Can travel advisors influence physical activity in personal travel planning projects using the Theory of Planned Behaviour? A longitudinal study

Jolel Miah[1], Andy Guppy[2], & Erica Cook[2]
[1]University of Sunderland (United Kingdom)
[2]University of Bedfordshire (United Kingdom)

info@drjolel.com

ISSN: 2515-138X

The objective was to examine the effect of travel advisors (TAs) used in personal travel planning interventions (PTP) on physical activity (PA) in an urban, ethnically diverse residential settings. The study assessed the utility of the Theory of Planned Behaviour (TPB) to predict both intention and PA associated with "TAs". A quasi-experimental longitudinal study was conducted with two groups to examine changes in physical activity levels. The methods involved a survey targeted at residents in a PTP targeted area who spoke to a TA (intervention group) and residents who did not (control group). Participants in the intervention group (n = 147) and control group (n = 95) self-reported their PA levels and constructs of the TPB at three time points. The results show that residents who had spoken to a TA reported significantly higher levels of physical activity at each of the three time points. ANOVA"s revealed significant interaction effects for the TPB constructs. The overall conclusion was that those who had spoken to a TA reported more PA at each of the three time points.

Keywords: personal travel planning; physical activity; travel advisor, theory of planned behaviour; travel advisor

There is increased recognition of the need to encourage healthier lifestyles by promoting physical activity (PA). The UK Government (DoH, 2016) states that people living in the UK are currently 20% less active than in the 1960s, with current projections suggesting it could rise to 35% by 2030. Consequently, this could significantly increase the risk of coronary heart disease, the onset of Type 2 diabetes, and other lifestyle-related diseases across the general population (Fogelholm, 2010). The UK Government currently recommends that adults should aim to be active daily and carry out 150 minutes a week of moderate-intensity activity, such as brisk walking or cycling (DoH,2016), which is achieved by completing 30 minutes of PA at least five days a week (Knox et al., 2015).

To address this, the launch of the UK Government policy in 2020, "Gear Change", focused on the promotion of active travel by encouraging communities to walk instead or cycle to work or other local destinations (DfT,2020). This was viewed as a more feasible way to increase physical activity across communities rather than advocating larger goals, such as attending sports or gym sessions, which individuals are less likely to form into a habit (Saunders et al., 2013). However, cycling promotion interventions have been met with limited success (Yang et al., 2010), with limited evidence of the effectiveness of infrastructure interventions to promote cycling and walking (Ogilvie et al., 2011). It is suggested that physical and ecological factors combined with social and environmental factors (such as local walking and cycling prevalence) may act as a more useful approach to change both behavioural intentions rather than behaviour alone (Ogilvie et al., 2011), with habit strength, individual characteristics (such as age, gender and distance to work), household and family factors, including car ownership, all shown to moderate this relationship (Ogilvie et al., 2011). There have also been suggestions that new infrastructure may increase PA (Goodman et al., 2013).

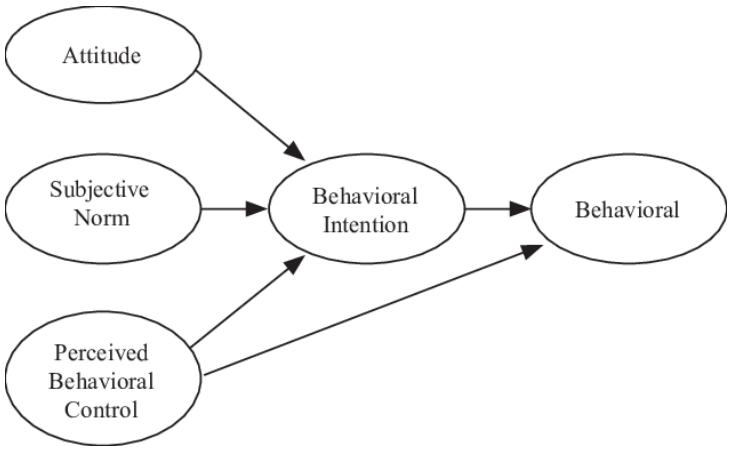
In other interventions, Hardeman et al. (2009) study was a theory-based intervention delivered face to face or by telephone and had an advice leaflet group. Peterson (2012) found no difference in PA levels, including a pedometer and consultation. However, Baker et al. (2008) did find an increase in PA in a community walking intervention with a pedometer. Self-monitoring and feedback have also increased PA (Prestwich et al., 2017). Therefore, initial behaviour changes through behavioural Intention can have long-term effects on PA, long-term travel behaviour and health outcomes.

