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An intervention encouraging planned self-regulation and goal setting in drivers across the lifespan: testing an extended theory of planned behaviour

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Abstract

Previous work has demonstrated that planning behaviours may be more adaptive than avoidance strategies in driving self-regulation, but ways of encouraging planning have not been investigated. The efficacy of an extended Theory of Planned Behaviour (TPB) plus implementation intention based intervention to promote planning self-regulation in drivers across the lifespan was tested. An age stratified group of participants (N=81, aged 18 to 83 years) was randomly assigned to an experimental or control condition. The intervention prompted specific goal setting with action planning and barrier identification. Goal setting was carried out using an agreed behavioural contract. Baseline and follow-up measures of TPB variables, self-reported, driving self-regulation behaviours (avoidance and planning) and mobility goal achievements were collected using postal questionnaires. Like many previous efforts to change planned behaviour by changing its predictors using models of planned behaviour such as the TPB, results showed that the intervention did not significantly change any of the model components. However, more than 90% of participants achieved their primary driving goal, and self-regulation planning as measured on a self-regulation inventory was marginally improved. The study demonstrates the role of pre-decisional, or motivational components as contrasted with post-decisional goal enactment, and offers promise for the role of self-regulation planning and implementation intentions in assisting drivers in achieving their mobility goals and promoting safer driving across the lifespan, even in the context of unchanging beliefs such as perceived risk or driver anxiety.

Key words: Older drivers; lifespan driving; self-regulation; mobility; theory of planned behaviour; goal setting.

Highlights:

Planned driving self-regulation may be more adaptive than avoidance strategies.

A theory of planned behaviour (TPB) intervention was conducted in drivers (18-83 years).

The intervention did not result in change to TPB components addressed.

93% of intervention participants achieved their first goal to extend their driving safely.

Variance in goal achievement was predicted by self-regulation indices and TPB constructs.

1.0 Introduction

The current generation of older adults has certain expectations about their lives and mobility. They anticipate that they will remain active, independent and mobile for as long as possible (Holland, 2001) and in today's society, that generally means reliance on a car. A travel survey by the UK Department of Transport (2010) stated that 68% of trips made by people aged over 70 were by car, either as a driver or passenger. Sustained driving in older age has implications for quality of life (Oxley & Whelan, 2008), greater social engagement (Marottoli et al., 2000), reduced likelihood of significant depression (Marottoli, et al., 1997) and depressive symptoms (Fonda & Herzog, 2001) and even, in some cases, greater life expectancy (Marottoli et al., 2000; Ragland, et al., 2005). Maintaining safe driving in older adults is therefore a priority. Nevertheless, given four million drivers aged over 70 on UK roads (RAC Foundation, 2013) and similar increases in other developed countries, this dilemma for policy makers and older drivers themselves indicates a need for research on how to balance potential safety risks of age-related functional change with mobility needs of individuals. One potential approach is the use of self-regulation. Berry (2011) proposed that a system of 'nudging' drivers into voluntary 'self-regulation' could be "the only viable option for producing safer, older drivers without undermining mobility and well-being" (Berry, 2011 p8). This study examines the utility of an extended theory of planned behaviour (Ajzen, 1985) intervention in promoting self-regulation and changes in driver coping strategies.

Self-regulation is a strategy used by drivers to improve feelings of safety and wellbeing. Traditionally, it has been conceptualised as driving avoidance, specifically in difficult or challenging circumstances, often in response to skill attenuation or age-related physical and functional decline (Baldock, et al., 2006; Ball et al., 1998; Hakamies-Blomqvist & Wahlström, 1998). However, the value of driving avoidance has been questioned, in terms of constraining everyday behaviour and independent mobility and disregarding an older adult's goals and motivations for driving (Gwyther & Holland, 2014). Molnar et al., (2013) examined self-regulatory practices in older adults taking into account motivations behind driving avoidance in certain circumstances. They determined that reasons for driving avoidance were often more

closely related to lifestyle or preferences than self-regulation *per se*. Further, avoidance is only one strategy amongst a range of self-regulatory behavioural countermeasures, including pre-journey route planning and trial runs, pre-arranging rest stops, making vehicle adaptations (Molnar, et al, 2009) and presence of a 'co-pilot' (e.g. Shua-Haim, Shua-Haim, & Ross, 1999; Vrkljan & Millar Polgar, 2007; Gwyther & Holland, 2014).

Planning behaviours have not been as widely researched as avoidance strategies in terms of driving self-regulation, but previous research (Gwyther & Holland, in prep) suggests they may be more successful in terms of managing risk and feelings of vulnerability in driving. In addition, they offer a means of ensuring that older drivers' motivations and goals for driving (Hatakka, et al., 2002) are addressed, ensuring safe independent mobility. While there will always be a place for sensible, risk-related avoidance, this research aims to promote planning behaviours (e.g. route planning, planning to drive with a co-pilot, sharing driving) using a theory of planned behaviour (TPB) (Ajzen, 1985) plus implementation intention based intervention. (Gollwitzer, 1993).

1.1 Previous Interventions with older adults

A number of campaigns have been established with the intention of improving mobility in older drivers. Generally, these focus on refresher training with advice on risk reduction, hazard perception and legislation. Evaluated examples include '55 Alive-Mature' in the USA (Bedard, et al., 2005; Nasvadi, 2007), 'Wiser driver' in Australia (Strain, 2003) and "Knowledge Enhances Your Safety" (KEYS) in the USA (Owsley, et al., 2004; Owsley, et al., 2003; Stalvey & Owsley, 2003). They also promote driving reduction/avoidance strategies and planning for driving cessation. However, with exception of the KEYS programme, which was devised for drivers with visual limitations, they lack a structured theoretical basis.

Evaluations of these programmes have demonstrated significant improvements in driving behaviour, specifically road knowledge (e.g. '55 Alive-Mature' Bedard et al., 2005), driving skills and confidence

(e.g. 'Wiser Driver' Strain, 2003), self-reported alertness and health awareness relating to visual impairments (e.g. '55 Alive-Mature' Nasvadi, 2007). Less success has been found in terms of reducing crash risk (Owsley et al., 2004) or promoting self-regulation.

Nasvadi (2007) demonstrated, using a retrospective cohort design, that although 75% had changed some aspect of their driving after attending, only 9% of women and 4.2% of men said they had increased avoidance strategies as a result of the "55 Alive-Mature" course. Strain (2003) evaluated behavioural changes three months after the 'Wiser Driver' course; 80% of participants had altered their self-reported habits, but only 16% had changed the way they 'recognised, avoided or developed strategies to manage difficult driving conditions...'(p.4). However, 7% had improved trip planning strategies. The findings from these studies suggest that educational programmes are an effective means of altering driving behaviour or promoting planning, but are less successful when promoting driving avoidance.

