The role of businesses in facilitating voluntary travel behaviour change - Insights from the London 2012 Olympic Games

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Abstract

The organisers of the London 2012 Olympics faced transport congestion challenges whose resolution required travel behaviour change across an entire transport network. This study evaluates the role of Transport for London's (TfL) £30m business-focussed Travel Demand Management (TDM) programme in achieving significant traveller behaviour change across its entire transport network. The paper argues that soft TDM measures, together with a targeted 'hard-edge' message, alongside travel alternatives, can achieve significant voluntary travel behaviour change (VTBC) across a whole transport network, despite such behaviour normally being habitual.

Incorporating a longitudinal study comprised of pre-and post-Games qualitative interviews, office attendance data and analysis of TfL's travel survey with Ajzen's (1991) Theory of Planned Behaviour, this research highlights the importance of reliable information, freedom of choice, and faith in the effectiveness of the measures proposed, in eliciting acceptance of the TDM policy. The results also demonstrate the importance of a relevant, hard-edge message in the form of a 'big scare'—which operates as a 'catalyst-for-change' (CfC), breaking habit by increasing cognitive engagement and acceptance—as well as the importance of the role of businesses in delivering significant levels of voluntary travel behavioural change. The findings contribute to the evaluation of methods for achieving actual VTBC, which could be instrumental in enacting the large-scale travel behaviour changes required to meet international environmental objective of reducing carbon resource consumption by both businesses and individuals.

1. Introduction

A key promise in London's bid to host the 2012 Olympics was that it would be a 'public transport Games' (Jones et al., 2015). Various measures were employed to support this aim, including no public car parking being available at Games venues, an extensive information campaign to encourage visitors to utilise the public transport system, and a public transport travel coupon included in the price of a Games ticket. London's public transport system was already at, or near, capacity (ODA, 2012), so catering to the anticipated additional nine million visitors required a strategy to reduce existing regular daily travel demand. Achieving voluntary commuter travel behaviour change on a large scale at reasonable cost is a significant challenge (Brög et al., 2009) and became one of TfL and the Olympics Delivery Authority's (ODA) transport policy objectives (Dosunmu, 2012; ODA, 2012). This study analyses the actual travel behaviour change that occurred during the London Olympics, the antecedents that create such change, and the role of business in facilitating it.

Travel Demand Management is a tried-and-tested method that has been utilised in a range of cities hosting mega-events (Currie and Delbosc, 2011), and is increasingly being used to address transport congestion issues. The limited research evaluating employers' engagement with and acceptance of TDM (Ko and Kim, 2017) has identified that acceptance of TDM varies depending on employee type, location, and the characteristics of the TDM programme being proposed (see Anable, 2005; Ko and Kim, 2017; Lo et al., 2016). The current research extends our understanding of the role of employers in TDM, through analysis of the different roles businesses play in facilitating VTBC.

Though external factors such as travel time, efficacy, cost effectiveness and comfort can affect an individual's travel intentions (Ceder, 2007; Chowdhury et al., 2015; Currie and Willis, 1998; Grdzelishvili and Sathre 2011; Sharaby and Shiftan, 2012; Stradling, 2002), habitual behaviour has proved to be a powerful influence (see Aarts and Dijksterhuis, 2000; Gardner, 2009; Schwanen et al., 2012; Verplanken et al., 1994, 1997). The frequency of past behaviour, over and above the effects of attitudes and intention, has specifically been identified as a more accurate predictor of future behaviour (Ouellette and Wood, 1998). To achieve VTBC, therefore, there is a need to interrupt the automaticity of habit through raising conscious awareness— a major focus of this paper.

There is an increasing level of awareness of climate change and environmental degradation, with its anthropogenic causes and impacts being well established (Hannah and Adams, 2017; Hartmann et al., 2013). For some time, physical and social scientists have highlighted the role of transport in anthropogenic climate change (Banister, 2011; Barr, 2018; Chapman, 2007; IPCC, 2007; Scott et al., 2012). Transport is a sector where CO_2 emissions continue to rise and is therefore worthy of special consideration in reducing total carbon emissions (Cohen et al., 2011; Geels, 2012).

The complexity and diversity involved in such a behavioural transformation and transition involves contributions from disciplines such as psychology, social sciences, humanities and economics (Mont et al., 2014; Steg and Vlek, 2009). To achieve such a transition requires large-scale changes to everyday life, including transport modes and methods of supporting everyday commuting mobility. Such change "represents a major challenge for social scientists and practitioners given the embedded nature of mobility in daily life" (Barr, 2018:1). The current paper's analysis of business' role in achieving TfL's TDM objectives will make a valuable contribution to the existing methods of achieving such a transformation.

It is estimated that by 2050 70% of the world's population will live and work in cities, resulting in a threefold increase in urban journeys (Lerner, 2011). The issue for policy makers, then, is how to cater to this growth whilst balancing important concerns over levels of pollution and consumption against shorter-term demands for generating economic opportunities and maintaining stability (Banister, 2008). Already in cities such Hong Kong, Mexico City and Cape Town more than half of the total energy consumption is transport-based (UN Habitat, 2008). Insights from the methods used by TfL to alter travel behaviour across a whole network will be useful in enacting the changes required for existing and future international transport planning for growing cities such as these and others.

This study uses the conceptual framework of the Theory of Planned Behaviour (TPB) in a novel way, to identify the methods by which TfL's TDM policy influenced businesses and their employees in changing their travel behaviour. Businesses' awareness of and attitudes towards TDM strategy and proposed travel change requests are assessed in relation to several factors: belief in the policy's effectiveness, level of perceived and actual control over travel policy implementation, the possible effect of TDM on their business, the support needed to achieve VTBC, and the nature of the event itself. The link between intention and actual change is assessed, and the requirement of a 'breaking or defrosting' mechanism to ensure change where the influence of the other constructs may be limited, is evaluated.

The influence of business on VTBC has received significantly less attention than car use change and personal mobility (Ko and Kim, 2017). Organisations and businesses create the majority of commuting demand and transport network use, therefore, evaluating businesses' role in travel behaviour change is an important factor in the future of transport policy. With 35% of travellers changing their behaviour at some point during the 2012 Olympic Games, the TDM strategy employed by TfL can be considered a success (Butcher, 2012; Currie et al.,

2014; TfL, 2013). By using the 2012 Games as a case study of a successfully applied TDM strategy, this paper:

- analyses the requirement for perceived acceptability of TDM in the context of businesses' influence on travel behaviour

- presents an application of the Theory of Planned Behaviour (Ajzen 1991) in a context of Transport Network Travel Behaviour Change

- supports the view that to ensure travel behaviour change there needs to be mediation between intention and actual behaviour

- recommends that in order to generate substantial VTBC across a whole transport network, in addition to a catalyst-for-change (CfC) to raise cognitive awareness and gain positive engagement, there is the requirement for targeted businesses to engage in operational flexibility in facilitating such change

This paper adds to the small but growing literature on the behaviour of travellers under disruption (Birtchnell and Büscher, 2011; Cairns et al., 2002; van Exel and Rietveld, 2001, 2009; Guiver and Jain, 2011; Parkes et al., 2016; Quarmby et al., 2010; Zhu and Levinson, 2010). Through an evaluation of the significant contribution of businesses in facilitating VTBC across both public and road transport networks for business commuters, leisure travellers and freight, the findings of this paper support and build on research undertaken by Parkes et al. (2016), analysing the success of TfL's TDM strategy in changing overall travel behaviour. This paper contributes to the identification of possible opportunities for transport policy change (Marsden and Docherty, 2013) and the applicability of using scare tactics to raise awareness targeted at different types of organisation able to influence and support VTBC.

1.2 Acceptability of hard and soft travel demand management measures

The main methods available to transport planners when demand outstrips supply are to increase supply or to reduce and shift existing travel through Travel Demand Management (TDM). Aimed at addressing the challenge of achieving large-scale, habitual travel behaviour change (Brög et al., 2009; Meyer, 1997), TDM can be applied for a specific increase in demand caused by a mega-event such as the Olympic Games, or as a means to reduce recurrent everyday demand (Bhattacharjee et al., 1997; Tanaboriboon, 1994).

A TDM strategy can include 'hard' measures including laws, fiscal stimulus, financial penalties or structural changes to transport systems (see Bamberg et al., 2011; Erikisson et al., 2006, 2008; Loukopoulos et al., 2004) which are intended to improve infrastructure and reduce the advantage of using the specific transport mode being targeted. On the other hand, 'soft' measures can take many forms but are primarily information-based, and centre on raising public awareness of transport problems while promoting alternative transport options (Bamberg et al., 2011). In order for these measures to be effective, the travelling public must positively embrace and respond to them. For this reason transport planners need to consider what transport users deem acceptable, especially as travellers' needs are often idiosyncratic (Brög et al., 2009).

Research on private car use has identified that the aforementioned 'hard' measures, despite being less popular or acceptable (Bhattacharjee et al., 1997; Eriksson et al., 2006, 2008, 2010; Loukopoulos et al., 2004; Schade and Schlag, 2003), have been more effective in engendering actual changes in behaviour (Ison and Wall, 2003). Research into the acceptance of hard measures has identified that awareness, effectiveness, simplicity and equity—including enforcement to ensure fairness is guaranteed—are important considerations (see Bamberg et al., 2003; Bartley 1995; Eriksson, 2010; Errikson et al., 2006, 2008, 2010; Jakobsson et al., 2000; Loukopoulos et al., 2004, 2005; Schade and Schlag, 2003; Sheldon et al., 1993), Despite their effectiveness, however, the persistent unpopularity of hard measures has meant that

governments increasingly employ soft options to encourage VTBC (Bamberg et al., 2011; Enoch and Potter, 2003; Moser and Bamberg, 2008).