Personal travel planning (PTP) has been viewed as a more practical way to provide targeted information directly to travellers to help them make sustainable travel choices (Chatterjee, 2009). It seeks to overcome habitual car use by providing information, assistance, incentives and motivation, enabling more journeys to be made on foot, by bike or by public transport. The largest scale evaluation of "PTP interventions was conducted by Chatterjee (2009), who assessed the effectiveness of "PTP" interventions across eight towns and cities in the UK. Overall, the findings were promising, with an increase in both walking and cycling (6% and 1% respectively), alongside an average reduction of around 11% in-car driver trips recorded (Typically over 6–8 months). To promote active travel, "Travel advisors" (TAs) have also been used and seek to engage residents in a short doorstep conversation. They listen out for travel needs, key motivators, and potential barriers to determine what types of information are likely to be used to be relevant to that participant. "TAs" has been perceived as a valuable part of the intervention thought to influence changes in attitudes. intentions alongside behaviour (Chatterjee, 2009). However, further work is needed to identify the psychological predictors to determine what motivates change in response to "PTP" (Chatterjee, 2009; Ogilvie et al., 2011; Yang et al., 2010). Furthermore, on behaviour change, the Combi model proposed by Michie et al (2011) suggests that there needs to be capability, opportunities, and motivation for people to change their behaviour. The intervention in this study was delivered in areas where environmental infrastructure improvements were made such as cycling and walking paths. In addition to this, the intervention provided motivation through "TAs" and positive reinforcements such as a pedometer for walking, and bike locks for cycling.

Theory of Planned Behaviour and physical activity

The Theory of Planned Behaviour (TPB) is a social cognition model (see Figure 1), proposed by Ajzen (1991), which has four primary constructs: "Subjective Norms" (SN), "Attitude" (ATT), "Perceived Behavioural Control" (PBC) and "Behavioural Intention" (BI). The "SN" component refers to the perceived influence significant others have on an individual performing the behaviour. The ATT component is based on either the positive or negative feelings an individual has towards delivering the behaviour. The "PBC" construct focuses on how much individuals perceive the level of control they have over the behaviour. More recently, the construct of Self Efficacy (SE) has been added to the model, reflecting how people feel confident about carrying out a behaviour (Connor & Norman, 2005).

Figure 1
Theory of Planned Behaviour (Ajzen, 1991)



Hausenblas et al., (1997) reviewed the effect sizes between "TPB" constructs and exercise behaviour across 31 studies which included over 10,000 participants. The results found that "PBC" and "ATT" had mean correlations of 0.52 and 0.43 respectively in relation to "BI" with "SN" lower at 0.27. With respect to Exercise Behaviour, "BI", "PBC", and "ATT" had mean correlations of 0.47, 0.41 and 0.39, respectively, while "SN" was only 0.09. These findings were largely replicated in relation to PA in a more recent review of over 90 studies and 25,000 participants by Schuz et al., (2017), who reported mean transformed correlations of 0.50, 0.36 and 0.30 respectively for "BI", "PBC" and "ATT". The mean transformed correlation with "BI" was only 0.17 for "SN". Based on these findings, there is good evidence to suggest that the "TPB" could be a useful framework for explaining intentions and behaviour related to exercise and physical behaviour in the active travel context (Hausenblas et al., 1997; Schüz et al., 2017) and Zhang et al. (2019) have used the "TPB" in studies to measure PA.

Context of the Current Study

The "Local Sustainable Travel Fund" (LTSF) is money the UK Government made available to local authorities to improve towns" infrastructure and change travel behaviour (DfT, 2017). The main objectives of the "LTSF" were to reduce carbon emissions and congestion, support the local economy, and increase access to employment and health services. The secondary objectives were also to deliver more comprehensive social and economic benefits (e.g., accessibility and inclusion) for the community, to improve safety, to improve the environment by delivering better air quality and a reduction in noise pollution, and finally to promote an increase in PA (through active walking and cycling) that results in broader health benefits (Gagani et al., 2016; Sloman et al., 2016).

As part of the LTSF project in Luton, funds were allocated to use "TAs" as part of their active travel interventions. Luton is an ethnically diverse urban town with a population of around 216,000 people situated in the East of England. Luton is only one of three towns in the UK where less than 50% of the population identify as white British (Luton Council,2019). Luton also experiences high levels of deprivation and ranked the 70th (of 317) most deprived local authority, with four output areas in the country's top ten per cent most deprived areas (Luton Council, 2019).

The main aim of the present study was to investigate the impact of "TAs" on changes in "PA" within the community in Luton over time. As the "TPB" has been successfully applied to explain a wide range of health-enhancing behaviours (Daddario, 2007; Sutton & White, 2016), including exercise (Hagger et al., 2002), this framework was adopted in the present study to examine the mechanisms through which change might occur.

METHOD

Design

This study adopted a quasi-experimental longitudinal survey design with two groups (intervention and control) to examine changes in physical activity levels. The intervention group spoke to a travel advisor, and the control group was made up of those who did not. Residents were assessed at three-time points 1) baseline approximately 2 weeks after the "TA" intervention, 2) 6 months post-baseline, and 3) 12 months post-baseline.

Participants

Residents were recruited in an area of Luton where they had either spoken to a "TA" in the last two weeks (intervention group; n =147) or those who lived in the same area but did not speak to a "TA" (control; n = 95). The majority of the residents who took part were unemployed (39–43%), and a breakdown of the demographics is presented in Table 1. A total of 827 residents took part in this study from baseline, which was reduced to 242 residents at 12 months. This study analysis was only restricted to the 242 residents who completed all three surveys.

Table 1
Sociodemographics of participants across all time points.