Although avoidance self-regulation has been widely advocated as a means of producing safer drivers, the evidence linking it with risk reduction is mixed. Baldock et al., (2006) and De Raedt & Ponjaert-Kristoffersen (2000) determined a positive effect of compensation tactics on collisions; Owsley et al., (2004) found no effect of self-regulation on crash rate in the KEYS study prospectively, while Ball et al., (1998) and Charlton, et al., (2003) noted that drivers who avoided certain situations were more likely to have been crash involved retrospectively. These variations may be due to differences in confidence or function, or confounds with health status or gender. Charlton et al., (2003) found that half of their drivers lacked confidence in a given situation, and Hennessy (1995) found that older avoidant drivers with reduced vision or processing speeds had a higher number of at-fault crashes than drivers with good visual fields or speed of processing. Similarly, Ball et al., (1998) found that generally, the most crash involved drivers reported the highest levels of driving avoidance, but these drivers were also the ones with the most severe impairments. These drivers may be struggling to function generally and so their avoidance strategies are insufficient to ameliorate their risk, or ameliorate it enough, or conversely, their avoidance may be placing them into a category of very low mileage, occasional drivers whose skill is attenuating (Langford, et al., 2006). Thus, function and confidence may be confounding the relationship between

avoidance self-regulation and risk reduction. This evidence clearly highlights a need for support for older drivers to plan their self-regulation appropriately, especially in the context of impairment, but also for less confident younger drivers, given that previous research has demonstrated a U-shaped age curve for self-regulation with younger *and* older drivers showing more self-regulation than experienced middle-aged drivers, in a manner related to confidence (Gwyther & Holland, 2012).

Another reason that promoting avoidance behaviour is not entirely successful or related to safer driving may be that promoting driving avoidance fails to acknowledge older drivers' goals and motivations for driving (Hatakka et al., 2002), i.e. to maintain day-to-day mobility and independence. Simply asking people to stop or reduce driving may be distressing (Coughlin, et al., 2004) and could lead to inappropriate restrictions. The over-regulation (as a result of avoidance without planning in line with goals) is not an optimal solution in terms of a driver's health and quality of life, resulting in some of the negative health and social effects associated with driving cessation (e.g. Oxley & Whelan, 2008). A more positive and appropriate intervention might involve changing avoidance strategies that are responses to loss of function, low confidence or perceived risk, to alternative strategies of planned behaviour. For example, for someone who feels at risk driving in poor light to avoid that situation is sensible but may restrict their access to certain activities or locations, but if that same person planned their self-regulation to move those activities to daylight hours, or to use a better lit route then the self-regulation occurs, but the restriction does not. Taking these findings into consideration, the present intervention uses an extended theory of planned behaviour (Ajzen, 1985) model to predict planned self-regulation behaviours, including both older and younger drivers, with an implementation intention strategy to promote enacting of planned behaviours.

1.2 Theory of Planned Behaviour.

One of the best established social-cognition models (Ajzen, 2011; Godin, Conner, & Sheeran, 2005) is the theory of planned behaviour (TPB: Ajzen, 1991). This model has been applied extensively to health (e.g. exercise, dieting, binge drinking) and non-health related behaviours (e.g. travel choices and driving behaviour). Meta-analytic reviews (Armitage & Conner, 2001; Cheung & Chan, 2000; Rivis & Sheeran,

2003; Schulze & Wittmann, 2003) provide empirical support for its capacity to predict a high proportion of the variance in behavioural intention; as such, it is a useful theory on which to base interventions.

Developing effective interventions depends upon identification of suitable psychological constructs for modification. Despite a growing literature on mobility in older age, driving cessation and self-regulation, recommendations for interventions targeting specific TPB constructs are not available. TPB studies conducted within the field of driving research have concentrated exclusively on risky or aberrant driving behaviour, e.g. speeding, mobile phone use. Individually these studies have demonstrated that attitude, subjective norm and perceived behavioural control all successfully predict, to varying degrees, intention to perform risky or unlawful driving behaviours. Given that an intervention designed to safely extend driving mobility may rely on different constructs from those predicting risky driving behaviours, it is difficult to offer a literature based recommendation for a specific modifiable construct associated with self-regulation driving behaviour intentions. Previous research (Gwyther & Holland, 2012) demonstrates that affective attitudes and low self-efficacy (i.e. high anxiety, low confidence) are strongly associated with driving avoidance both for younger less experienced drivers as well as for older drivers. Since attitudes (specifically affective attitude) and perceived behavioural control (specifically self-efficacy) may be implicated in choices about driving, these constructs will be targeted in the intervention, but it may be hypothesised that instrumental attitudes may also have a significant influence specifically where the behaviour is planned.

The KEYS campaign (Stalvey & Owsley, 2003) is a good example of a theoretically based intervention, possessing a theoretical basis that is an amalgamation of social cognitive theory (Bandura, 1977), the health belief model (Rosenstock, 1974) and the transtheoretical model (Prochaska, et al., 1992), with evaluation demonstrating improved driving behaviour (Owsley et al., 2003). Although this programme was devised for drivers with visual limitations, techniques can be adapted and used and a similar theoretically based approach is taken here. The KEYS programme promoted awareness, hazard identification and selection of risk based avoidance strategies, as well as the identification of barriers to performing those strategies.

Although previous TPB studies are based in law-breaking and non-compliance rather than self-regulation, two interventions relevant to the driving field have been moderately successful. A longitudinal, advertising campaign shaped by TPB constructs to reduce incidence of speeding (Stead, et al., 2005) reported that an advertisement designed to challenge attitudes towards speeding influenced affective beliefs about speeding. However, counterpart adverts designed to alter subjective norms and PBC were less successful. Further, the intervention showed no changes in behavioural intention or reported behaviour. Similarly, a video-based intervention designed to target beliefs about speeding (Parker, et al., 1996) resulted in anticipated changes in normative beliefs but changes in a contrary direction in control beliefs. Again, no changes were found for behavioural beliefs or intention.