The efficacy of approaches combining *both* soft and hard measures is underscored by many contemporary studies (see Bamberg and Schmidt, 2001, 2003; Eriksson et al., 2006, 2008, 2010; Schade and Schlag, 2003; Verhoel et al., 1996). While soft TDM measures improve the acceptability of the need for behaviour change, there must also be a degree of coercion in TDM to overcome the influence of habitual behaviour (Aarts and Dijksterhuis, 2000; Eriksson et al., 2008; Loukouplos et al., 2004; Meyer, 1999). Research suggests there is a need for "breaking, or de-frosting" (Schwanen et al., 2012: 523) an individual's automatic habitual response, as intentions alone are less effective in engendering change (Aarts and Dijksterhuis, 2000; Darnton et al., 2011).

In addition to habit, the role of personal priorities and social norms have also proven important in influencing future behaviour (see Bamberg et al., 2007; Bamberg et al., 2007:203; Eriksson et al., 2006, 2010; Nordfjaen et al., 2014; Nordlund and Garvill, 2003; Verhoel et al., 1996), with information campaigns being used to create the pre-requisite supportive public opinion needed to engage with TDM. To gain conscious awareness and ensure support, promotional messages need to vary depending on the specific TDM requirements of the situation (Parkes et al., 2016). To break individuals' habitual behaviour and achieve VTBC requires effective targeted information, alongside more coercive interventions that raise awareness of the problem and increase the desirability of making a change.

1.3 Theory of Planned Behaviour

Whilst information campaigns may well prove effective in increasing popular awareness and acceptance of TDM, it is necessary to understand the attitude-behavioural factors associated

with travel choice. The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is a social cognitive model of behaviour that has been used extensively to predict travel mode choice (Anable, 2005; Bamberg et al., 2003, 2007, 2011; Bamberg and Schmidt, 2001, 2003; Lanzini and Khan, 2017; Nordfjaen, 2014). According to the theory, there is a relationship between the social-psychological processes associated with intentions and actual performed behaviour in terms of three constructs: first, behavioural beliefs and attitudes; second, control beliefs or perceived behavioural control (PBC) or perceived ease in changing behaviour and, third, normative beliefs, subjective norms, and perceived social pressure to change.

The theory proposes that change in behaviour is more likely when there is a combination of a favourable attitude towards the change, such as change in travel time, convenience and comfort, a positive subjective norm, and a strong belief in perceived control. The degree to which these constructs are evident will have an impact on the strength of intention: the latter being the proposed antecedent to behaviour (Ajzen, 1991; Bamberg et al., 2003; Bamberg and Schmidt, 2001). When PBC reflects *actual* control, it can influence behaviour without the initial requirement of a strong intention (Anable et al., 2006; Nordfjaen et al., 2014) (See Figure 1, below).

Where a strong habitual relation to past behaviour exists, any intention to change behaviour may not lead to action without a habit-breaking intervention (see Bamberg et al., 2003; Gardner, 2009; Lanzini and Khan, 2017; Verplanken et al., 1994, 1997). Considering the habit perspective, the process of deliberation as articulated in the TPB occurs as a result of novel or unusual situations (Aarts and Dijksterhuis, 2000; Gardner, 2009). Norgjaen et al. (2014) contend that habit is not necessarily a clear indicator of intention, and that social influence (subjective norms) can also play a role. However, the role of subjective norms has proven less consistent in influencing intention, and may not necessarily need to be present for behaviour to be influenced (see Anable, 2005; Bamberg and Schmidt, 2003; Lanzini and Khan, 2017).
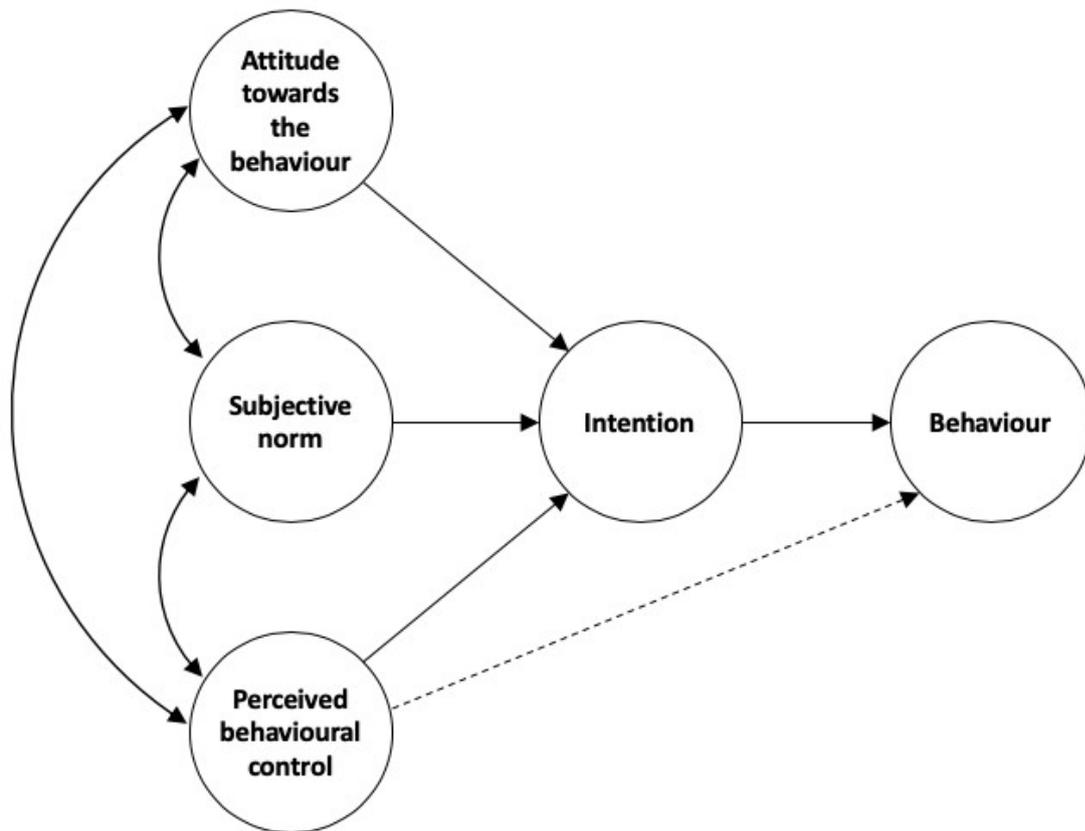
Figure 1. Theory of Planned Behaviour, Ajzen, 1991.

The Theory of Planned Behaviour proposes that even when behaviour has become routine, the injection of influences such as TDM measures can impact prior behavioural intentions (habit)— in this instance attitudes towards travel time, convenience and comfort. Changing behaviour that is habitual requires interventions other than those associated with motivation (Aarts et al., 1997; Gardner, 2009), for example hard TDM measures (see Bamberg et al., 2003; Fujii and Kitamura, 2003; Thøgersen and Møller, 2008).

Rather than target the whole population, successful TDM promotion strategies should focus on specific groups and their beliefs, with PBC segmented by business or region being the most powerful construct in creating intention or change in behaviour (Anable, 2005; Ko and Kim, 2017; Lo et al., 2016).

1.4 Travel Demand Management and London 2012 Olympics

The 2012 Summer Games TDM challenge was the greatest ever faced by a Western mega-city location (Jones et al., 2015; ODA, 2012). It needed to cater to an expected nine million additional visitors, an exclusive 175-kilometre-long Olympics Route Network (ORN) and ensure that the existing transport network supported business as usual (Dosunmu, 2012; Springett, 2013). To achieve this objective, a series of initiatives were developed to alter the travel demand of the existing base load during critical peak travel times. Strategies involved by TfL were 'reduce, re-time, re-route or revise' mode of travel. The TfL TDM programme utilised a range of measures and tools targeted at both spectators' businesses and at the daily travelling public, including:

1. Travel advice to business— targeted advice to businesses and other large trip-generating organizations

2. Road freight management— managing background freight demand during Games time

3. Marketing and communications— general and targeted travel awareness campaigns

4. Traveller information services— including an online "Games Time Journey Planner" and the provision of real time travel information

