

The sport participation legacy of major events in the UK

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THE SPORT PARTICIPATION LEGACY OF MAJOR EVENTS IN THE UK

Summary

This paper examines the extent to which attending major sporting events leads to subsequent changes in the sport participation behaviour of spectators. The research covered seven single-sport events of World or European level held in the UK in 2014 and was concerned with spectators (aged 16 and over) who attended one of these events. Baseline data was gathered from a sample of spectators at each event using a face-to-face survey. Follow-up data was captured using an online survey at least nine months post-event. Our analysis is based on 258 people for whom both baseline and follow-up data was available (matched pairs). Using the Transtheoretical Model (TTM), the evidence from this research points to a small (net) positive staged change in sport participation among the sample overall. Variations in the nature and scale of changes associated with events featuring different sports were observed. Progression between the TTM stages was evident for individuals who were previously in the pre-preparation, preparation and action stages. The likelihood of progression appears to be strongest where prior contemplation for behaviour change was prevalent. Event attendance emerged as an important contributor for moving individuals along the TTM continuum, alongside a range of other factors. The demonstration or trickle-down effect was the primary mechanism by which any sport participation legacy supported by these events occurred. The practical applications of the research and the wider health benefits of leveraging event-induced sport participation increases are discussed.

INTRODUCTION

This paper contributes to the academic and policy debate on the legacies of sporting events in terms of promoting participation in sport at grassroots level. The main purpose of the research underpinning this paper was to investigate whether attending a major sports event inspires spectators to change their own sport participation behaviour. The Transtheoretical Model (TTM) was used as the framework to record and analyse the sport participation patterns of spectators who attended one of seven major sports events held in the UK in 2014, both before and after their event attendance. The basic questions that guided this research are outlined below:

- To what extent do spectators who attend major sports events move between the TTM stages of change following their event attendance?
- What is the net effect on sport participation (i.e. progression minus regression)?
- Does prior contemplation to increase sport participation have a bearing on the likelihood of any movement between the TTM stages of change post-event?
- Can post-event participation increases and progression along the TTM continuum be attributed to attending a specific event?
- What are the inspirational factors of an event through which any positive behavioural changes in participation occur?

The TTM was the preferred framework for the research for three reasons. First, this research is a successor to a recent study by Ramchandani *et al.* (2017), which utilised the TTM to examine the 'attitudinal' changes towards sport participation among spectators stimulated by the same set of events. The baseline data used in this research including spectators' incumbent and planned sport participation levels pre-event was gathered by Ramchandani *et al.* (2017). The use of the TTM to measure 'behavioural' changes in sport

participation post-event is therefore a logical extension of the above-mentioned study. Second, previous research has also called for the application of the TTM in an events context to measure change in the attitudes and behaviour of attendees (see Mair & Laing, 2013; Ramchandani & Coleman, 2012; Ramchandani *et al.*, 2015) since the TTM constructs are global in nature and can be applied to a wide range of behaviour change settings (Hutchinson *et al.*, 2009). It is deemed by the authors that the measurement of changes in sport participation among spectators who are exposed to major sports events lends itself to the TTM stages of change construct. Third, Sport England (the agency responsible for promoting regular sport participation and developing sporting talent in England) has adopted the TTM to guide its investment decisions for grassroots sport and behaviour change principles have been explicitly embedded within its strategy (Sport England, 2016). Therefore the selection of the TTM is also vindicated from a sport policy standpoint in the UK.

An overview of the extant literature relating to the sporting legacies of major sports events is presented in the next section. The chosen theoretical framework, the TTM, and its application to this research is then considered. Details about the events, the data collection process and sample sizes achieved as well as the approach used to analyse the data follow in the methods section. The results of the investigation are subsequently presented and the contribution to knowledge, practical applications and wider health implications are discussed. The paper concludes by identifying the research limitations and providing directions for further research.

SPORTING LEGACIES OF MAJOR EVENTS

The term 'legacy' in the context of a sporting event refers to the planned and unplanned, positive and negative, intangible and tangible structures that are created through an event and

remain after the event (Preuss, 2007). The International Olympic Committee (2012) identifies five dimensions of event legacy - sporting; social; environmental; urban; and, economic. The sporting legacy dimension has two sub-dimensions. First, the sporting venues that are either built or refurbished for an event as tends to be the case for mega events like the Olympic Games, which can be used for sport following the conclusion of the event for which they were constructed. For example, permanent venues constructed in connection with the London 2012 Olympic and Paralympic Games such as the Aquatics Centre and the VeloPark have hosted other major sports events subsequently and are also open for public use. The Olympic Stadium in London is now home to West Ham United Football Club. Second, the public interest generated by hosting a major sporting event provides an opportunity to boost participation in sport. In fact, one of the legacy ambitions of London 2012 was to increase grassroots sporting participation, particularly by young people, and to encourage the whole population to be more physically active (DCMS, 2010). It is this second aspect of sporting legacy that this paper addresses.