In the absence of proven, face-to-face targeted intervention techniques in the driving field, a commonly used extension to the TPB model incorporating planning behaviours is proposed for this study. This extension has been successful in promoting walking behaviour (Darker, et al., 2010) and health behaviour compliance and involves the formation of implementation intentions, i.e. specific plans about when, where and how the behaviour in question is to be performed (Gollwitzer, 1993). One of the criticisms of the TPB is that while it often explains a high proportion of the variance in intentions, it is a weaker predictor of actual behaviour (Ajzen, 2011), the so called 'intention-behaviour gap'(Armitage & Conner, 2001; Sheeran, 2005). This suggests a need for an additional step in the model to enable the translation of intentions into actions. Goal setting, action planning (Gollwitzer, 1993) and coping planning (Sniehotta, et al., 2005) have been used effectively in previous interventions (e.g. Darker et al., 2010) to facilitate behaviour change. That is, a multi-stage model (or action phase model, Heckhausen & Gollwitzer, 1987; Gollwitzer, 1993) is used in which pre-decisional and post-decisional phases are both addressed, with the pre-decisional phase being the formation of intentions where role of TPB constructs on intentions is important, and the post-decisional stage being where a person's plans of how and where they will perform the intended behaviour is important.

Given the paucity of evidence relating to the effectiveness of behavioural change techniques on specific TPB constructs, the present intervention was designed to promote self-regulation in its wider sense as a

means of planning and preparing carefully for challenging driving circumstances. The targeted TPB constructs were attitudes, specifically affective attitudes and perceived behavioural control. Given the success of one previous intervention method (Darker et al., 2010) on changing PBC, the intervention was based on TPB constructs and extended to incorporate the post-intentional, volitional processes of goal setting, including action planning and coping planning with an agreed behavioural contract designed to provide a written record of the participants' resolution to change (Abraham & Michie, 2008). This intervention model also incorporated but extended upon successful aspects from the reasonably successful KEYS older drivers' education programme.

1.3 **Aim:** Although the ultimate benefit of this work would be to reduce premature driving cessation in older drivers and over-regulation in more anxious drivers of all ages, the aim of the present study was to determine whether established driving behaviours could be positively influenced by an 'extended' TPB plus implementation intention intervention designed to both change attitudes and improve PBC through the adoption of self-regulation planning behaviours, but also to result in goal enactment. Given previous findings of the role of confidence (Gwyther & Holland, 2012), a stratified lifespan age group was used to determine effectiveness. The following hypotheses were tested:

1. That the intervention will result in change in TPB predictors of intention towards driving in situations people may find challenging.
2. That the intervention will result in an increase in intention to drive in situations people may find challenging, mediated by the TPB constructs (attitude, subjective norm, PBC).
3. That the intervention will lead to a change in self-regulation behaviours (as measured using the self-regulation index) mediated by a change in intention or in PBC.
4. That the intervention will result in successful achievement of individuals' planned goals.
5. That the achievement of goals would be predicted by self-regulation and the TPB model.

2.0 METHODS

2.1 Participants

The sample consisted of 81 drivers (65.4% women) aged 18 to 83 years (*M* =46.40 years, *SD*= 20.58). Driving experience ranged from 3 months to 66 years (*M* =26.26 years, *SD*= 19.03). Anyone not currently driving was excluded. There were no other exclusions.

Participants were sourced from the university staff and student population, through advertising on social networking sites and via social clubs. Older participants were specifically targeted through the Aston Research Centre for Healthy Ageing (ARCHA) panel and local social clubs. The only pre-determined criteria for inclusion were that participants had to be over 17 years of age, hold a full driving licence, be practising drivers and have access to a car within the next month. Participants received a payment of £7.50 when they had completed both the pre- and post-intervention questionnaires.

2.2 Design

The study used a randomised controlled trial procedure. In order to ensure that the control and intervention groups both contained drivers across the lifespan, a stratified sampling procedure was employed. Participants were stratified by age into three groups: 17-25 years; 26-64 years and over 65 years. Forty participants were recruited to each stratum. University ethics committee approval and informed consent were obtained. Participants were randomly allocated to the control or intervention groups using a random numbers generator.

A priori power calculations indicated that the necessary sample size for 80% power to detect a moderate-large effect was 38 participants per condition (Soper, 2006). Although 120 participants were recruited (60 to each condition), 8 participants chose not to take part after allocation to the intervention condition and 31 failed to return all necessary information, despite follow up contact (email, letter or telephone call) to all participants. Therefore the final sample (N=81) reflected a 67.5% completion rate (35 control, 46 intervention).

2.3 Materials

2.3.1 Questionnaires

All participants were given a packet of questionnaires comprising demographic information, a self-regulation index and a newly constructed TPB questionnaire designed to measure intention to drive or avoid driving in challenging situations.

2.3.2 Self-Regulation Index (SRI)

The SRI assessed self-regulation behaviours using a scale specifically developed for this study and designed to reflect avoidance (6 items) and planning (9 items) coping strategies. The instrument was constructed by adapting common items from existing self-regulation measures (e.g. Baldock et al., 2006; Donorfio, et al., 2008; Sullivan, et al., 2011). These scales were not used as they did not cover the full range of avoidance and planning behaviours. New items were generated using planning and preparation strategies gathered from focus groups (Gwyther & Holland, 2014). Items were subject to internal consistency analysis and Principal Components Analysis (PCA) to establish construct validity. Factor loadings and internal consistency results (Cronbach's alpha) are shown in Table 1. The resulting dependent variables are self-regulation avoidance and self-regulation planning.

[Insert Table 1]

2.3.3 TPB Questionnaire

The TPB questionnaire (Appendix 1) consisted of 35 items, including direct measures of attitude, subjective norm (SN) and perceived behavioural control (PBC) as well as belief based measures (behavioural beliefs, normative beliefs and control beliefs, Ajzen, 2002). Additional measures of attitudinal subcomponents, i.e. affective and instrumental attitude were also taken based on previous findings (Gwyther & Holland, 2012). The mean was determined to give the scale score for each direct TPB construct. Unipolar composite scale scores were calculated for belief based measures (Ajzen, 2002, 2010; Francis et al., 2004). Details of the TPB construction can be found in Table 2.

[Insert Table 2]

2.3.4 Post-intervention measure

The post-intervention measure first asked participants to write their goal down in a free text box and then respond to the question 'I have achieved my goal' on a five point scale from 'not at all' to 'completely'. The questions were repeated for each of the three potential goals.

2.3.5 DriveSafe Book

Participants were given a copy of the 'DriveSafe' book (Goodman & Gwyther, 2012). This is a printed book designed to offer motorists practical advice on driving. The book aims to:

- Raise actual risk awareness by publishing statistics relating to crash and incident rates, e.g. p1, 'Almost 10% of all fatal and serious road accidents happen on slippery roads due to the weather'.
- Provide vicarious examples of successful planning self-regulation, e.g. p14 '*I planned the whole day giving myself an extra hour'*.
- Encourage perceived control over driving behaviour, e.g. p2 'Remember, you are free to choose the time you set off and how fast you go!'