Demographics	TA	Control
N	95	147
Age		
Mean Age	29.5	29.6
Standard Deviation	6.5	6.6
Gender		
Male	24.0%	33.1%
Female	76.0%	66.9%
Employment Status		
Fulltime Employed	27.0%	45.8%
Part-time Employed	3.0%	2.8%
Unemployed	64.0%	44.4%
Disabled / Retired	3.0%	0.0%
FT/PT education	3.0%	7.0%
Ethnicity Group		
White British / Irish / Other	42.0%	63.4%
Mixed	2.0%	4.2%
Asian or Asian British Indian	3.0%	4.9%
Asian or Asian British Pakistani	40.0%	15.5%
Asian or Asian British Bangladeshi	12.0%	9.9%
Black or British African / Caribbean	1.0%	2.1%

Measures

Physical activity was measured using the International Physical Activity Questionnaire (IPAQ) (Craig et al., 2001). This section consisted of questions from the short version of the International physical activity questionnaire (IPAQ). The questionnaire had seven items in which participants had to self-reported physical activity levels in minutes over the past seven days. This study followed the scoring protocol for measuring PA with IPAQ, and the median and interquartile ranges were computed for: walking (Walking), moderate-intensity (Moderate PA), vigorous-intensity (Vigorous PA) and a

combined total PA score (Total PA). IPAQ has been used in studies and has been shown a reliable measurement to assess physical activity in larger groups (Cleland et al., 2018).

Predictor measures

A self-reported questionnaire previously used to measure behaviour change in sustainable travel interventions (Bamberg et al., 2003) was adapted for the purpose of the study (Lee et al.,2016; Downs & Hausenblas, 2005) to assess constructs of the "TPB" (Ajzen, 1991). Adaptations included replacing the word "exercise" with "walking" or "cycling". Nineteen statements had 4 items for behaviour predictor components, "5 items for "attitude", "4 Items for subjective norms", "6 items for perceived behavioural control", and "4 items for intention" to undertake physical activity. The "TPB" framework's main prediction is that cognitions can change despite past behaviour or behavioural habits if targeted as part of the intervention (Bamberg et al., 2003).

Procedure

The Travel Luton intervention was an initiative to change their travel behaviour and use more sustainable forms of transport. Based on previous evidence, this initiative involved "TA"s speaking to residents on their doorstep and encouraging them to think about ways they can use transport and increase their physical activity at the same time.

"TA"s visited households on either a weekday, evening, or Saturday. The "TA"s informed the household resident that they were providing free travel information resources and were there to discuss current travel patterns. The "TA" then outlined the potential householder health (e.g., increasing physical activity) and economic benefits (e.g., saving money on travel) of participating in the project. Householders were then given the option to participate in parts of the project (e.g., request travel information but not take part in the travel survey) or decline altogether. Householders who agreed to participate in the project were then asked a few open-ended questions (not in any particular order) by the travel advisor on everyday journeys (e.g., work, shopping, visiting friends) such as when did they last use the bus instead of the car to go shopping or to work? Additional questions were: Where was it possible to walk or cycle instead of using the vehicle? How did they find the journey? Who did they go with? How often would they walk, cycle, or use the bus instead of using the car? The "TA" would then offer "travel challenges" and incentives for people who wanted to participate in the Travel Luton scheme.

Leaflets and information on the study were distributed soon after the "Travel Luton" intervention. The flyer invited residents across two wards in Luton to participate in a self-report questionnaire study of walking and cycling in the areas. Participants were offered different options on how to participate in the study, such as via phone, post, or the website.

Participating residents were asked to read a detailed participant information form, and if they agreed to take part were required to sign a consent form. This was collected by the online platform Qualtrics in Nov/December 2014. 6-month follow-up was collected in June/July 2015 and with a final follow-up at 12 months Nov/Dec 2015. Participants who chose to do it over the phone; filled in a contact form, and the researcher was contacted at a time selected by the participant. Participants were also informed that this study would collect data at two further time points, e.g., 6 months and 12 months. Once participants had completed the questionnaire, they were thanked for their time and reminded they would be contacted in 6 and 12 months to complete similar surveys.

Ethical considerations

The study was conducted according to the guidelines of the British Psychological Society (2009) and approved by the School of Psychology Research Ethics Committee. All participants were briefed about the research and were given an informed participant form that clearly explained what the study was about (deception) after completion (debrief). Informed consent was obtained from all subjects involved in the study. Written informed consent was obtained from all participants. All participants were given the right to withdraw from the study without reason. All residents were given incentives such as a fridge magnet calendar as a goodwill gesture to participate in this study.

RESULTS

Study and demographic characteristics

Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted.

Baseline characteristics. The mean age of all participants was 29.5 (*SD* = 6.5) for the "TA" group and 29.6 for the control group. Table 1 shows the mean score of all demographic characteristics, and there were more females than males. However, the age profile was almost identical.

Table 1 also shows there were high levels of unemployment than anticipated. A potential reason for this is that residents were more likely to be at home than those in paid employment. The local data reports that 2.1% of the Luton population is unemployed (Luton, 2015), like the national average. This is different to the data collected in this study to those who were able to fill in the survey. Therefore, the findings have a potential bias for those who were unemployed.