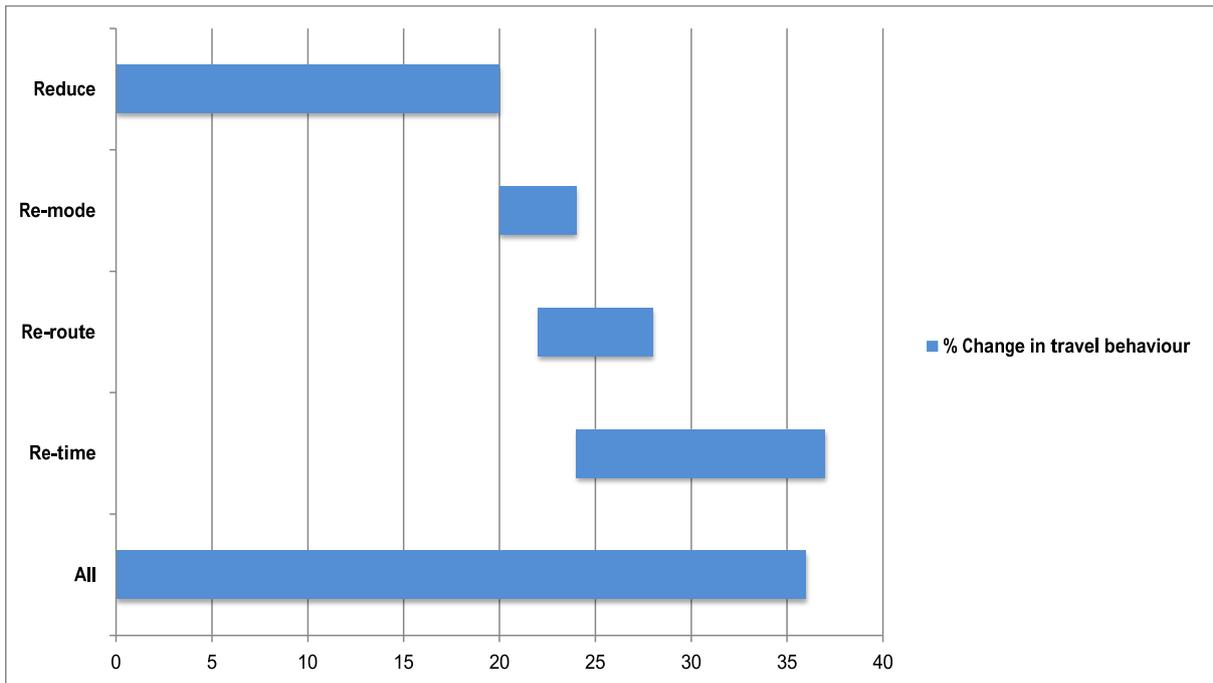(see Jones et al., 2015 for more details of TfL TDM programme).

Figure 2. Overall change in regular travel on an average weekday during the Olympics Base: 5,204 regular travellers in London
Source: ODA /TfL TDM Games-time Journey Maker Survey (TfL, 2013)

TfL's £30m travel demand management strategy achieved many of their voluntary travel behaviour change objectives (See Figure 2). In an average weekday, 35% of regular travellers changed their travel behaviour (TfL, 2013), including a 20% reduction in regular travellers' behaviour. Specifically, over half (54%) of London business commuters altered their usual travel behaviour at some point during the Games period, with the following breakdown based on the strategies discussed above: 27% "reduce", 25% "re-time", 16% "re-route" and 11% "re-mode" whilst only 32% continued their normal business commute. Travel for personal business purposes (meetings, conferences etc.) fell significantly, with 57% of study participants stating that they made no trips for personal business during the 2012 summer games period (TfL, 2013).

As a result of motorists and business delivery vehicles actively engaging with TfL's policy of re-timing, projected disruptions to the road network did not occur and the restrictions imposed

by the Olympic Route Network were curtailed to less than 50 per cent levels of intensity (TfL, 2012).
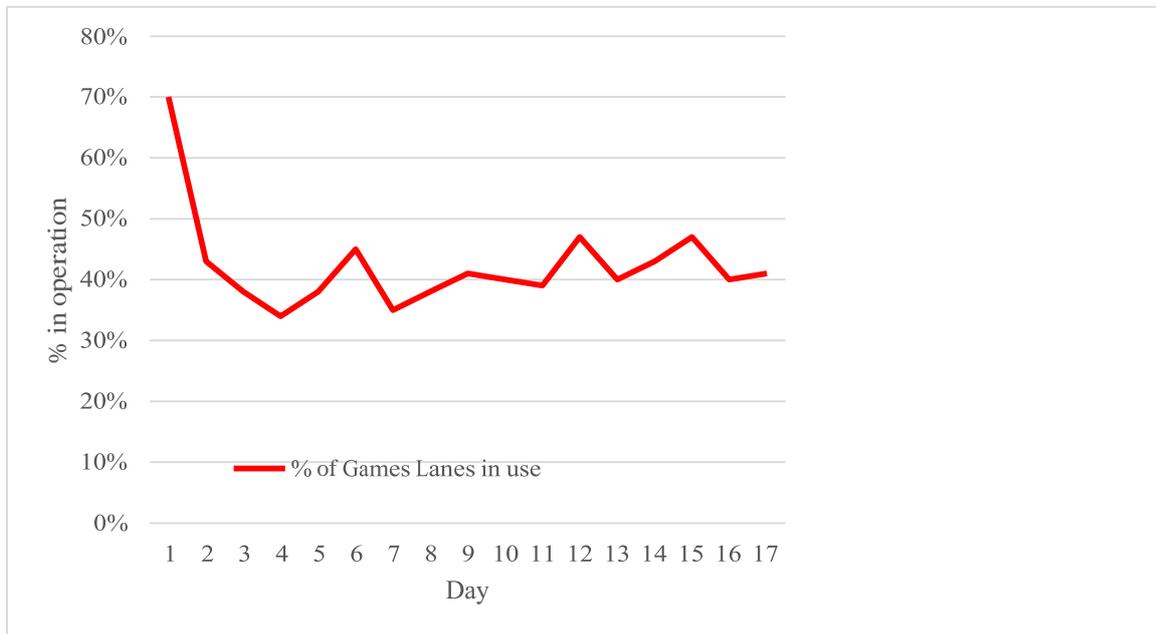

Figure 3. Relative levels of Games Lanes and Active Travel Management (ATM) during the Olympics, 2012
Source: TfL, surface road transport (2012)

1. 5 The Big Scare

To develop awareness of possible transport issues, previous Games' host cities have employed what Currie and Delbosc (2011) refer to as 'the big scare'. By highlighting possible impacts on important elements of travel choice decisions, such as travel time, comfort and convenience (Ceder, 2007; Chowdhury et al., 2015; Currie and Willis, 1998; Sharaby and Shiftan, 2012; Stradling 2002), travellers are psychologically steered into changing their attitude towards the need for, time, or mode of travel to support more acceptable urban travel congestion. The authorities were aware of the concept of 'the big scare' (Clean Air, 2011; Shawcross, 2011) and TfL actively publicised the possible road and public transport network *hot spots* (see Parkes et al., 2016) of expected intensive congestion.

The impact of this hard-edge narrative in an otherwise soft-measured approach to achieve more acceptable urban travel congestion is depicted in Figure 4, and is further evaluated within this research through incorporation into a proposed adaption of Ajzen's (1991) Theory of Planned Behaviour model. The role of 'scare tactics' and how they act as a "breaking or de-frosting agent" (Schwanen et al., 2012:523) in eliciting VTBC is evaluated in this study in the transition from intentions to actual behavioural change. An important consideration alongside the "stick" of the scare tactics is an evaluation of the "carrot" or methods used to facilitate a move to reduce, re-time, re-route or revise the mode of travel.
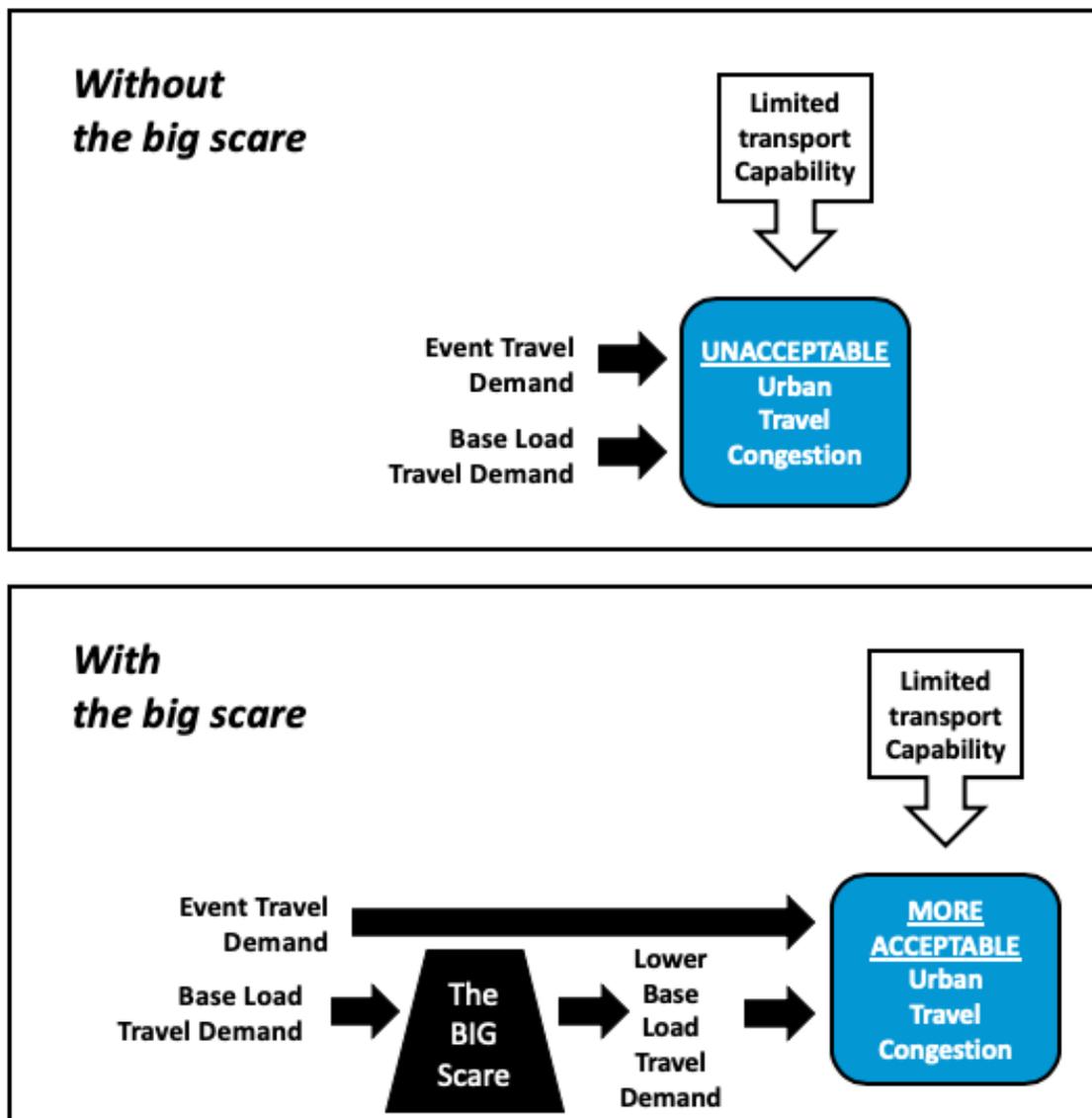
Figure 4. Concept of the Big Scare's Impact on Event Transport Congestion (adapted form Currie et al., 2015)