2.4 Procedure

All interventions took place in a laboratory setting at Aston University. Participants were issued with a unique reference number to ensure anonymity as well as pre- and post-intervention data matching. All participants received one group session.

2.4.1 Control Group

Participants received an information pack containing identical baseline and post-intervention Theory of Planned Behaviour (TPB) and Self-Regulation Index (SRI) Questionnaires and a copy of the 'DriveSafe' book. They were asked to complete the baseline (Time 1) questionnaires (TPB and SRI). Then they completed a filler task which took a similar length of time to the intervention group's task (1 hour). This consisted of a discussion and short questionnaire (8 items) eliciting their views on the general layout, design and attractiveness of the 'DriveSafe' book.

2.4.2 Intervention Group

Participants in the intervention condition received the same information pack incorporating TPB and SRI Questionnaires and a copy of the 'DriveSafe' book. They were asked to complete the baseline (Time 1) questionnaires before the intervention.

2.4.3 Intervention Components

Intervention components included prompting specific goal setting with action planning and barrier identification (coping planning). Goal setting was carried out using an agreed behavioural contract. Participants were guided to develop behavioural change plans using the following process. The process is based on previous interventions, particularly the theoretically based KEYs intervention indicated above, with underlying principles of staged behaviour change models (e.g. Prochaska et al., 1992; Weinstein et al., 2008) and implementation of goals (Gollwitzer et al., 1993) incorporated both in the DriveSafe booklet design and in the goal setting intervention, as appropriate.

1. To change attitudes, participants were provided with persuasive information about links between driving cessation/over-regulation and health effects such as loss of mobility and depression.
2. The facilitator then prompted goal setting by asking whether they would like to set a general goal to change driving behaviour when driving in challenging circumstances through a short series of goal setting and action planning tasks. Participants were given complete freedom to choose which area of their driving behaviour they intended to change since participants with some choice over their goal are more successful in achieving their target (Gollwitzer, 1993). However, examples were given which emphasised self-regulation planning behaviours, e.g. route planning, planning to drive with a co-pilot, planning breaks on a long journey, planning strategies to manage road rage incidents etc.
3. Next, participants took part in an exercise to improve feelings of control over driving and increase self-efficacy (i.e. PBC) using mastery experience (Bandura, 1997). Participants were asked to describe a prior incident where they had successfully driven in challenging circumstances, e.g. in unfamiliar towns, on busy roads or on motorways. They were asked which

factors were most important in contributing to their success, for example route planning, driving slowly, taking regular breaks, etc. and to note them down.

4. Participants were then asked to set a maximum of three conditional goals relating to changing their self-regulation planning behaviours, e.g. 'I will plan my journey on the motorway next week to include at least one 15 minute break every 2 hours' or 'I will use a route finder programme on the internet and plan my route carefully'.
5. Participants were asked to develop their action plans, i.e. specify when, where, how and with whom they would act (Gollwitzer, 1997; Gollwitzer and Sheeran, 2006). Next, participants were asked to develop their coping plans (Sniehotta, 2009; Sniehotta et al., 2005) by identifying potential barriers to change and anticipating ways of overcoming them. To promote social comparison and group interaction, participants were encouraged to discuss and clarify their goals and action plans with the facilitator and each other.
6. Finally, participants were asked to agree their behavioural contract by signing their personal action plans in front of the group and facilitator and committing to change their driving on at least one occasion in the next month.

2.4.4 Post-intervention measure

The post-intervention measure was taken one calendar month after the intervention/filler task. All participants completed the same questionnaires – TPB and SRI - taken at Time 1. Participants returned questionnaires in pre-paid, addressed envelopes. Participants in the intervention condition also answered an additional set of questions to monitor the extent to which they had achieved their goals (Ajzen, 2002).

Ethical Considerations

Under no circumstances were people encouraged to drive in circumstances beyond their capabilities. They were not encouraged to take risks. Instead, they were asked to plan and prepare more carefully to safely extend the range of circumstances and places that they were confident to drive in. During each session, the facilitator emphasised that all of the plans were for the participants own benefit and that individuals should not drive in circumstances beyond their personal confidence and competence level.

2.4.5 Analysis plan

Data were coded and entered for statistical analyses using IBM SPSS version 19. Preliminary analyses were conducted to determine whether randomisation had been successful. To test Hypothesis 1, analyses compared the intervention with the control group. Between participants ANCOVAs were performed on measures at Time 2 controlling for the initial (Time 1) levels. Partial η^2 was used to calculate effect size. Mediation analyses of the effects of the intervention on intention with TPB variables as mediators were conducted on the TPB measures taken at end of Time 2 (Hypothesis 2) and on effects of the intervention on SRI scores at the end of Time 2 with intention, attitudes, subjective norm, PBC as mediators (Hypothesis 3) to examine causal relationships (Ajzen,1991) using an SPSS macro for the bootstrapped sampling distribution model (Preacher & Hayes, 2008). Then, a comparison of regression models for the intervention group before and after the intervention was made to determine if the influence of the TPB variables changed (as opposed to examining any changes in the levels of the measures) .Finally, an analysis of self-reported goal achievement was undertaken (Hypothesis 4). Multiple regression modelling was used to determine the best TPB construct predictors of goal achievement across the sample (Hypothesis 5).

3.0 Results

3.1 Preliminary Analyses

Randomisation of groups was tested and deemed successful. No significant differences were found between control and intervention groups in terms of age, TPB constructs or measures of self-reported self-regulation behaviour using the SRI (see Table 3). A Chi-square test for independence (with Yates Continuity Correction) indicated no significant differences between groups in terms of gender, $\chi 2 = (1, n = 81) = 0.44$, $p = 0.51$, phi = .1. Checks for normality were conducted and no assumptions were violated. Given that previous work has indicated that women self-regulate more (e.g. see Gwyther & Holland, 2012), the effect of gender was examined. There were expected initial differences between men and women in that women avoided more situations than men (Self-regulation avoidance score was higher, $F(1,80)=7.34$, $p<0.01$), women were more likely than men to say they were an anxious driver: $F(1,80) =$

4.64, $p<0.05$, and they reported lower mileage: $F(1,80)=14.74$, $p<0.001$. However, men and women did not differ on the baseline measure of intention: $F(1,80)=0.89$, $p>0.05$, or on the baseline measure of planning self-regulation: $F(1,80)=0.54$, $p>0.05$.