Of those who spoke to a "TA", for females, 30% were in full-time employment, 66% were unemployed, 36% were employed full-time, and 57% were unemployed. Of those who did not speak to a "TA" for females were 32% were in full-time employment, 54% were unemployed and for the men 56% in full-time employment and 39% were unemployed. The proportion of the sample unemployed was higher than census records would have suggested. However, as this is a longitudinal study, the sample characteristics are consistent over time.

Levels of physical activity

Factorial repeated measures ANOVAs (between x within groups) were performed to investigate group differences in walking, moderate, vigorous, and total physical activity levels (Table 2) at all time points. The results revealed that there was a statistically significant difference between groups ($F(1, 239) = 431.97$, $p = <0.001$) whereby those in the intervention group had higher levels of total PA across three different time points (Baseline $M = 812.50$; 6 months $M = 1964.61$; 12 months = 1852.18) when compared to residents in the control (Baseline $M = 91.72$; 6 Months $M = 495.28$; 12 months $M = 649.08$). There was also a significant effect of time observed ($F(2, 478) = 129.91$, $p <.001$) indicating a significant difference between Times 1 and Times 2 and 3 but no difference between Times 2 and 3. There was also a significant interaction effect for the time x group ($F(2,478) = 22.57$, $p <.001$), indicating that changes in the mean total of PA over time were different between the two groups. These findings were largely similar for the individual PA measures and were significant (see Table 2 and Figure 2).

Table 2
Levels of physical activity at all time points with group and interactions.

Physical activity	Group	*N*	Baseline Mean (SD)	6 Months Mean (*SD*)	12 Months Mean (*SD*)	ANOVA *F* Value
Total	Intervention	95	**812.50**[b] (856.12)	**1964.61**[a] (815.77)	**852.18**[a] (708.71)	*F* Group= 431.966*** *F* Time 129.913*** *F* Int = 22.571***
	Control	147	**91.73**[c] (528.79)	**495.28**[b] (556.81)	**649.08**[b] (480.61)	
Walking	Intervention	95	**178.03**[b] (199.47)	**401.73**[a] (177.64)	**399.82**[a] (156.12)	*F* Group = 391.63*** *F* Time = 117.330, *F* Int = 16.399
	Control	147	**23.35**[c] (95.33)	**112.69**[b] (126.67)	**140.64**[b] (103.49)	
Vigorous	Intervention	95	**434.10**[b] (490.87)	**1029.89**[a] (456.23)	**961.68**[a] (371.27)	*F* Group = 463.762*** *F* Time = 136.376***, *F* Int = 19.479***
	Control	147	**23.07**[d] (131.76)	**256.05**[c] (290.97)	**337.69**[bc] (253.32)	
Moderate	Intervention	95	**215.32**[b] (225.29)	**527.87**[a] (229.24)	**483.41**[a] (184.91)	*F* Group = 228.543*** *F* Time = 54.134***, *F* Int = 14.275
	Control	147	**45.31**[c] (400.60)	**126.53**[b] (146.69)	**170.79**[b] (128.50)	