2 Methods

Whilst previous studies have primarily relied on what respondents state they would choose to do given a certain scenario (see Anable, 2005; Erikisson et al., 2006, 2010; Loukopoulos et al., 2004, 2005; Rienstra al., 1999; Schade and Schlag, 2003; Talyor et al., 1997) this study's findings are drawn from the analysis of reported actual behavioural change. Reliance on 'intention' raises questions with regard to the validity and accuracy of the research, as findings are based on speculation and intention demonstrably does not always lead to actual behavioural change: this study overcomes some of these deficiencies (Goodwin et al., 2004) and therefore these results make a significant contribution to the evaluation of the actual effectiveness of TDM.

To deliver a comprehensive review of what was planned and what actually occurred, and to overcome concerns valuable to both policymakers and planners, about the relationship between intention and actual behaviour (Richie et al., 2009), a longitudinal approach was selected which spanned from the planning stages to post-event. To provide a "rich dialogue with the evidence" (Yin, 2003:59) and a deeper understanding (Geertz, 1973), a qualitative methodology was adopted, comprising 24 semi-structured in-depth interviews.

Travel behaviour involves complex interactions of perception, attitude and behaviour, which necessitate the use of qualitative methods (Beirão and Cabral 2007; Clifton and Handy, 2003). Whilst a quantitative approach is often used to evaluate TDM in terms of providing measurement and figures, qualitative methods produce a wealth of detailed data and enable a deeper understanding of transport problems (Clifton and Handy, 2001; Patton, 1990). Indeed, in considering methods for understanding commuting behaviour—which is specifically relevant to this paper—Cass and Faulconbridge (2016:5) contend that a qualitative   approach

provides "breadth and depth of research" and is able "to identify the extent, variety, quality and nuance of beliefs, understandings, explanations, empirical details, supporting societal narratives and discourses, and identity-related justifications for social action." Such an approach follows a longstanding tradition in the study of travel and transport of using interviews to understand rather than just report what people have done (see Beirão and Cabral 2007 – attitudes towards public transport and private car; Gardner and Abraham, 2007 – driving to work; Guiver, 2007 – bus usage; Hagman, 2003 – car usage; Jensen 1999 – mobility types). Eleven participants representing ten businesses—operating in central London and employing in excess of 40,000 people—were interviewed both before and after the Games. The businesses in question varied by size, sector and geographical location and ranged from sole traders to multinationals employing thousands. The sectors sampled included financial services, professional services, wholesalers and those operating in logistics (table 2). The sample specifically excluded businesses publicly linked to the Games, such as sponsors, as such a connection could have resulted in a conflict of interest.

The respondents interviewed were involved in preparing their organisation for the anticipated impact of the London Olympics on travel and logistics (see table 2 for details). To gain representation from a segment whose responses would have been hard to capture on an individual business level, an official from the Federation of Small Business (FSB), with responsibility for preparing its members for the impact of the Olympics, was included in the sample. The sample also included a senior manager from a property management company who had operational oversight for an estate located adjacent to the Olympic Park, where 100,000 people working and living would be impacted.

Table 2. Table of interview partners and other data sources

Large businesses (over 250 employees)	Medium sized businesses (20-249 employees) and Small businesses (under 20 employees)	Authorities, information meetings and Quantitative Data

Adam and Brian Banking A - 10,000 employees Responsibility-Manager Risk and Business Continuity Recruitment - personal contacts	Simon Engineering consultancy-120 employees Responsibility - Senior Manager Recruitment - personal contacts	Discussion with TfL's TDM Team
Mark Banking B - 4,000 employees Responsibility - Manager Business Travel and meetings Recruitment - snowball	Jonathan P.R. Agency - 70 employees Responsibility - MD Recruitment – personal contacts	Presentation: Institute of Travel and Meeting - Background data gathering
Sean Financial services - 6,000 employees Responsibility- Facilities Management Recruitment - personal contacts	June Film production company-200 employees Area of Responsibility-MD Recruitment - personal contacts	Presentation: Institute of Directors City of London Branch -Background data gathering
Barry Property Management 100,000 people working and living on the estate Responsibility- Business Facilities Recruitment - snowball	Claire Architects - 70 employees Area of Responsibility-Senior HR Manager Recruitment - personal contacts	Statistical data: Office attendance by employees and visitors provided by participant organisation
Dave Logistics -1,500 employees Responsibility - Operations Manager Recruitment - personal contacts	Howard Meat wholesaler - 5 employees Responsibility - Owner Recruitment - personal contacts	Statistical data: TfL, 2013 –Journey Maker, Personal Plan and Business and Freight Survey
Don Fresh Food market - 250 traders Responsibility - Traders Senior representative Recruitment - snowball	Tim Federation of Small Businesses -representing over 7,000 small businesses operating in central London Responsibility - Senior Manager Recruitment - snowball	

Respondents were recruited using a combination of convenience sampling of contacts known

to the researchers, and snowball techniques— methods which enable recruitment of willing,

able and appropriate participants (Heckathorn, 2002). Each respondent received an interview

guide pre-Games, containing interview questions intended to understand the context of their organisation, gauge the interviewees' level of awareness of TDM, ascertain the nature of each company's planning for possible impacts of the Games, and investigate attitudes towards the TDM measures. Post-Games, the interviews were concerned with identifying any changes to plans as discussed at the earlier pre-Games interviews, and ascertaining actual levels of travel behaviour change, the reasons for such change, the impact of TDM on the business, their attitude towards TfL's TDM policy, and an overall reflection on the TDM process.

Both researchers attended all of the interviews to ensure conformity of understanding and to provide the opportunity to compare and discuss results post-interview (Roper, 2004). Notes were made after each interview to enable immediate reflection by the researchers (Miles and Huberman, 1994). All interviews pre-Games, and all but two post-Games, occurred in participants' offices and lasted between 20 and 40 minutes. Interviews were, with participant permission, recorded and later transcribed for a thematic analysis, which grouped frequently occurring ideas into themes. These themes were then categorized to provide a method of understanding the data using an inductive approach, producing themes that are strongly linked to the data itself (Patton, 1990).

Representatives of Transport for London's TDM department were also interviewed pre-Games, in order to provide more insight into TfL's TDM policy and their monitoring process. The researchers attended a number of presentations and meetings organised by various business groups, which provided an opportunity to assess general attitude towards TfL's TDM strategy. To evaluate the effectiveness of TfL's TDM strategy, quantitative data from TfL's monitoring of actual travel behaviour (Journey Makers Survey, Personal Plan Survey and Business and Freight Survey) and audits of office attendance are combined with the qualitative findings from the pre-and-post Games interviews.

Three criteria—validity, reliability and objectivity—are used to evaluate the quality of scientific knowledge and research (Bryman, 2008; Patton, 2002). Prolonged engagement (Lincoln and Guba, 1985) in the form of two separate extended interviews with senior employees who had responsibility for their organisations' plans for the Games, adds a level of credibility to the findings of the current study. In addition, the inclusion of secondary data and information provided publicly by TfL (i.e. Journey Makers Survey, Personal Plan Survey and Business and Freight Survey) provides a cross check for the accuracy of the primary data included in this research.

3. Findings

3.1 Pre-Games interviews – *planning and engaging*

Findings from the pre-games interviews (six months before the Games commenced) identified that intention to comply with TfL's TDM programme varied depending upon the size and sector of the business in question, together with the level of engagement they in turn received from TfL. These factors had a direct impact on the organisations' understanding of the requirements of the programme, the perceived behavioural control (PBC) over their ability to engage in VTBC, and their attitude towards the impacts of these measures. The diversity in organisations' understanding and plans can be seen from Sean (Financial Services) whose organisation was aiming for "at least a 60–70% reduction in heads", compared to an informed decision of "we are thinking of a suck-it-and-see policy" (June, Film Production) or for Howard (Meat Wholesaler) who stated "we have no plans at all, I'm not sure how it will affect us". These differences highlight the complexity of achieving engagement with TfL's TDM objectives, which results from differences between organisations.