People who are experiencing significant health problems that they perceive as affecting their driving may be more or less likely to volunteer for such a study which may affect the generaliseability. Given the issues with the confounding of health and driving avoidance in terms of effects on safety noted from previous studies (e.g. Ball et al., 1998), the initial demographic questionnaire asked participants if they had any health conditions that may affect their driving. 7 people said "yes" and 5 of them gave details. 3 people indicated visual concerns (two said they were corrected with spectacles) and 2 people indicated back and hip pain. The random assignment to groups resulted in 5 of these people being in the control group and 2 in the intervention group. The numbers are too few for any statistical comparison.

[Insert Table 3].

Given that the total sample was essentially a convenience sample, it was assessed to determine if this was a typical UK sample in terms of driving behaviour compared with national data (National Travel Survey Statistics, 2013). National statistics demonstrated that the average car/van driver mileage is 7,900 miles per year. The sample mileage was 7,186. Given that women generally drive less than men and there were more women than men in this sample, it is suggested that this sample is no different from the general population in terms of amount of driving.

3.2 Effects of the Intervention

The differences between control and intervention groups were compared at Time 2, controlling for levels of the measures at Time 1. In order to examine whether the effect of the intervention varied by age, given the age range used, age was also entered as a covariate. However, there were no age effects whatsoever; the use of age as a covariate did not significantly influence any of the group differences.

Although sample size was not designed for a full gender comparison, in order to give an indication of whether men and women differed in terms of the impact of the intervention on intention or on planning,

gender was added as a further factor to the analysis of intervention effects and there were no significant group by gender effects: intention, $F(1,76)=0.47$, $p>0.05$; self-regulation planning, $F(1,76)=1.71$, $p>0.05$. Finally, in terms of checking for gender differences, there was no difference between men and women in terms of whether they achieved their first, second, or third goals ($F<1$ in all cases).

Table 4 illustrates that few differences between the intervention and control groups were apparent. There were significant effects for Instrumental Attitudes and for Subjective Norms (SN), but these differences (both $p<0.05$) were such that it appeared that the control group's attitudes and SN became more positive over time than did the intervention group, contrary to Hypothesis 1, suggesting that these constructs were not altered by the goal setting intervention but may have been affected by the DriveSafe booklet only. However, the analysis also indicated a marginally significant change ($p=0.07$, partial eta^2 =0.04, small to medium effect) for self-regulation planning, which does suggest that the hypothesis of a positive effect of the intervention on planning should not be entirely rejected.

[Insert Table 4]

3.3 Mediation Analyses

Mediation analyses were conducted using 1000 bootstrap re-samples of the data with replacement; alpha was set at .05. First, analyses were conducted to assess whether the effects of the intervention on intention were mediated by direct measures of attitude, SN and PBC or by indirect measures of behavioural beliefs, normative beliefs and control beliefs (Hypothesis 2). No significant effects were found. Next, analyses examined whether the effects of the intervention on self-regulation behaviours (planning and avoidance) were mediated by the same variables (Hypothesis 3). No significant effects were determined. A larger resample size (5000) had no effect on the results. Thus Hypotheses 2 and 3 could not be supported. However, an alternative approach is to examine whether the intervention had an impact on the relative importance of the variables in the TPB model in terms of predicting intention to self-regulate. This was done by conducting two stepwise multiple regressions on just the intervention participant data, entering self-regulation planning and avoidance variables followed by TPB variables. The results in Table 5 indicate that the overall prediction of intention changed little (R^2 = 0.46 and 0.50

respectively, both p<0.001). SN appeared more important at Time 2 than at Time 1, but generally the pattern of prediction of intention remained very similar, with attitudes and instrumental attitudes being the most salient of the predictors. The role of self-regulation planning was low and changed little.

3.4 Goal Achievement

Many of the principal goals set (Goal 1) involved self-regulation planning behaviours such as setting off on a journey earlier (N=3), pre-planning journeys and rest stops (N=4), sharing the driving (N=4) and using navigational aids such as satellite navigation (N=2). Others involved planning for new challenges, for example driving new routes (N=6) or on motorways (N=9). Some participants planned to maintain their speed within the legal limits (N=4) while others prepared action plans to manage feelings of impatience and annoyance with other road users (N=6). Two participants planned to take additional driver training. Participants' ratings of their goal achievement were assessed. Descriptive analyses (Table 6), show that 93.4% of participants partially or completely achieved their first goal, 72.3% partially or completely achieved their second goal and 68.8% partially or completely achieved their third goal. Results strongly supported Hypothesis 4. Not all intervention participants set themselves three goals

[Insert Table 6]

3.5 Regression analyses.

Hierarchical multiple regression analyses were conducted to determine whether the TPB variables at Time 1 (intention, attitude, affective attitude, instrumental attitude, PBC and SN) and self-reported self-regulation avoidance and planning behaviours, predicted goal achievement for the primary goal after controlling for effects of age and gender. The model explained 47.5% of the variance in goal achievement. Self-regulation and planning were entered at Step 2, and explained 11.1% of the variance, and the three direct TPB constructs (attitudes, SN and PBC) and the sub-components of attitude (affective and instrumental attitude) at Step 3 added 34.6% of the variance explained, F (10,41) = 2.80 p<0.05 (see Table 7). In the final model, the significant predictors of goal achievement were attitude and subjective norm, with affective attitude and intention being marginally significant.

[Insert Table 7]

4.0 Discussion

The aim of this study was to determine whether established driving behaviours could be positively influenced by an extended TPB intervention designed to change attitudes and improve PBC through the adoption of self-regulation planning behaviours. The results only partially support the study hypotheses proposed at the outset. Critically, Hypothesis 3, that the intervention would lead to a change in self-regulation behaviours, was partially supported in that the intervention resulted in a marginally significant effect on self-regulation planning behaviour. However, this effect was not mediated by an effect of the intervention on intention or PBC. Further, there was no change in the precursor to behaviour change, that is, intention, and consequently Hypothesis 2 could not be supported. Nevertheless, Hypotheses 4 and 5, that the intervention would lead to successful achievement of planned goals, and that this would be predicted by TPB constructs, was strongly supported.

The goal planning intervention did not result in differences in measures of TPB constructs between the control and intervention groups. There were significant differences in instrumental attitudes and subjective norm but in such a manner as to indicate that the control group increased more than the intervention group. This suggests that the control condition of reading through the DriveSafe manual, even in the absence of the goal setting intervention, still had a positive effect on these TPB components. Given that later analyses demonstrated instrumental attitudes to be an important predictor of intention to drive in challenging circumstances, it is suggested that this positive manual alone has an important effect on intention. Subjective norm and overall attitudes were also found to be significant predictors of goal achievement in the intervention, implying that the manual may have had an impact on goal achievement, but because the control group did not set goals, the separate effect of the manual alone without the full intervention is not possible to determine.