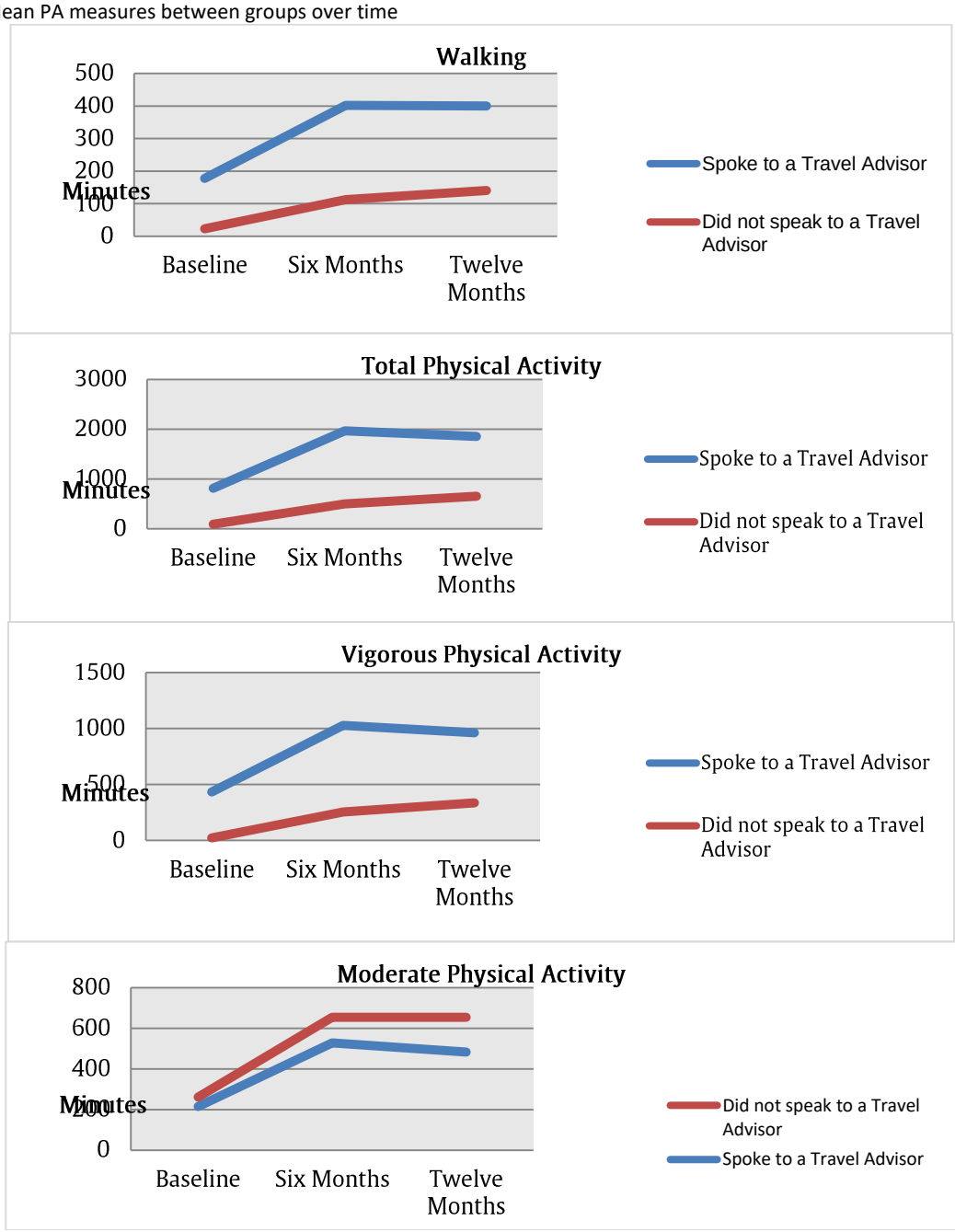
*p < 0.5, **p < 0.05, ***p < 0.001. Means sharing the same letter are not significantly different.

Table 3
TPB construct results for time, group, and interactions.

TPB Construct	Group	*N*	Baseline Mean (SD)	6 Months Mean (SD)	12 Months Mean (SD)	ANOVA *F* Value
Intention	Intervention	95	**18.53**[b] (4.36)	**20.80**[a] (4.37)	**20.73**[ab] (7.09)	*F* Group = 434.377***
	Control	147	**13.18**[c] (3.60)	**12.14**[c] (3.97)	**9.85**[d] (4.73)	*F* Time = 4.2*, *F* Int = 23.3***
Attitudes	Intervention	95	**28.01**[a] (3.09)	**24.13**[b] (2.68)	**27.85**[a] (5.61)	*F* Group = 113.52***
	Control	147	**26.76**[a] (3.10)	**21.50**[c] (3.14)	**20.75**[c] (7.27)	*F* Time = 59.16***, *F* Int =25.51***
Subjective norms	Intervention	95	**14.41**[a] (3.73)	**12.61**[b] (3.56)	**14.54**[a] (5.53)	*F* Group = 320.23*** F Time = 16.67***, F Int =13.71***
	Control	147	**9.20**[c] (5.00)	**6.86**[d] (3.18)	**5.59**[d] (4.84)	
Perceived behavioural control	Intervention	95	**29.16**[a] (7.40)	**31.67**[a] (5.22)	**33.26**[a] (8.53)	F Group = 408.17*** F Time = 10.201***, F Int =10.330***
	Control	147	**19.16**[b] (6.01)	**21.10**[b] (4.91)	**18.83**[b] (6.47)	

*p < 0.5, **p < 0.05, ***p < 0.001. Means sharing the same letter are not significantly different.

Figure 2
Mean PA measures between groups over time



Predictor measures

There were large significant group differences for all TPB components including "Intention" (F (1, 240) = 434.37, p = <0.001), "attitudes" (F(1, 240) = 113.52, p = <0.001), "subjective norms" (F(1, 240) = 320.23, p = <0.001), and "perceived behavioural control" (F (1, 240) = 408.17, p = <0.001) (Table 3). There were also significant time effects for all TPB components including "attitudes" (F (2, 480) = 59.16, p<.001), "perceived behavioural control" (F (2, 480) = 10.20, p<.001), "subjective norms" (F (2, 480) = 16.67, p<.001) and "behavioural intention" (F (2, 480) = 4.24, p<.001) to physical activity. "There were also significant Interaction effects for components; "attitudes" (F (2,480) = 25.51, p<.001), "behavioural intention" (F (2,480) = 23.29, p<.001), "perceived behavioural control" (F (2,480) = 10.33, p <.001) and "subjective norms" (F(2,480) = 13.71, p <.001) (Table 3).

DISCUSSION

The main aim of the present study was to investigate the impact of "TAs" on long-term changes in PA within an ethnically diverse community. This framework was adopted in the present study to examine the mechanisms through which change might occur.