Large businesses gained a high level of awareness through TfL's targeted communication. They appreciated the scale of the problems, had belief in the robustness of the TDM programme

and understood the possible negative consequences their inaction would have on the ability of their employees to work and for their business to operate. Dave (Logistics) commented that, "the collective view [of the freight industry] is there was going to be a problem and they were prepared to do whatever was necessary, working with TfL to over- come [sic] the problems." These businesses had the capability to initiate systems allowing them to operationally accommodate the 'hard-edge' measure of the Olympics Route Network (ORN), whilst soft TDM initiatives alerted them to issues for which they were able to plan. Don (Fresh Food Market) explained how "the whole operation is going to be brought forward by a couple or 3 hours—but it is going to need a lot of cooperation by a lot of people within the trade". This highlights businesses' willingness to engage and respond, as a consequence of their awareness of the problem.

TfL's targeted approach was appropriately designed with the aim of raising awareness with organisations able to help achieve the TDM objectives. Large organisations, through TfL's one-to-one consultancy, felt involved and had perceived behavioural control and a positive attitude towards TfL's strategy: "to give them [TfL] credit, they have made themselves available… on an individual basis… and they have had a positive approach" (Don, Fresh Food Market). Sean (Financial Services) noted "they [TfL] came to us and said… we are looking for organisations across London to reduce… by 40%." All of these businesses had extensive plans in place to accommodate TfL's TDM requests, indeed, for Brian (Banking A) "planning for such an event is part of our day to day business".

Medium-sized businesses engaged with some limited elements of TDM being incorporated into their plans and were more reliant on the resilience of their employees to ensure minimal disruption to their operations. Simon (Engineering Consultancy) stated that, "ok we [the organisation] are going to have to deal with that [congestion] but I don't think anyone has a clear idea how to do it." These organisations were aware of the transport issues through the

Travel Advice to Business programme. Claire (Architects), who attended one such session, stated, "I trusted the information… and came out thinking phew- we have to do something about this… but it was going to be an issue we could manage." Plans were developed by organisations which were tailored to the specific requirements of their business operation, predominantly a policy of re-timing: "we will operate a flexi attitude to start and finish times" (Jonathan, P.R. Agency). The interviews identified that perceived behavioural control, coupled with interviewees' belief in the success of TDM, directly impacted organisations' planning to accommodate the disruption with as limited impact on operations as possible.

Smaller organisations were less able to comply. They received a lower level of communication and support from TfL, "maybe the big companies are made aware of it [TfL's TDM strategy] but we haven't had anything" (Howard, Meat wholesaler). Consequently, their knowledge of the TDM programme was minimal and their awareness of potential transport problems was low. These organisations did not feel informed, lacked PBC and were therefore less able to plan and actively engage. Tim (Federation of Small Business) explained that for organisations with "two members of staff they need to be in central London, they just can't shut operations otherwise their business will fold". These findings support previous studies and suggest that intentions are influenced by an organisation's size and structure (Ko and Kim, 2017; Li et al., 2016).

Though the *Travel Advice to Business* programme would usually be described as a soft TDM measure, findings from the pre-Games interviews indicated that there was a hard edge to its delivery. Participants made explicit references to the impact of the messages in raising awareness and their importance in ensuring businesses engaged in TDM planning. Sean (Financial Services) recounted that "an article appears front page of the [*London Evening*] *Standard* and, all of a sudden, our lead partner is going 'hang on, maybe we do need to focus a bit of attention on this'." Similarly, presentations at the *Travel Advice for Businesses*

workshops, whilst informative, also contained elements that were intended to scare, in particular the modelling which predicted considerable travel delay times at *hot spot* locations. Claire (Architects) commented, "I do think that the figures [congestion and delay forecasts used in the presentation] were quite scary." Findings indicate that there was a deliberate attempt on the part of TfL to use both the media and other channels of communication to raise awareness through tactics that would raise concerns for both people generally and impacted organisations in particular.

All the respondents who had attended these *Travel Advice to Business* workshops were shocked by an image, reportedly from the Atlanta Olympic Games, where "spectators were queuing for up to nine hours," with the message, "we have to avoid this… there isn't a solution… the solution is if you [businesses] help and change your [travel] behaviour" (Simon, Engineering Consultancy). This 'hard-edge' message or, as Currie and Delbosc (2011) categorise it, 'scare tactic', which was instrumental in raising awareness, will be discussed further in the analysis of the findings from the second component of the longitudinal study (post-Games interviews, office attendance data) and data from TfL's own surveys.

3.2. **Post Games Interviews-** *Achieved Travel Behavioural Change*

Findings from the post-Games interviews indicated that the majority of businesses initially fully implemented their planned changes, however this varied depending on the size and type of organisation.

Large organisations implemented strategies involving a combination of all four of TfL's "travel change R" options, with the most popular element being 'reduce'. Many reported achieving their desired TDM goals: "some days it was down 50% on the full [London Office] population but generally we hit that [TfL target]" (Adam, Banking A). This is significantly more than the 27% reduction reported by TfL (see Figure 2), and shows the importance of targeting large

organisations to help TfL reach its TDM targets. Some organisations scaled down their original plan, however, including a change from a plan of 60% reduction to a more client-focused one: "the 'working from home is fine' approach [changed] to a 'we need to support the client' policy" (Sean, Financial Services). Despite the change in plans, the organisation nevertheless achieved close to the TfL target of a 40% reduction on a number of days (see Figure 5), but with, they stated, no noteworthy compromise to their business operation.
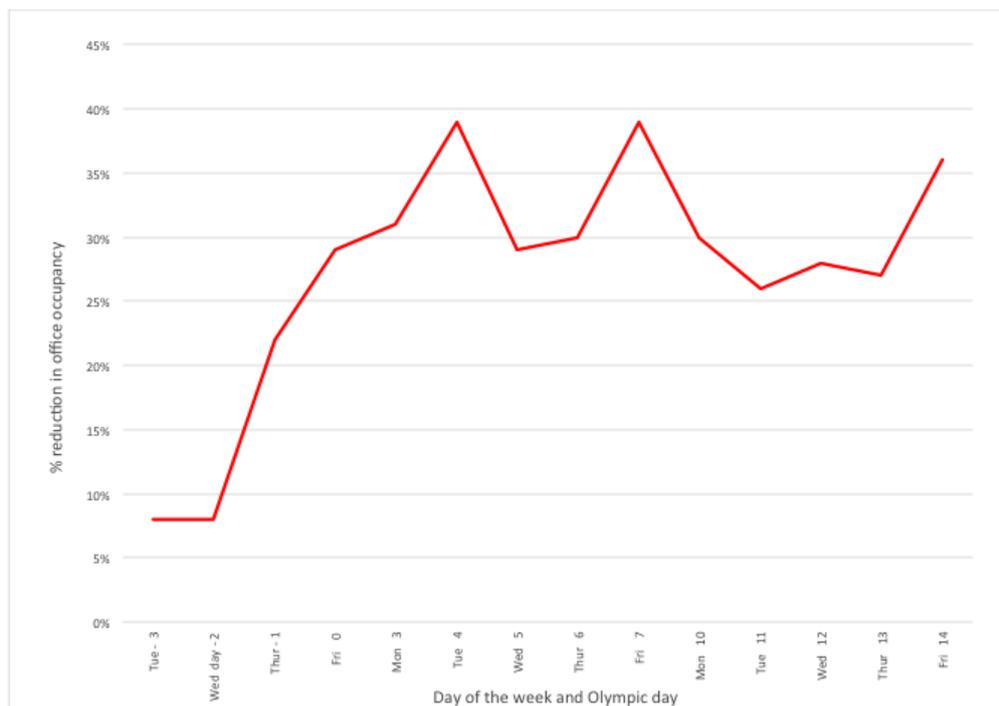

Figure 5. Percentage reduction in staff entries at a large business office location during the Games

Source: Data provided by Financial Services Participant Sept 2012

In addition to influencing the pattern of employee commuting, the aim of TfL's business engagement programme was to reduce the need for travel generated by those attending business meetings and conferences. Statics provided by Sean (Financial Services) indicated, in comparison to the previous year, a reduction of up to 80% in visitors to the office, a greater reduction than achieved for daily office attendance reduction (See Figure 6). This reduction in the volume of personal business travel (as discussed in section 1.5) is supported by TfL's own