Mediation analyses failed to find any mediating effects of the intervention on intention via TPB constructs or on self-reported self-regulation behaviours via intention and PBC, related to the lack of change in these variables, including intention, wrought by the intervention. Given this, few inferences can

be drawn from this study about the causal nature of the TPB model, i.e. that behavioural change is initiated by changes in behavioural, normative or control beliefs (Ajzen, 1991). This is not unique to this study. Other researchers (e.g. Chatzisarantis & Hagger, 2005; Stead et al., 2005) have also drawn incomplete links between the TPB constructs, intention and behaviour. One issue here is the phrasing of the intention question "I intend to drive a car in challenging circumstances (e.g. in unfamiliar towns, in bad weather, on busy roads, on motorways, at rush hour, at night) regularly in the forthcoming year". We know from previous research that planned behaviour models work less well when the behaviour is seen as too risky for people to contemplate (Holland, Hill & Cooke, 2009) and there is the possibility that this phrasing may have had this impact for some participants. Although the mean response was above the centre point suggesting that this was not something the sample in general really would not do at all, this previous work implies that if an intervention does not change risk perception, it is not be likely to show mediation of a TPB model in change. The fact that neither appraisal of risk or vulnerability as a driver change as a result of the intervention here, supports this explanation of the findings.

However, the comparative roles of motivational versus volitional stages of enactment further suggest that while one may expect TPB constructs to predict behaviour, and expect the theoretically grounded information booklet to have an impact on targeted beliefs, one may not expect the goal setting intervention to actually change the perceived values of the behaviour or other related TPB constructs. Heckhausen & Gollwitzer (1987) clearly distinguished between pre-decisional processing (planned behaviour, involved with appraising the expectancy of behavioural outcomes or values of the behaviour) and post-decisional, or volitional implementation, explaining why goal achievement is not necessarily accompanied by changes in the expected direction in the underlying behavioural beliefs.

However, the comparison of the TPB plus self-regulation models at Time 1 and Time 2 is revealing, suggesting that although the levels changed little, the way in which the variables had an impact on intention did change, with subjective norm showing as a marginally significant predictor at Time 2 but having very little impact at Time 1. While this change is not significant, it is suggestive of an impact of the group style intervention which needs further investigation.

Participants in the intervention group of this randomised controlled trial largely reported that they had successfully achieved their primary mobility goals, whether these were related to driving in new circumstances or reducing feelings of vulnerability when coping with aggressive drivers. This finding is of specific practical interest. Goal theories recognise that enactment of a particular intention may depend on its relative goal priority and on specific planning (Gollwitzer & Sheeran, 2006; Gollwitzer, 1993). By enabling participants to choose their own goal within the scope of the intervention, participants' motivations for driving were acknowledged (Hatakka et al., 2002) and perhaps given greater priority. Together, the results provide evidence that the intervention was successful in facilitating self-reported achievement particularly of primary of goals and that the initial TPB model plus self-regulation variables accounted for a large amount of the variance in the gradations of successful completion of the intended behavioural change.

This study had some limitations. Despite the strength of using a theory based intervention and the recruitment of sufficient participants based on power analyses, the attrition rate meant that the final sample of control participants was slightly smaller than optimal. It is possible that non-random attrition of control participants may have affected outcomes (those with more enjoyment of the process and/or DriveSafe manual continued in the study). However, the stratified sampling procedure resulted in a diverse range of participants representing drivers across the lifespan. The gender balance was such that women were slightly better represented than men, particularly in the intervention group. Since research has suggested that women are more likely to over-regulate when driving (e.g. Hakamies-Blomqvist & Siren, 2003; Jette & Branch, 1992; Siren & Hakamies-Blomqvist, 2005), the findings are of value.

Another potential criticism of this work is that it uses a self-report measure of self-regulation behaviour. Self-report measures may be prone to socially desirable responding (Anastasi and Urbina, 1997) and some authors have suggested that there is a tendency to over-report avoidance behaviours on questionnaires in comparison with actual behaviour (Blanchard and Myers, 2010). However, this present research did not find any change in avoidance behaviours and so perhaps, the difficulty of over-reporting is not so pertinent. The self-report measure does suggest that the intervention increased planning

behaviour as assessed by participants, but this alone was not a significant predictor of goal achievement, rather, the full TPB model predicted this.

A further potential effect of demand characteristics is that the self-report of goal achievement is the only measure of goal achievement available or practical, given that by the nature of the study and as recommended by the theoretical background, people set their own goals. Self-report of goal attainment is the usual method used in the literature (e.g. Elliott & Armitage, 2006) and the difference between achievement of Goal 1 as compared with Goals 2 and 3 suggests that goal achievement did occur in line with importance of the goal to the individual. Simple demand characteristics effects would not have predicted this difference.

Given the multi-component nature of this intervention, the effects cannot be specifically attributed to either the TPB intervention, the DriveSafe manual, or to the use of action planning or coping planning techniques, although the specific goal achievement in the intervention group in the absence of TPB construct change does supports the role of action and coping planning. Future research with a larger sample could perhaps review the effects of the various components in separate groups to establish which component had the greater effect on actual driver behaviour. Nevertheless, the results support previous findings (e.g.Armitage, 2007; Gratton, Povey, & Clark-Carter, 2007; Kellar & Abraham, 2005) that goal planning interventions have the capacity to effect goal attainment, specifically of self-selected primary goals.

This study only examined effects at baseline and at one month post-intervention. Although initial results are promising in terms of behavioural changes, there was no opportunity to assess the longer term implications of the intervention on driving behaviour and whether these changes were maintained over a significant period. According to Ajzen (1991), initiation of cognitive and behavioural change is a prerequisite to sustained behavioural change. Critically, follow up work is required to determine whether initiation of cognitive and behavioural changes leads to sustained behavioural change in this model and whether planning was particularly influential at different time points (e.g. Sniehotta et al., 2005).

One final potential area for criticism of this study is that both the control group and intervention group received the 'DriveSafe' handypack and the control condition was not therefore completely inactive. This pack was designed to provide tips and safety advice on driving. Although it could be argued that giving the drivers in both groups the same book meant that they were receiving almost the same intervention, this was not the case. Drivers in the control group were simply asked for their views on the general layout, design and usefulness of the book. They did not receive advice on developing their action or coping plans and they were not asked to review the book for content. However, subsequent research could usefully employ a second control group with a non-driving filler task to determine the separate effects.