The findings revealed that those who had spoken to a "TA" reported significantly increased levels of PA when compared to the control group at all time points across all measures of PA (walking, moderate, vigorous, and total PA). These findings support the usefulness of a "TA" in increasing PA behaviour. Time 1, at baseline, "TA" the intervention group reported higher PA levels than the Control group, which remained the case at 6 months and 12 months follow-ups. The "TA" group received the "TA"s intervention approximately up to 2 weeks before the survey, immediately before the first survey, which may explain why the difference between the two groups is present from time 1. PA scores increased from time 1 to time 2 for both groups, which suggests it is not just the "TA" intervention influencing PA. One explanation is that being involved in the study and repeatedly answering questions about exercise and health may have influenced reported PA (Campbell & Stanley, 1963). Also, the local infrastructure improvements and the environment may have contributed to these changes and would have equally affected both groups. Although there was a decrease in vigorous PA for the experimental group at 12 Months from 6 Months, this was not significant.

The present findings are similar to those reported by Hardeman et al. (2009), where PA increased from baseline to 6 months and again to 12 months for the combined interventions. This pattern of change was also found in Rhodes et al.'s (2020) study. Both their planning and education group and their education-only group increased reported Moderate Physical Activity from 6 weeks to 13 weeks and 26 weeks. The findings also support previous research such as Prestwich et al. (2017) and Baker et al. (2008), where Interventions including PA consultation and a motivational element have been shown to increase PA in participants. The study by Baker et al., (2008) collected PA data over 12 weeks, whereas Prestwich et al., (2017) was carried out at 4-5 weeks. Therefore, it is difficult to make identical comparisons; however, they reached similar conclusions that PA increased.

This study's findings also reported an increase in PA over time for the control group, albeit significantly lower than the "TA" group. Previous research has also found this effect too; for instance, Petersen et al., (2012) reported an increase in PA for the control group over time. A possible explanation of why the PA levels increased over time could be down to broader exposure to "PTP" intervention, such as improvements to infrastructure, which may have motivated them to change behaviour. Similar conclusions were made by Peterson et al. (2012), where their control group received information about PA and an extensive health examination. Although this was controlled for in this study, there is a possibility, as Petersen et al. (2012) note, that factors outside the investigation area could be causing people to increase their PA. Another study by Prestwich et al. (2017) also reported more PA at baseline than other experimental groups. However, the control group in Prestwich et al., (2017) did not increase PA in follow-up studies, whereas the experimental ones did. These findings (e.g., Prestwich et al., 2017) are somewhat different from this thesis's results. Nevertheless, much like Prestwich et al. (2017), experimental conditions report an increase in PA over time and more than the control groups.

Summary of the travel advisor impact

This study aimed to investigate the claim that "PTP" projects that use "TAs" on the doorstep of residents" houses increase those residents" PA. At the time of this study, no research has been found that has investigated this. A review by Chatterjee (2009) reported an overall increase in PA in "PTP" projects; it also mentioned that "TAs" were used in these interventions. However, the review did not assess or evaluate the impact of "TAs" on people's PA. In this study, the research looked at the impact made by "TAs" on residents" doorsteps. The results suggest that "TAs" are associated with higher levels of PA. This potentially supports the argument that "PTP" interventions using "TAs" are sufficient to change behaviour and adds further evidence that these types of projects can increase PA. Although the research was evaluated over 12 months, more work needs to be conducted to examine if the results stay the same for a longer time frame. Nevertheless, the findings add to the literature area and attempt to answer the broader question of whether "PTP" effectively changes behaviour concerning PA.

Overall, this study attempts to address the rationale of using "TAs" as an effective way of changing PA behaviour by motivating people on their doorstep. Furthermore, the findings add to the literature and notably support the claim made by Goodman et al. (2013) that when new infrastructure is built-in, PA increases. This study also adds to Goodman et al. (2013) findings that "TA"s potentially can increase PA compared with those who live in the same infrastructure.

Theory of Planned Behaviour

In relation to the components of TPB that were also assessed in this research, a similar pattern of findings emerged. Again, there were strongly significant differences across all time points with the intervention group indicating much higher levels of "intention", "Subjective Norms", "Attitude" and "PBC".

With respect to Intention, the travel advisor group intervention group increased slightly over time, while the control group decreased significantly. For the predictor constructs, "PBC" had the clearest pattern, mirrored that of Intention, especially for the travel advisor group with increases over time while the control group slightly increased and then decreased over the final two-time points. For "attitudes" and "subjective norms", the pattern was less clear, with the travel advisor group showing initial reductions at 6 months with slight upturns observed at 12 months. For the control group, there was a steady decline in these constructs from Time 1 (baseline).

Implication for future research

The key strength of this study is the impact of "TAs" on PA over 6 and 12 months follow up. In addition, the impact of PA and its predictors in relation to the TPB. These findings suggest there may be significant benefits in using PTPs to encourage communities to increase the use of active travel alternatives in the context of improved environmental infrastructure. The research has also suggested that such interventions can impact the psychological predictors of Intention and behaviour and that such mechanisms should be considered when developing future interventions. However, some limitations are noteworthy.