findings and contributed to the overall program's success as seen in Figure 2. Respondents representing large businesses agreed that personal business travel was actively discouraged during the Games. For Mark (Banking B), the message was clear: "only travel to London [for business] if necessary." As it was easier to decrease travel related to business through relocating or re-schedule such journeys to outside London or outside of the Games period than changing travel associated with commuting, businesses readily subscribed to this objective.
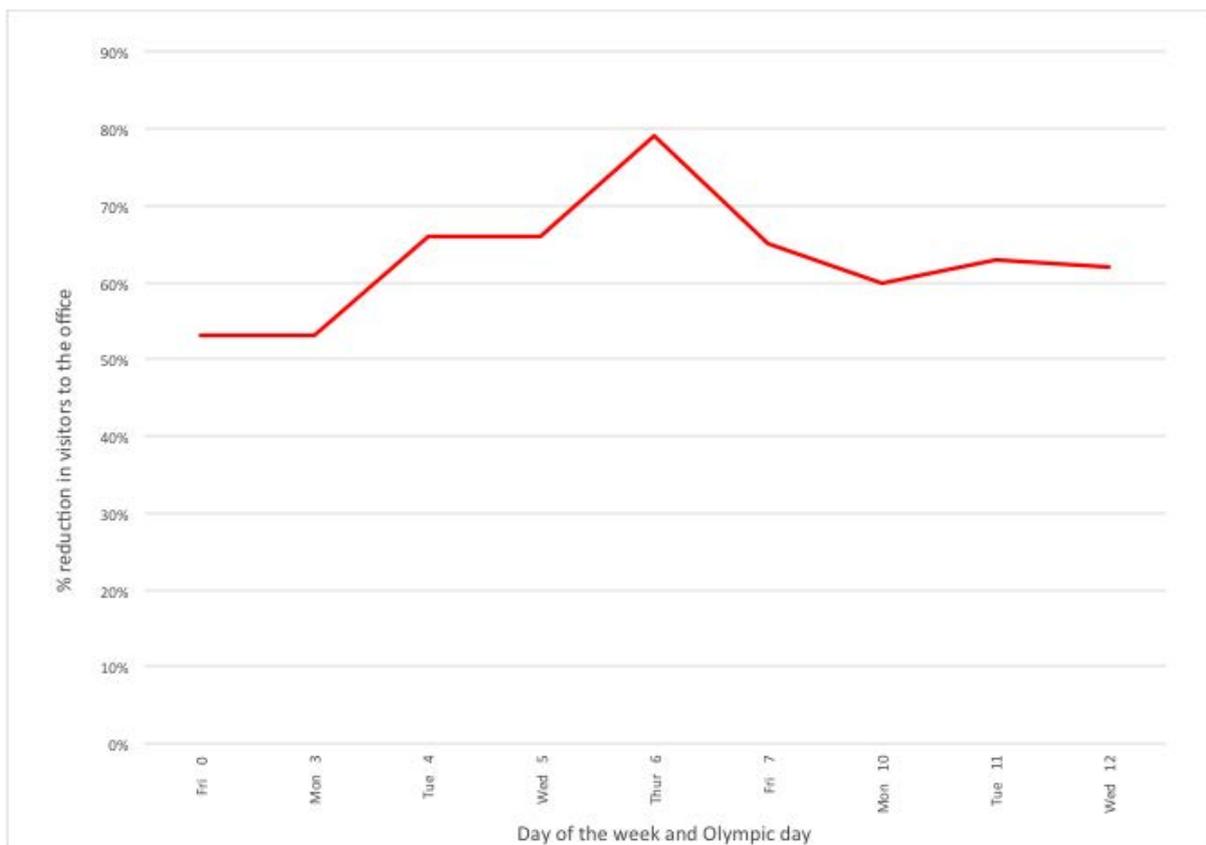

Figure 6. Percentage reduction in the number of visitors to a large business office location during the Games

Source: Data provided by Financial Services Participant Sept 2012

The findings from our qualitative research suggested a preference by large business for 'reduce' methods rather than the other travel behaviour change options, a finding supported by TfL's commuter's survey results (see Figure 2). These companies had both perceived and actual behavioural control over both their employees' travel arrangements and supporting   freight

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logistics, and were able to ensure their plans were fully implemented. As Mark (Banking B) confirmed, "it was a matter of ensuring that we had the right solutions in place. We were confident we did." This, together with findings from the pre-Games interviews, supports the Theory of Planned Behaviour in that it is organisations with PBC who are able to engage easily in behaviour change, and thus significantly contribute to TfL's TDM objectives, without necessarily first meeting the requirements of a strong intention.

TfL's 'soft' TDM strategy of targeted one-to-one consultancy support proved very effective. By identifying and targeting appropriate large organisations that had PBC, they ensured that the required level of engagement and VTBC could be achieved. These findings are supported by previous studies, where public awareness and belief in the effectiveness of engagement are pre-requisites to engaging in TDM (Erikson et al., 2006, 2008, 2010; Parkes et al., 2016; Schade and Schlag 2003), and also reconfirms the importance of targeted messaging and promotion (Anable, 2005; Brög et al., 2009; Gardner, 2009; Meyer, 1997; Parkes et al., 2016) specifically to large businesses.

The large organisations whose operations were anticipated to be significantly affected by the hard measure of the ORN stated that they had no choice but to develop comprehensive strategies to mitigate its impact. Contributing to the 25% (see Figure 2) who 'retimed' their journeys, the fresh food market implemented their early opening operation plans in full. As the road network was not as disrupted as predicted, the restrictions of the ORN were quickly reduced (see Figure 3). Dave (Logistics), whose company was "planning to work through the night," stated, "it [the disruption] never transpired. With the advice we were getting from TfL [daily updates] we would plan accordingly" and thus were able to revert back to their normal hours of operation. The engagement from TfL ensured that more than enough business altered their operation to accommodate the road restrictions of the ORN, to the extent that the constraints could be reduced and not always fully implemented.

The daily updates from TfL ensured continued PBC for large organisations, which allowed them to respond with some flexibility throughout the Games: "We had fantastic information from TfL, we had daily bulletins, two a day" (Dave, Logistics). The value of effective communication—"it was all about information flow" (Barry, Property Management)—is a central finding of this and previous research (See in particular Bamberg et al., 2007 but also Eriksson et al., 2006; Loukopoulos et al., 2004) in ensuring continued engagement and, where necessary, compliance.

Medium-sized businesses initially kept to their original plans, which for Claire's (Architects) organisation was "flexible working from 7.30am - 7.30pm". As the Games neared, many organisations increased the level of internal communication, to ensure employees were fully aware of the potential impact of the Games on their individual commute. The focus of communication was on both awareness and maintaining responsibility with employees for getting to work. Claire (Architects) explained that, "e-mails were sent around to everyone. Posters were put up in the office reinforcing what times not to travel or to arrange meetings." Their policy supported TfL's 'retime' objective and contributed to the 25% change achieved (see Figure 2). Generally speaking, **however**, medium-sized businesses—although aware of possible transport disruptions and TfL's TDM policy requirements and requests to change—lacked PBC and felt limited in their ability to fully facilitate significant VTBC for all their employees, as they predicted this would negatively impact their operation.

The most significant changes between planned and actual policy implementation were reported within the small business sector, where up-front planning was less evident. Tim from the Federation of Small Business (FSB) commented on how FSB members' plans changed as the Games approached. The change in attitude and behaviour of small businesses are exemplified by Howard (Meat wholesaler) who originally stated "it's in the future, I can't be bothered with it, wait until nearer the time." However, as the Games neared and Howard received more

information both from TfL and through the media, his original "no plan" policy altered to "we would have to change the whole system [delivery] for the whole [Games] period." Small organisations, despite limited PBC, were shocked into a late 'retiming' of travel behaviour in a way that could be considered involuntary, as they had not planned or prepared for it early on.

Tim (FSB) identified that "it was quite noticeable… in the run up to the Games… more businesses were looking at more flexible working operations." He reported that FSB members, many of whom worked in the service industries, in particular hospitality and tourism, were not in a position to incorporate flexible working practices. He stated that it was members operating in the financial services sector, or those within a business-to-business environment, which were able to incorporate more flexible working practices and contribute to TfL's objectives of 'reduce' and 'retime'. TfL's survey supports these sectorial differences, identifying organisations that introduced a 'reduce' travel change policy as predominantly office-based, whereas retail and hospitality sectors were less able to implement such changes (TfL, 2013). As small businesses became more aware of the significance of travel disruption, as the games neared and despite limited PBC, they engaged in 'retime' and 'reduce' where possible.

The FSB's survey reiterates the importance of perceived behavioural control in an organisation's ability to engage in policies facilitating behavioural change, and identifies that an organisation's level of behavioural control is directly influenced by their working practices. Understanding business operations and specifically targeting business sectors with PBC, and therefore the ability to implement change, underscores findings from previous research regarding the importance of using segmentation strategies when designing and promoting TDM (see Anable, 2005; Brög et al., 2009; Gardner, 2009; Ko and Kim, 2017; Meyer, 1997; Parkes et al., 2016). Where there is limited PBC, and organisations are not as willing to engage in VTBC, a more coercive approach is needed to achieve travel behaviour change, even if it is partly involuntary.

3.3 **Perceptions and effectiveness of TfL's TDM campaign**

All interviewees agreed that TfL implemented a comprehensive and effective communication and engagement strategy. Those large businesses that were considerably impacted by the imposition of the ORN were particularly complementary. "Transport for London people made themselves readily available, to their credit, and [they] came down with maps and plans and convinced us that it would be a flexible scheme" (Don, Fresh Food Market). There was also praise from large organisations for TfL's 'light touch' approach. "There was no pressure from TfL to try and hit targets; it was very much an information flow" (Barry, Property Management). For Adam (Banking A) TfL "pitched it exactly right, London ran perfectly". Although analysis indicates that during the lead-up to the start of the Games many small businesses were not aware of TfL's campaign, the FSB nevertheless praised TfL's engagement strategy. "It was a vigorous and rigorous attempt by TfL to ensure that no stone was unturned. They [TfL] had a very strong stakeholder engagement team… so in terms of handling information, gathering and providing, they [TfL] were very strong on that" (Tim, FSB). The importance of freedom in selecting an appropriate response in addition to accurate information has been central to the findings within much of the TDM literature, for example Bartley (1995), Sheldon et al. (1993), Eriksson (2006) and Parkes et al. (2016), and is a key component of these findings.