Despite the limitations, the findings of the present research are of both practical and theoretical significance. This study suggests that it would be prudent for future mobility interventions to adopt a wider definition of self-regulation to incorporate planning behaviours and to address individual goal setting (Gollwitzer, 1993) and coping (planning) behaviours (Sniehotta et al., 2005) as well as the constructs identified by the theory of planned behaviour (Ajzen, 1991). The reasonable retention rate of intervention group participants (90%), the relatively high uptake by women and the mean age of the sample (46.40 years, *SD* =20.65) suggest that in practice this intervention is of interest and use to drivers, specifically those at most risk of premature driving cessation.

Conclusions

This study provides support for a theoretically based extended TPB plus goal setting intervention in encouraging wider mobility in drivers across the lifespan, and initial suggestions that such an intervention may also have an impact on changing self-regulation planning behaviours. Despite the study's limitations and limited effects on theory of planned behaviour components, the intervention was successful in that planned goals were achieved and so the results offer promise for such self-regulation planning (using evidenced implementation intention strategies) as a tool to assist drivers in achieving their mobility goals and promoting safer driving across the lifespan. The results are noteworthy because the intervention achieved prediction of goal achievement despite having no effect on underlying attitudes and beliefs,

which previous research has suggested can be difficult to change. It also demonstrated the comparative roles of the pre-decisional and post-decisional phases of behaviour intention and enactment.

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Appendix 1: TPB Questionnaire

This section asks about your attitudes towards driving, particularly in difficult or challenging situations. It also asks what you think that your friends, family and work colleagues might say about your driving under those circumstances.

1. In the course of the last year, how often have you driven a car in challenging circumstances e.g. in unfamiliar towns, in bad weather, on busy roads, on motorways, at rush hour, at night?

Never	1	2	3	4	5	6	7	Regularly

2. I intend to drive a car in challenging circumstances (e.g. in unfamiliar towns, in bad weather, on busy roads, on motorways, at rush hour, at night) regularly in the forthcoming year.

Disagree	1	2	3	4	5	6	7	Agree

3. For me to drive a car in challenging circumstances e.g. in unfamiliar towns, in bad weather, on busy roads, on motorways, at rush hour, at night, is:

a.	Harmful	1	2	3	4	5	6	7	Beneficial
b.	Pleasant	1	2	3	4	5	6	7	Unpleasant
c.	Good	1	2	3	4	5	6	7	Bad
d.	Worthless	1	2	3	4	5	6	7	Useful
e.	Unsafe	1	2	3	4	5	6	7	Safe
f.	Foolish	1	2	3	4	5	6	7	Wise
g.	Enjoyable	1	2	3	4	5	6	7	Unenjoyable
h.	Reckless	1	2	3	4	5	6	7	Cautious

4. I am apprehensive about driving a car in challenging circumstances e.g. in unfamiliar towns, in bad weather, on busy roads, at rush hour, at night

Very True	1	2	3	4	5	6	7	Very False

5. I am concerned about the unsafe and aggressive behaviours of other drivers when driving under challenging circumstances e.g. in unfamiliar towns, in bad weather, on busy roads, at rush hour, at night
6. I am happy to drive under challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night
7. Being able to drive a car under challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night, is central to my independence
8. Being able to drive a car under challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night is important to me
9. Driving a car under challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night is necessary to my life to give me the flexibility I need
10. Driving in challenging circumstances (e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night) makes things more convenient for me
11. Driving in challenging circumstances (e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night) increases my risk of accidents
12. Driving in challenging circumstances (e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night) makes me feel vulnerable
13. Having convenience is

Extremely undesirable	1	2	3	4	5	6	7 Extremely desirable

14. Increasing my accident risk is

Extremely undesirable	1	2	3	4	5	6	7 Extremely desirable

15. Feeling vulnerable is

Extremely undesirable	1	2	3	4	5	6	7 Extremely desirable

16. Most people who are important to me think that I should drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night.
17. I feel under pressure (e.g. from family members, friends or work) to drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night.
18. My family, friends or work colleagues approve of my driving in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night.
19. My family, friends or work colleagues approval is important to me

Not at all	1	2	3	4	5	6	7 Very much

20. I am confident that I could drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night, if I wanted to
21. For me to drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night is

Easy	1	2	3	4	5	6	7 Difficult

22. I have control over whether I drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night.
23. A helpful passenger is a comfort when driving in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night.
24. Journey planning is important when driving in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night
25. Being well prepared and carrying emergency equipment is necessary when driving in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night
26. I would be more likely to drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, at rush hour, at night if I had a helpful passenger
27. I would be more likely to drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, on motorways, at rush hour, at night if I had carefully planned my journey
28. I would be more likely to drive in challenging circumstances e.g. in bad weather (snow, fog, ice, heavy rain), in unfamiliar towns, on busy roads, on motorways, at rush hour, at night if I was well prepared and carrying emergency equipment.

Note: Items without end points were labelled Strongly Agree/Strongly Disagree.

Table 1: Self-Regulation Index (Planning and Avoidance) Factor model coefficients and Internal Consistency

	Items	Factor Loading
Planning	When I'm making a long journey, I check traffic news before I set off	0.77
α=0.76	I take care to plan the best time of day to make a journey	0.70
	I think about my route before I set off	0.70
	When I'm making a long journey, I plan rest breaks ahead	0.59
	I have specific strategies to cope when I get tired driving	0.58
	When I'm making a long or unusual journey, I allow extra time before setting off	0.64
	I'd rather just get going and work out my route as I go along (-)	0.62
	I tell someone of my whereabouts when making a long or unusual journey	0.54
	When I'm making a long or unusual journey, I check my car (e.g. oil, water, tyre pressures) before setting off	0.66
Avoidance	I avoid driving on the motorway	0.88
α= 0.75	I avoid changing lanes or overtaking on the motorway	0.85
	I avoid making right hand turns at busy junctions	0.65
	I prefer to have a trusted friend or family member with me when driving in difficult circumstances	0.58
	I avoid driving in heavy traffic, e.g. at rush hour	0.48
	I drive in the dark (-)	0.44