The process by which major sports events are normally assumed to inspire the general population to engage in sport and physical activity more generally is a 'trickle-down' effect, whereby the performance of elite athletes provides the catalyst for encouraging grassroots participation. Weed *et al.* (2009, p.12) identify the following potential effects:

- a demonstration effect, whereby an event may contribute to increasing the frequency of participation in sport of existing participants, or to rekindling interest in lapsed sport participants; and,
- a festival effect, whereby an event may contribute to stimulating the contemplation of physical activity or the most informal sport-related activities among those who have not previously contemplated participation.

Hindson *et al.* (1994) recognise potentially dual models of the dynamics, suggesting that, on the one hand, elite sports people can be inspirational as role models, but on the other, they may deter participation because of the perceived competence gap. In other words, the effect can be positive (inspiration) or negative (discouragement). Systematic reviews have returned mixed evidence on the impact of mega sports events such as the Olympic Games and the Commonwealth Games on grassroots participation among adults (McCartney *et al.*, 2010; Weed *et al.*, 2009, 2015). An overview of systematic reviews by Mahtani *et al.* (2013) concluded that there was a paucity of evidence to support the notion that the Olympics or Paralympics lead to increased participation in physical and sporting activities in the host country. Veal (2003) found that in the year following the Sydney 2000 Olympic Games, seven Olympic sports experienced a small increase in participation whereas nine declined. Subsequently, in relation to the 2006 Melbourne Commonwealth Games, Veal *et al.* (2012) found that between 2005 and 2007, 13 of the 18 Commonwealth Games' sports experienced a decline in participation in the Australian state of Victoria and five experienced an increase. Using data from a nationwide survey of Australian residents, Wicker and Sotiriadou (2012) reported a relatively small trickle-down effect as a result of the 2006 Commonwealth Games on the population at large in the year after the event, with certain demographic groups, particularly young people, more likely to benefit than others. On the other hand, a more recent study found that the 2010 Winter Olympic Games had no measurable impact on objectively measured physical activity or the prevalence of overall sports participation among children in Canada (Craig and Bauman, 2014).

Focussing on a single-sport mega event, a study by Frawley and Cush (2011) suggests that rugby participation in Australia increased following the hosting of the 2003 Rugby World Cup (measured using registration data) and that the increase was substantially greater for the junior rugby category than the senior rugby category. Other studies focussing on

audiences at single-sport non-mega events, which are more appropriate to the scale of the events included in this research, have also provided disparate results. Ramchandani and Coleman (2012, p.269) contend that attending such events "can play an important role at the start of what is a complex process, sparking people's desire to participate or participate more frequently, and sign posting them towards the next stage of that journey." A subsequent study by Ramchandani *et al.* (2014) found that the strength of the perceived inspirational effect of such events on spectators varies across different population segments and across different types of events. Both these studies dealt with attitudinal (rather than behavioural) changes. Ramchandani *et al.* (2015) examined the post-event participation behaviour of a sample of event spectators across multiple events and found that event attendance was more likely to be associated with physically active individuals doing more sport as opposed to the uptake of sport by physically inactive people. Ramchandani *et al.* (2017) examined both inspiration and discouragement effects associated with event attendance through the lens of the TTM. Although their study stopped short of measuring actual changes in sport participation post-event, they demonstrated that events can have a positive influence on the attitudes of spectators towards participation in sport, regardless of the TTM stage to which they belonged. Virtually no discouragement effects were observed in their study across the different TTM stages. This study builds directly on the Ramchandani *et al.* (2017) by examining changes in participation behaviour of spectators following an event.

TRANSTHEORETICAL MODEL OF CHANGE

Existing research on the sport participation legacy of events is rarely underpinned by any explanatory theory or model of behaviour change (Murphy and Bauman, 2007; Boardley, 2013). As noted by Potwarka (2015, p.74), "advancing knowledge and understanding of the participation impacts of sporting events requires a movement toward the application of

relevant theoretically grounded approaches to understanding the phenomenon." Potwarka (2015) applied the Theory of Planned Behaviour to understand motivational factors behind individuals' intention to become more active in response to the 2010 Winter Olympic Games in Vancouver (Canada). More recently, Ramchandani *et al.* (2017) used the TTM as their framework to examine the sport participation behaviours of spectators attending major sports events in the UK and the attitudinal changes towards sport inspired by event attendance. This study builds on these efforts and focuses on changes in participation behaviour, which goes beyond a mere shift in people's attitudes.