The effectiveness of their campaign was supported by findings from TfL's own survey, where commuters who were aware of the *Get Ahead of the Games* online tool were more likely to change their travel behaviour (TfL, 2013). Effectively communicating TDM, which in turn creates a positive attitude towards the outcome of behaviour change, is more likely to evoke an intention to change behaviour (Ajzen, 1991). Notwithstanding praise for TfL's communication, not all businesses were able to respond equally, which would imply that more than 'just'

effective communication is required, and supporting the importance of flexibility and freedom dictated by PBC.

TfL's pre-Games communication with businesses encouraged them to implement plans, whilst contact during the actual Games period ensured they continued to engage and respond. Adam (Banking A) explained "the message [from TfL during the Games] was 'ah now don't get over complacent... look, we have done well so far let's not lose it. You need to stick to your travel plans'." Significantly, all interviewees reflected that the negative tone of messages received through the press and via images presented in the *Travel Advice to Business* workshop presentations were a powerful psychological tool, effective in gaining attention and encouraging action. The importance of business support cannot be underestimated as, although individual-level travel considerations are affected by a range of factors, businesses have considerable influence on their employees' need to and time of travel.

The majority of participants interviewed post-Games believed that TfL 'overegged' the negative consequences of not participating in travel behaviour change. Sean (Financial Services) explained that "because they focussed on how bad it could be… they got people's attention; if they started out with a softly, softly approach, it would never have happened." Dave (Logistics) observed, "I think the fear of a total gridlock was a major factor in influencing people." Howard (Meat wholesaler), who in the pre-Games interviews expressed no desire or need for forward planning, reflected post-Games that the negative messages "scare-mongered [sic] you into doing something, it did have that effect, and it made us think bloody hell, we have got to do something now."

Howard's late change is supported by findings from the FSB's own survey immediately prior to the Games: "it was quite noticeable… with a move from 27% to 37% indicating more flexible working" (Tim, FSB). Habit has been shown to be an influencer on future travel

behaviour (see Aarts and Dijksterhuis, 2000; Bamberg, 2003; Brög et al., 2009; Verplanken et al., 1994, 1997), in this instance scare tactics acted as a "breaking or de-frosting" (Schwanen et al., 2012:523) impetus to elicit change in their employees' habitual travel plans.

Most of the businesses interviewed acknowledged that negative information tactics had been used, but agreed that these were justified. For Adam (Banking A), "I think the scare tactics were probably the right thing to do," whilst for Mark (Banking B), "a lot of good came out of it [the scare tactics] really." These sentiments were echoed by TfL's own survey, as commented on by a small business in the retail sector, "whilst it was noticed that the message from TfL seemed pessimistic and very much a scare tactic, they accepted that it dissuaded people from travelling into London and, as a result, travel experiences were good" (TfL, 2013:85). Although Ajzen's (1991) Theory of Planned Behaviour supports the concept that positive belief in the results of behaviour change influences intentions and therefore behaviour, these findings suggest that fear of the consequences of inaction also has a not-insignificant influence over actual behaviour.

All participants agreed the results achieved by TfL's TDM strategy exceeded their expectations: "we believed it would run a lot better than people [the general public] believed it would" (Brian, Banking A). From the outset, these large businesses had a positive attitude towards the TDM programme. "We were quite confident we could get near that 40% target" (Sean, Financial Services). Such findings support the conclusion of the TPB that both attitude towards behaviour and perceived behavioural control are powerful influences in behaviour change.

The medium-sized and small businesses that agreed to participate in transport planning initiatives and associated changes believed pre-Games that transport would be chaotic. As Jonathan (P.R. Agency) exclaimed "the Olympics haven't started and it's going to be awful."

This negative belief in the outcome while still complying with TDM is contrary to findings from previous research, which have found that belief in a positive outcome of TDM policy encourages acceptance (Bamberg et al., 2007; Eriksson et al., 2006, 2010; Schade and Schlag, 2003). This engagement with travel behaviour change, despite a negative perception of the outcome, is similar to TfL's own survey of personal behaviour during the Games. Londoners who expected the network to perform badly were also more likely to voluntarily plan to change their behaviour than those who did not (TfL, 2013). This would reinforce the view that fear of the consequences of inaction can be a catalyst to trigger VTBC and overcome a lack of positive belief in the effect of TDM.

Even though the perceived travel disruption did not occur, and despite many businesses implementing comprehensive changes to their operations and supporting extensive employee voluntary travel behaviour change, all those interviewed still supported the activities undertaken by TfL. Barry (Property Management) reported that the "scale, magnitude and prestige of the event" may have influenced attitudes to planning. Indeed, Adam (Banking A) highlights the specificity of the event in encouraging engagement:

> "It's the Olympics, and you can look at Atlanta where they did no planning and it was a complete disaster, versus London where they probably over-egged it, and it ran ultra-smoothly. I think if people had not done the planning, I think there would have been problems, to what extent you can't tell" (Adam, Banking A).

This link between support for the need for a TDM policy and the prestige of the event demonstrates the influence of the subjective norm—collective social interest—on encouraging acceptance (Eriksson et al., 2006, 2010; Loukopoulos et al., 2004, 2005; Schade and Schlag, 2003; Verhoel et al., 1996). However, when businesses were specifically asked whether participation in TDM was for their business continuity or to help the wider community, all

replied with something to the effect of "everyone was protecting their business" (Barry, Property Management) or "we did it for the customers" (Adam, Banking A). Notably, although extensive changes were implemented by organisations, none of our interviewees reported any adverse effects of the TDM measures on their business. It was also recognised that there was an element of corporate social responsibility for the wider community (the subjective norm). Adam (Banking A) reflected, "we were asked to plan but it was in our interest to plan that way… and we were involved to some extent, and we contributed to making the London Summer Games such a success. I think I got quite a buzz out of that." Despite some influence of the subjective norm, however, the predominant view from all our interviewees was that change was primarily implemented for business reasons, indicating that the subjective norm in relation to TDM has significantly less influence over the associated behavioural change. It is therefore important that messages aimed at business to encourage travel behaviour change are business benefit focussed.

4. Application of the Theory of Planned Behaviour on Transport Network Travel Behaviour Change

Using the TPB to analyse the reasons for travel behaviour change has identified some interesting conclusions. The targeted intensity of communication provided the antecedent for behavioural beliefs (attitude towards behaviour) and the development of a positive response towards the TDM strategy that may have led to intentions with those organization that were more able and more likely to facilitate change. The influence of the construct of perceived behavioural control (PBC) is most evident within larger organisations (Ko and Kim, 2017) who were more able to implement comprehensive travel change policies such as working from home or altering operational hours. Organisations that had PBC and were supported by TfL in their

planning could easily move to intentions and thence to behaviour. Medium-sized businesses possessed less PBC, and planned for possible behaviour change only after they had attended TfL's presentations where they were encouraged into action by TfL's psychological tactics (media messages, hotspot identification, workshop presentations), which made them consider travel change options.

In instances where the hard TDM measure of the ORN had a significant impact and PBC was present (large businesses) organisations were able to move directly to behaviour as they had the ability and confidence to react. Medium-sized businesses that did not possess PBC had more limited options. Within the confines of their own business requirements and control levels, they implemented change with which they felt comfortable. Small organisations with less robust control levels did not have the resources to plan changes to travel behaviour, resulting in the lowest level of intention leading to behaviour.

Transport for London's *Travel Advice to Business* programme successfully met its goals of engaging and gaining the support and co-operation of organisations with PBC, who were best placed to help meet TDM objectives. These were organisations employing large numbers of commuters, located in *hot spot* areas of high predicted congestion and possible disruption. This ensured VTBC from a sizeable commuter population in the desired locations.

The constructs of both attitudes towards behaviour and behavioural control operate together to influence intention. Norms and values, in this instance, appear to be a minor influence, as the importance of maintaining business continuity takes precedence over consideration for the wider community. This is not surprising considering previous travel-related studies using TPB have also identified the subjective norm as having limited influence (Anable, 2005; Bamberg and Schmidt, 2003; Lanzini et al., 2017). The importance of the nature of the event in this situation, the Olympics, cannot be ignored. For the larger organisations an element of corporate

social responsibility, alongside protecting the business, was evident in influencing this construct.