Table 2: Construction of the TPB questionnaire measuring self-regulation

Factor	Items	Alpha	Scale	Example item
Intention	1	-	1-7	I intend to drive a car in challenging circumstances regularly in the forthcoming year.
Past behaviour	1	-	1-7	In the course of the last year, how often have you driven a car in challenging circumstances?
Direct measures				
Attitude	8	0.76	1-7	For me to drive a car in challenging circumstances is...foolish/wise
Affective Attitude	3	0.72	1-7	I am apprehensive about driving a car in challenging circumstances ….
Instrumental Attitude	3	0.87	1-7	Being able to drive a car under challenging circumstances…… is important to me.
Subjective norm	2	0.47	1-7	Most people who are important to me think I should drive in challenging circumstances…
PBC (self-efficacy/ease)	2	0.71	1-7	
PBC (self-efficacy)	1	-	1-7	I am confident that I could drive in challenging circumstances…if I wanted to.
PBC (ease)	1	-	1-7	For me to drive in challenging circumstances is ...easy/difficult
PBC(controllability)	1	-	1-7	I have control over whether I drive in challenging circumstances…
Indirect measures				
Behavioural beliefs	3	0.51	1-7	Driving a car under challenging circumstances… makes things more convenient for me.
Outcome evaluations	3	0.39	1-7	Having convenience is…extremely desirable/extremely undesirable
Normative beliefs	1	-	1-7	My family, friends or work colleagues approve of my driving in challenging circumstances…
Motivation to comply	1	-	1-7	My family, friends or work colleagues approval is important to me.
Control belief strength	3	0.64	1-7	Journey planning is important when driving in challenging circumstances...
Control belief power	3	0.78	1-7	I would be more likely to drive in challenging circumstances…if I had carefully planned my journey.

Table 3: Randomisation of Groups – Age and TPB Constructs at Time 1.

Item				Control		Intervention	
	t	*df*	*p*	*Mean*	*S.D.*	*Mean*	*S.D.*
Age	0.63	79	0.53	48.06	18.63	45.15	22.16
Intention	-0.57	79	0.57	4.80	2.15	5.06	2.04
Direct measures							
Attitude	-0.64	75	0.52	4.16	0.77	4.28	0.79
Subjective norm	-0.24	79	0.81	4.49	1.27	4.57	1.62
PBC	0.68	79	0.49	4.96	1.38	4.75	1.32
Indirect measures							
Behavioural beliefs	0.19	79	0.85	23.90	7.09	23.55	9.03
Normative beliefs	1.29	78	0.20	16.08	10.93	13.00	10.36
Control beliefs	-0.39	78	0.70	55.08	15.44	56.44	15.58
Behaviour							
Avoidance	-1.11	77	0.27	13.94	4.09	15.13	5.14
Planning	-1.29	77	0.20	32.65	4.94	34.07	4.79

Note: Control N ranges from 32-35, Intervention N ranges from 45-46

Table 4: Mean scores of direct and indirect TPB measures at Times 1 and 2 of the intervention with ANCOVA findings (Group differences at Time 2 controlling for measures at Time 1)

	Time 1 Control		Intervention		Time 2 Control		Intervention		Group		Partial η^2
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	p	
Intention	4.80	2.15	5.07	2.04	5.11	2.11	5.20	1.97	0.60	>0.05	0.01
Direct measures											
Attitude	4.16	0.77	4.28	0.80	4.23	0.64	4.54	0.91	2.41	>0.05	0.03
- Affective	3.94	1.29	3.43	1.34	4.11	1.39	3.79	1.29	0.30	>0.05	0.00
- Instrumental	5.24	1.67	5.42	1.40	5.62	1.46	5.50	1.36	5.23	<0.05	0.06
Subjective norm	4.49	1.27	4.57	1.62	4.72	1.49	4.47	1.82	4.69	<0.05	0.06
PBC	4.96	1.38	5.16	1.33	4.75	1.32	5.20	1.25	1.31	>0.05	0.02
Beliefs											
Behavioural	23.90	7.09	23.55	9.03	23.86	8.61	24.99	9.10	0.76	>0.05	0.01
Normative	16.09	10.93	13.00	10.36	15.24	8.90	11.71	8.36	1.59	>0.05	0.02
Control	55.09	15.44	56.44	15.58	56.00	13.93	55.93	14.30	0.06	>0.05	0.00
Self-Regulation Behaviour											
Planning	32.65	4.94	34.07	4.80	32.06	5.84	34.59	5.11	3.98	0.07	0.04
Avoidance	13.94	4.10	15.13	5.14	13.91	4.20	15.26	4.73	0.52	>0.05	0.01

Table 5
Comparison of TPB prediction of self-regulation intention before and after intervention for intervention group (N=46)

		Time 1				Time 2			
Step	Variable	*ß*	R^2	R^2 change	*Model F*	*ß*	R^2	R^2 change	*Model F*
1	Gender	-.048	0.05	0.05	0.96	-.143	0.04	0.04	0.85
	Age	-.224				-.186			
2	Gender	.105	0.46	0.41	4.21**	.035	0.49	0.45	5.00**
	Age	.036				.011			
	Attitude	.370*				.459**			
	Affective attitude	-.089				-.132			
	Instrumental attitude	.376*				.328*			
	Subjective norm	.135				.273^{m}			
	PBC	.214				.263			
3	Gender	.104	0.46	0.01	3.17**	.027	0.50	0.1	3.83**
	Age	.098				-.023			
	Attitude	.345*				.455**			
	Affective attitude	-.046				-.113			
	Instrumental attitude	.412*				.303^{m}			
	Subjective norm	.139				.260^{m}			
	PBC	.272				.215			
	SR Planning	-.058				.092			
	SR Avoidance	.123				-.084			

** p<0.01, *p<0.05, ^{m} p<0.07

Table 6: Percentage of intervention participants reporting goal achievement

Did you achieve your goal?	Goal 1 (N=45)	Goal 2 (N=36)	Goal 3 (N=16)
5 Completely	51.1	41.7	37.5
4	28.9	30.6	31.3
3	6.7	16.7	12.5
2	6.7	8.3	6.3
1 Not at all	6.7	2.8	12.5

Table 7: Predicting Goal 1 achievement using direct measures of TPB constructs.

Model	Step	Variable	*B*	R^2	R^2 change	*F*
Goal achievement	1	Age	0.13	0.017	.017	0.34
		Gender	-0.02			
	2	Age	0.08	0.128	.111	1.36
		Gender	-.11			
		SR Planning	0.04			
		SR Avoidance	0.04			
	3	Age	0.22	0.475	.346	2.80*
		Gender	-0.04			
		SR Planning	0.10			
		SR Avoidance	0.26			
		Intention	-0.35^{m}			
		Attitude	0.44*			
		Affective attitude	0.39^{m}			
		Instrumental attitude	-0.05			
		Subjective norm	-0.38*			
		PBC	-.22			

$*p<0.05$, $^{m}=p<0.06$