of how much control they have over performing the behaviour. PBC is said to refer to the perceived ease or difficulty of performing a certain behaviour (Ajzen, 1998) and is believed to determine both intention and actual behaviour. The TPB proposes that a more positive attitude towards a behaviour, together with a supportive subjective norm and higher perceived behavioural control, will result in a stronger intention to perform the behaviour and subsequently more likelihood of the behaviour being performed.

Although traditionally the TPB focused simply on prediction of intention and thus behaviour, this focus expanded quite early on with desire and expectation both believed to play a role in predicting behaviour (Bagozzi, 1992; Warshaw & Davis, 1985). Previous studies have demonstrated close relationships between intention, desire and expectation in predicting behaviour using the TPB model (Armitage & Conner, 2001; Fishbein & Stasson, 1990; Warshaw & Davis, 1985). Expectations and desires have both been shown to be better than intentions at predicting behaviour (Fishbein & Stasson, 1990; Warshaw & Davis, 1985). One meta-analytical review concluded that perceived behavioural control, subjective norm and attitude were better at predicting desire than they were at predicting intention, whereas intentions and expectations were better than desires at predicting actual behaviour (Armitage & Conner, 2001). In relation to behaviours which an individual may not have complete volitional control over, expectation is of particular importance as it is said to consider those unintentional determinants of behaviour (Warshaw & Davis, 1985) which is likely to apply to a behaviour such as weight control. Therefore, it is important to investigate the relationship between expectation, desire and intention, and the role of the other predictors in explaining these three variables.

A review by Armitage and Conner (2001) meta-analysed 185 studies which applied the TPB, and reported that the TPB accounted for 27% and 39% of the variance in behaviour and intention, respectively (Armitage & Conner, 2001). More recently, efforts to increase predictive capacity of the traditional model have led to the addition of other constructs which have included anticipated affect (Raats, Sparks, Geekie, & Shepherd, 1999; Richard, van der Pligt, & de Vries, 1996) and perceived need (Paisley & Sparks, 1998; Payne, Jones, & Harris, 2004; Povey, Conner, Sparks, James, & Shepherd, 2000a; Raats et al., 1999). Anticipated affect measures expected reaction from a particular outcome or behaviour which could be expected to be of importance when the behaviour relates to weight control (i.e. expected good feeling about "preventing weight gain"). Perceived need is a measure of the extent to which it is felt necessary to perform the behaviour in question (Raats et al., 1999). Both constructs have been shown to have an additive effect when included in the TPB model (Paisley & Sparks, 1998; Parker, Stradling, & Manstead, 1996; Richard et al., 1996).

This study attempts to further our understanding of weight control by examining the relationship between the cognitions underlying weight regain of individuals enrolled in a dietary intervention study for weight loss maintenance. This paper investigates the relationship between the various components of the TPB model and intention, expectation and desire to prevent weight gain, as

well as actual weight regain behaviour. It is hypothesised that a positive association between the TPB model and intention, expectation and desire, and a negative association with weight regain will be revealed. In addition, given the nature of the behaviour in question, it is hypothesised that the TPB items will be more successful in predicting expectation, over intention and desire and thus in turn that expectation will relate more closely to the behaviour, than either intention or desire.

Methods

Study sample

Reported data were collected as part of the DiOGenes study, a Pan-European, randomised, controlled dietary intervention study investigating the effects of dietary protein and glycemic index on weight (re)gain, metabolic and cardiovascular risk factors in obese and overweight families in eight European centres (www.diogenes-eu.org). A detailed description of the DiOGenes intervention trial can be found elsewhere (Larsen et al., 2010a; Moore et al., 2010; Saris & Harper, 2005).

The aim of this intervention trial was to investigate factors influencing weight maintenance following a period of rapid weight loss. In brief, this randomised trial consisted of two phases. The first was an 8-week weight-loss phase during which participants followed a fixed low calorie diet (LCD) and expected to lose at least 8% of their body weight. Following successful completion of this weight loss phase participants were randomised to one of five ad libitum (no restriction on total energy intake) low fat diets for 6 months. The second phase of the study (the randomised phase) was designed to promote weight loss maintenance (or prevent weight regain).

Families eligible for inclusion consisted of at least one overweight (BMI > 27 kg/m²), but otherwise healthy parent aged less than 65 years with at least one healthy child between 5 and 18 years of age. The complete list of inclusion and exclusion criteria has been published previously (Larsen et al., 2010a). 932 adults from eight European countries participated in the trial.

The families were provided with recipes, together with cooking and behavioural advice, during the study. Specific details on the diets and the dietary counselling are given in a separate publication (Moore et al., 2010).

Participants were asked to complete a battery of psychological, social and demographic questionnaires at three time points during the study. These time points are shown in Fig. 1. Participants first completed the questionnaires prior to commencement of the 8-week weight loss phase (Time 1, "pre-weight loss"). The questionnaires were completed again at the end of the 8-week weight loss phase (which was also the start of the randomised phase of the study) (Time 2, "post-weight loss") and at the end

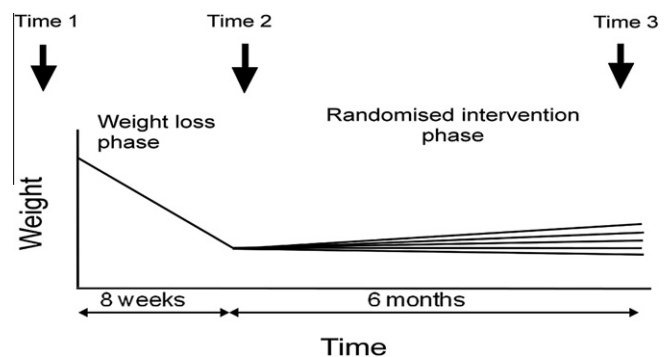


Fig. 1. Outline of the DiOGenes study structure.

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