A key limitation in the present study was the lack of a "before" measurement in the travel advisor group. Clearly, advanced warning of this naturally occurring experiment would have provided this opportunity, and future research would be advised to take pre-intervention baseline measures. Another limitation was the lack of incentives used in other studies. Perhaps a more serious limitation was that the interactions with the "TA" were not recorded to monitor the quality and quantity of their intervention. Clearly, these are recommendations we would suggest for future research projects.
There was also a slight difference in the "TA" and control Group demographics. While there were differences in the groups, the significant effects remained when additional analyses were performed to include demographics such as gender as covariates.

CONCLUSION

Despite the limitations, this research adds to our understanding of "PTP" interventions; in part, it helps us understand the role the "TA" has in changing long-term behaviour, especially physical activity. These findings suggest there may be significant benefits in using "PTP"s to encourage communities to increase the use of active travel alternatives in the context of improved environmental infrastructure. Although the longitudinal study is based on a small sample, the findings suggest that people are increasing their physical activity after talking to a "TA". Those who did not speak to a "TA" but lived in the same area also increased their physical activity. This potentially suggests that people are changing their behaviour due to the broader intervention. Although, this is still lower than those who talked to a "TA". The research has also suggested that such interventions can impact the psychological predictors of Intention and behaviour and that such mechanisms should be considered when developing future interventions.

Acknowledgements: Travel Luton, Luton Council, JMP Consultants (SYSTRA Group)
Conflict of interests: The authors declare no competing interests.
Ethical approval: Not applicable
Funding: No funding was received.

REFERENCES

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Baker, G., Gray, S. R., Wright, A., Fitzsimons, C., Nimmo, M., Lowry, R., & Mutrie, N. (2008). The effect of a pedometer-based community walking intervention "Walking for Wellbeing in the West" on physical activity levels and health outcomes: A 12-week randomized controlled trial. The *International Journal of Behavioral Nutrition and Physical Activity, 5*. https://doi.org/10.1186/1479-5868-5-44

Bamberg, S., Rölle, D., & Weber, C. (2003). Does habitual car use not lead to more resistance to change of travel mode? *Transportation, 30*(1), 97–108. https://doi.org/10.1023/A:1021282523910

British Psychological Society (2009). Ethics and conduct. BPS (Vol. 52). https://doi.org/10.2113/gsecongeo.52.2.198

Campbell, D.T., & Stanley, J.C. (1963). *Experimental and quasi experimental designs for research*. Houghton Mifflin.

Chatterjee, K. (2009). A comparative evaluation of large-scale personal travel planning projects in England. *Transport Policy, 16*(6), 293–305. https://doi.org/10.1016/j.tranpol.2009.10.004

Cleland, Ferguson, S., Ellis, G., & Hunter, R. F. (2018). Validity of the International Physical Activity Questionnaire (IPAQ) for assessing moderate-to-vigorous physical activity and sedentary behaviour of older adults in the United Kingdom. *BMC Medical Research Methodology, 18*(1), 176–176. https://doi.org/10.1186/s12874-018-0642-3

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U. L. F., Yngve, A., Sallis, J. F., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Exercise, 35*(8), 1381-1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB

Daddario, D. K. (2007). A review of the use of the health belief model for weight management. *Medsurg Nursing*, *16*(6), 363.

Department for Health.(2016). Health matters: getting adult active every day. Retrieved from https://www.gov.uk/government/publications/health-matters-getting-every-adult-active-every-day/health-matters-getting-every-adult-active-every-day

Department for Transport. (2017). Impact of the Local Sustainable Transport Fund Summary Report, (October 2017), 40. Retrieved from www.gov.uk/dft

Department for Transport. (2020) Gear change: One year on. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1007815/gear-change-one-year-on.pdf

Downs, D. S., & Hausenblas, H. A. (2005). The theories of reasoned action and planned behavior applied to exercise: A meta-analytic update. *Journal of Physical Activity and Health, 2*(1), 76–97. https://doi.org/10.1123/jpah.2.1.76

Fogelholm, M. (2010). Physical activity, fitness and fatness: Relations to mortality, morbidity and disease risk factors. A systematic review. *Obesity Reviews, 11*(3), 202–221. https://doi.org/10.1111/j.1467-789X.2009.00653.x

Gagani, A., Gemao, J., Relojo, D., & Pilao, S. J. (2016). The dilemma of denial: acceptance and individual coping among patients with chronic kidney diseases. *Journal of Educational Sciences and Psychology, 6*(2), 45–52. https://doi.org/f8nm

Goodman, A., Panter, J., Sharp, S. J., & Ogilvie, D. (2013). Effectiveness and equity impacts of town-wide cycling initiatives in England: A longitudinal, controlled natural experimental study. *Social Science & Medicine, 97*, 228–237. https://doi.org/10.1016/j.socscimed.2013.08.030

Hardeman, Kinmonth, A. L., Michie, S., & Sutton, S. (2009). Impact of a physical activity intervention program on cognitive predictors of behaviour among adults at risk of Type 2 diabetes (ProActive randomised controlled trial). *The International Journal of Behavioral Nutrition and Physical Activity, 6*(16), 16–16. https://doi.org/10.1186/1479-5868-6-16

Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: predictive validity and the contribution of additional variables. *Journal of Sport & Exercise Psychology, 24*(1), 3–32. https://doi.org/10.1123/jsep.24.1.3

Hausenblas, Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport & Exercise Psychology, 19*(1), 36–51. https://doi.org/10.1123/jsep.19.1.36

Knox, E. C. L., Musson, H., & Adams, E. J. (2015). Knowledge of physical activity recommendations in adults employed in England : associations with individual and workplace-related predictors.