The role of scare tactics in both developing intention and translating this into actual behaviour are significant. These activities were able to break entrenched travel habits (Schwanen et al., 2012) and act as a catalyst to ensure actual travel behavioural change. Despite smaller organisations possessing lower levels of perceived behavioural control, they still moved to either intention then behaviour, or directly to behaviour. As previous research has identified (see Aarts and Dijksterhuis 2000; Bamberg et al., 2003; Brög et al., 2009; Verplanken et al., 1994, 1997), habit is entrenched and hard to break: Without the scare tactics as a 'catalyst-for-change' (CfC) the level of engagement and behaviour change would have been more limited, especially for organisations with limited PBC.
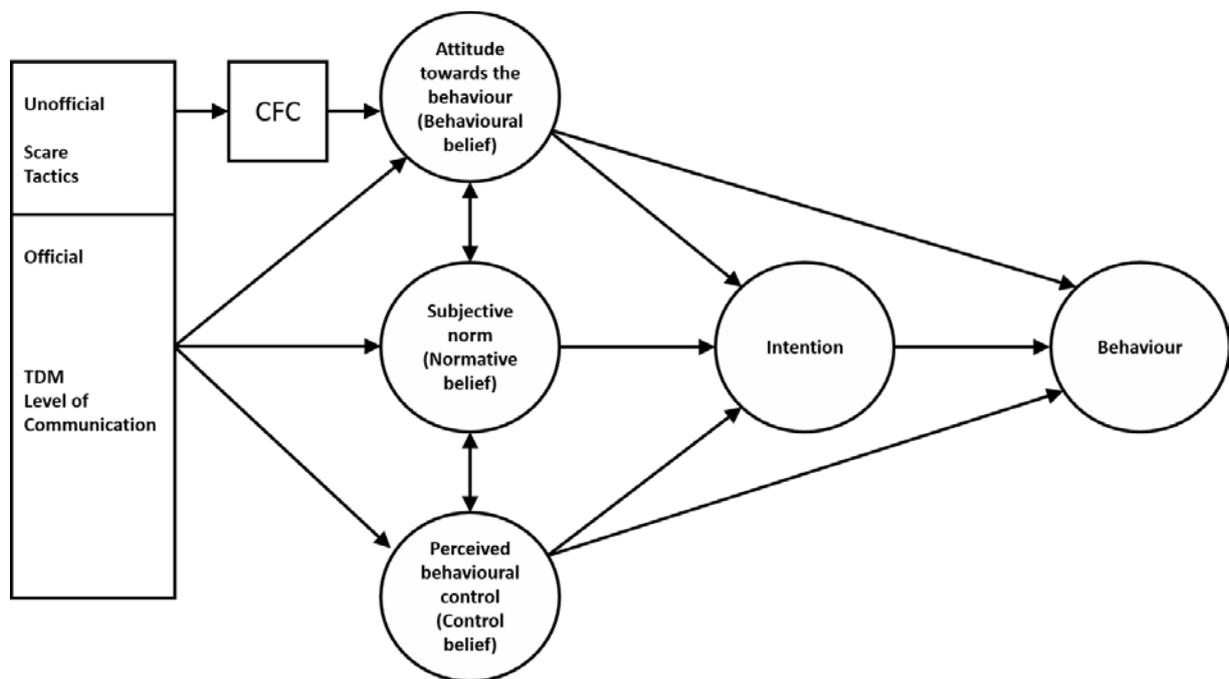

Figure 7. Application of the Theory of Planned Behaviour (Ajzen, 1991) to Transport Network Travel Behaviour Change, with the addition of a Catalyst for Change.

This research has identified that, although the information programme may have drawn attention to the problem, it was the addition of more forceful 'hard-edge' messages that raised conscious awareness of specific requirements and eventually delivered actual VTBC. Similar to challenges in quantifying the effects of marketing interventions on behaviour (Brög et al., 2009) it is difficult to measure the exact level of psychological impact and travel behavioural change that occurred as a direct result of the CfC. The research however *has* identified that, alongside the importance of raising awareness is also providing the opportunity, structure and choice to enable VTBC and is analysed in the next section.

5. Opportunities to facilitate and support Travel Behaviour Changes

Similar to TfL's own findings (Figure 2), this research has identified that organisations used various methods to support VTBC in various forms, specifically 'reduce', 're-time' and 're-route', depending on their size, structure and sector of operation. The methods used in reducing the need to travel were primarily employed by large organisations with a substantial office-based commuter workforce, who would be significantly impacted by the travel hotspots: "We made it easier to do remote working… we implemented a remote working system of technology … this took out some of the loop holes if you like the hassle to working remotely" (Sean, Financial Services). This was enabled through a policy that supported working from home and involved significant IT system development and technical support alongside a change in business culture.

The second mode of VTBC, 're-time', was utilised by organisations such as companies engaged in logistics. This measure was used by those that would be negatively impacted by the restrictions of the ORN and travel *hot spots* but who also had customers relying upon them, and by medium-sized office-based organisation who could not provide or cope with significant portions of their workforce working from home, but were able to provide some flexibility to

the start and end of the office working day. Those organisations involved in logistics engaged early in the process with their stakeholders, both those within London whom they were delivering to, and those across the UK who were delivering to them, to plan for changes to delivery times. Don, (Fresh food market) explained "we decided to start [open the market] two hours earlier… the guys in Scotland have to get their lorries to us two hours earlier… the whole of the north of England markets to accommodate that period started earlier."

The medium-sized organisations who were more reliant, due to their size, on their employees attending the office, focussed on facilitating opportunities for 'retiming'. This was achieved through various methods, from supporting employees in developing individual travel plans for more flexible working, to changing office opening hours. Jonathan. (PR Agency) accommodated retiming with flexibility: "if you want to come in at 7.30 and finish at 3,30 and take advantage of watching the Olympics …or if you like to have a lie-in and come in at 11.30 like we agreed and leave at 7.30 you are welcome to do that."

'Re-route' was adopted as a VTBC by businesses in two ways. The first was to re-route non-essential business meetings to locations that would not be impacted by the travel *hot spots* and so not add to the travel demand base load. Mark (banking 2) explained "we were trying to get people to think twice about travelling into London… to look at contingency plans to stay outside of London." The second re-route option was for, where possible, changing the designated office location for employees during the Games from locations impacted by *hot spots* to those that would be less impacted by the expected travel congestion. This involved various options including "work in a client site, work in an alternative office or work remotely" (Sean, Financial Services). Similar to working from home, this 're-routing' required planning and preparation before the Games commenced in order to ensure facilities and IT were available to support such a change. "We reworked with our IT teams to look at the different solutions which are available for the different opportunities here" (Sean, Financial Services).

For VTBC to occur, businesses needed to empower their workforce by providing them with the necessary information and facilities to allow them to comply with TfL's request to either reduce, re-route, or retime. The targeted information from TfL, alongside more hard-edge messages (CfC), encouraged those who would normally commute to engage with the travel behaviour change options available, and enabled them to choose the most suitable for their circumstances. However, it is the businesses themselves that decided if and how their employees engaged in VTBC, and this was also subject to issues related to the size and structure of the individual organisations.

6. Future policy considerations and research

The findings from this research make a significant contribution to understanding the role of businesses in influencing VTBC, and are important for future transport policy developments and initiatives. They highlight the importance of business in helping achieving TDM objectives through using a targeted approach with organisations that are able and willing, the importance of accurate and relevant and timely information to create trustworthiness and reliability, the role of a catalyst for change to ensure engagement and to help break through routine behaviour and the significance of choice and option for the type of change.

The application of the Theory of Planned Behaviour (TPB) has identified the importance of developing the self-efficacy required by commuters in order to voluntarily change their travel behaviour. The importance of the effectiveness of TfL's targeted TDM strategy, in understanding specific business groups and their level of PBC, is significant if voluntary travel behaviour change is to be achieved in an efficient and effective way. Future transport initiatives aimed at achieving VTBC associated with personal mobility need to target those groups with PBC, who are thus able to directly initiate behaviour change.

The findings of the current research support the necessity of effective communication for public acceptance of TDM, as high levels of problem awareness and belief in a positive outcome can lead to intention, which forms the basis for behavioural change— with engagement being proportionally lower where there is a lack of PBC and lower levels of belief. This paper contributes to a novel adaption of Ajzen's (1991) TPB model, indicating the possible role of a catalyst-for-change 'scare tactic' can increase engagement, resulting in this case in VTBC. In addition to the CfC, the findings have highlighted the importance of planning and providing options of alternatives such as 're-time' 're-mode' in facilitate VTBC.

These findings are also relevant for public transport policy in existing urban areas struggling to achieve substantial VTBC in order to alleviate congestion, reduce private car use and curtail transport contributions to anthropogenic climate change. The results help to evaluate the ways by which businesses and commuters can be encouraged to reconsider their reasons for and need to travel, in order to design policy initiatives aimed at achieving environmentally sustainable goals of reducing resource consumption associated with transport for individual mobility especially relevant in relation to the continued expected growth of the world's urban population (Lerner, 2011).

Cities are bidding to host mega- and sport events with the expectation of economic development, attracting tourists and media interest (Fourie and Santago-Gallego, 2011; Green et al., 2003; Heere 2018; Jones, 2015; Nauright, 2004; Smith, 2005). Due to the issues associated with hosting them, including transport congestion, there is increasing reluctance by municipal authorities and their citizens to accommodate these events (Smith et al., 2018). The lessons learnt from this analysis of London 2012 would help in planning for and facilitating the voluntary travel behaviour change that is required to help make such events a success, while limiting disruption and inconvenience and help alleviate some of the concerns of local stakeholders.

Although this study draws its conclusions from a highly prestigious one-off mega-event, its findings are relevant to future travel policy initiatives concerning the implementation of TDM more generally. The in-depth qualitative interviews and office attendance data supported by TfL's survey results are drawn from actual business decisions and action. They support the importance of PBC in achieving change, and highlight the role and influence of a CfC in raising awareness and engagement, and in ensuring that attitudes are converted into actual behavioural change. This research has added to the understanding that both a positive, and in this case a *negative*, belief in the outcome provides support for complying with TDM. This could be especially important in achieving the adoption of a number of information technology developments (GPS, autonomous vehicles) (Funk, 2015), which could be needed to support travel demand management in reducing congestion, resource usage and pollution in the future.

To further evaluate the role of a CfC in raising awareness of both the need for and engagement with TDM, the authors would recommend future studies on smaller, less prestigious events. In addition, there would be value in research identifying any legacy associated with the travel behavioural change and travel demand management required for mega-events. This paper focuses on the reasons why businesses engaged in TfL's TDM programme, while analysis of the actual plans employed have been presented in previous research (Jones et al., 2015). Anecdotal evidence suggests that some organisations have continued post-Games with aspects of their plans in response to TfL's TDM initiative, whilst others have benefited from the knowledge that they are able to initiate change when required.

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