International Journal of Behavioral Nutrition and Physical Activity, 1–8. https://doi.org/10.1186/s12966-015-0231-3

Lee, C. F., Chiang, I. C., Hwang, F. M., Chi, L. K., & Lin, H. M. (2016). Using the Theory of Planned Behavior to predict pregnant women's intention to engage in regular exercise. Midwifery, 42(June 2015), 80–86. https://doi.org/10.1016/j.midw.2016.09.014

Luton Council. (2015). 2015 Indices of multiple deprivation: Luton. Retrieved from https://www.luton.gov.uk/Environment/Lists/LutonDocuments/PDF/Planning/Observatory/2015Indices of deprivation in Luton.pdf

Luton Council., (2019). 2019 Indices of Multiple Deprivation Summary. Retrieved from: https://www.luton.gov.uk/Environment/Lists/LutonDocuments/PDF/Planning/Observatory/2019-indices-of-multiple-deprivation-in-luton.pdf

Michie, van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science : IS 6*(1), 42–42. https://doi.org/10.1186/1748-5908-6-42

Ogilvie, D., Bull, F., Powell, J., Cooper, A. R., Brand, C., Mutrie, N., Preston, J., Rutter, H., & iConnect Consortium. (2011). An applied ecological framework for evaluating infrastructure to promote walking and cycling: The iConnect study. *American Journal of Public Health, 101*(3), 473–481. https://doi.org/10.2105/AJPH.2010.198002

Ogilvie, D., Foster, C. E., Rothnie, H., Cavill, N., Hamilton, V., Fitzsimons, C. F., & Mutrie, N. (2007). Interventions to promote walking: Systematic review. British Medical Journal, 334(7605), 1204–1207. https://doi.org/10.1136/bmj.39198.722720

Petersen, C. B., Severin, M., Hansen, A. W., Curtis, T., Grønbæk, M., & Tolstrup, J. S. (2012). A population-based randomized controlled trial of the effect of combining a pedometer with an intervention toolkit on physical activity among individuals with low levels of physical activity or fitness. *Preventive Medicine: An International Journal Devoted to Practice and Theory, 54*(2), 125–130. https://doi.org/10.1016/j.ypmed.2011.12.012

Prestwich, A., Conner, M., Morris, B., Finlayson, G., Sykes-muskett, B., & Hurling, R. (2017). Do web-based competitions promote physical activity ? Randomized controlled trial. *Psychology of Sport & Exercise, 29*, 1–9. https://doi.org/10.1016/j.psychsport.2016.11.003

Rhodes, R. E., Quinlan, A., Naylor, P.-J., Warburton, D. E. R., & Blanchard, C. M. (2020). Predicting personal physical activity of parents during participation in a family intervention targeting their children. *Journal of Behavioral Medicine, 43*(2), 209–224. https://doi.org/10.1007/s10865-019-00116-2

Saunders, L. E., Green, J. M., Petticrew, M. P., Steinbach, R., & Roberts, H. (2013). What are the health benefits of active travel? A systematic review of trials and cohort studies. PLoS ONE, 8(8). https://doi.org/10.1371/journal.pone.0069912

Schüz, B., Li, A. S. W., Hardinge, A., McEachan, R. R. C., & Conner, M. (2017). Socioeconomic status as a moderator between social cognitions and physical activity: Systematic review and meta-analysis based on the Theory of Planned Behavior. *Psychology of Sport and Exercise, 30,* 186–195. https://doi.org/10.1016/j.psychsport.2017.03.004

Sloman, L., Cairns, S., Goodman, A., Hopkin, J., & Taylor, I. (2016). Meta-analysis of outcomes of investment in the 12 Local Sustainable Transport Fund large projects interim report. February, (March). Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/500220/meta-analysis_of-interim-report.pdf

Sutton, L. C., & White, K. M. (2016). Predicting sun-protective intentions and behaviours using the theory of planned behaviour: a systematic review and meta-analysis. *Psychology and Health, 31*(11), 1272–1292. https://doi.org/10.1080/08870446.2016.1204449

Yang, L., Sahlqvist, S., McMinn, A., Griffin, S. J., & Ogilvie, D. (2010). Interventions to promote cycling: Systematic review. *BMJ, 341*(7778), 870. https://doi.org/10.1136/bmj.c5293

Zhang, Zhang, R., Gan, Y., Li, D., & Rhodes, R. E. (2019). Predicting transport-related cycling in Chinese employees using an integration of perceived physical environment and social cognitive factors. Transportation Research. Part F, *Traffic Psychology and Behaviour, 64,* 424–439. https://doi.org/10.1016/j.trf.2019.06.003