Originally developed within the psychology discipline to understand addictive behaviours, the TTM suggests that individuals attempting to change their behaviour move through a series of five stages that differ according to an individual's intention and behaviour: precontemplation; contemplation; preparation; action; and, maintenance. The TTM is a dynamic framework "where individuals progress and regress through stages in an effort to create a lasting change" (Marshall and Biddle, 2001, p. 229) although "most relapsers do not regress all the way back to where they began" (Prochaska *et al.*, 1992, p. 1105). In other words, once people have progressed from precontemplation to contemplation, a return to the precontemplation stage is unlikely.

Applied to the concept of sport participation, individuals in the precontemplation stage are not currently active in sport and have no intention of changing their incumbent behaviour. Those in contemplation stage are also inactive but are thinking about becoming active. The preparation stage is where an individual is taking steps to make the desired change possible. Those in the action stage are meeting a criterion of activity (e.g. participating on a certain number of days and/or at a given level of intensity) and finally those in maintenance are meeting that criterion for a sustained period of time. In addition to the stages of change, the TTM also incorporates ten processes of change to help understand how

movement between the different stages can occur. The first five of these processes of change can be described as 'experiential' - consciousness raising, dramatic relief, environmental revaluation, self-revaluation and social liberation. These processes are associated typically with the early and middle stages of pre contemplation, contemplation and preparation. The other five processes are 'behavioural' - counter conditioning, helping relationships, reinforcement management, self-liberation, and stimulus control - and these are associated typically with the action and maintenance stages.

The TTM in its traditional form does not capture the contemplation levels of individuals in the middle or latter stages (i.e. preparation, action and maintenance). In other words, the orthodox stages of the TTM do not consider whether individuals who are already active in sport to some extent are thinking about increasing their level of activity. With a view to overcoming this deficiency, Ramchandani *et al.* (2017) proposed an amendment to the original stages of the model such that 'precontemplators' and 'contemplators' can be prevalent within the stages of preparation, action and maintenance - see Figure 1. The five original stages were condensed into four with each stage having two sub-stages. They propose that people can move forward and backward between the stages (as per the original TTM), but also between the sub-stages within each stage.

<FIGURE 1 HERE>

METHODS

The research covered seven sports events of World or European level held in the UK in 2014 and was concerned with spectators (aged 16 and over) who attended one of these events. Baseline data was gathered from a sample of spectators at each event using a face-to-face survey in order to position individuals within specific stages of the TTM, based on their

existing engagement with sport and their planned participation behaviour. In total 4,590 at-event responses were achieved across the seven events. Analysis of the baseline data is available in Ramchandani *et al.* (2017), which this study extends by incorporating follow-up data. Of the at-event sample, 1,386 people agreed to be contacted to take part in follow-up research. In August 2015, spectators who provided consent to be contacted were invited to take part in an online survey to investigate the following:

- whether they were doing more, less or the same amount of sport at the time of the follow-up survey relative to the stages of the TTM;
- the extent to which attending an event influenced any increases in sport participation (very influential (3), moderately influential (2), slightly influential (1), not at all influential (0));
- the event-specific factors that contributed to people being more active in sport (judged based on qualitative responses); and,
- the influence of other factors in leading people to do more sport (significant impact (3), moderate impact (2), slight impact (1), no impact (0)).

Overall 258 individuals responded to the online survey. The seven events and the sample sizes achieved in each instance are presented in Table 1. The follow-up sub-samples across the events were considered to be too small for robust event-by-event analysis and thus our analysis focuses mainly on the pooled data for the 258 people for whom both baseline and follow-up data was available (matched pairs). However, where deemed suitable and informative we present some event-specific findings.

<TABLE 1 HERE>

The TTM stage that survey respondents had reached when first surveyed at the event was judged based on their answers to two questions. The first question asked respondents about their frequency of participation in sport (for at least 30 minutes when the effort was usually enough to raise their breathing rate) in the four weeks prior to attending an event. 'Sport' in this context was defined to include traditional team sports such as football and cricket as well as activities such as swimming, cycling, running/jogging and going to the gym. Activities such as walking, gardening, coaching and refereeing were explicitly excluded from the definition of sport participation. The second question asked respondents whether, prior to attending an event, they had planned to increase their sport participation frequency over the next twelve months. The precise approach used to classify respondents was that used by Ramchandani *et al.* (2017) and is explained below.

- Respondents who had not done any sport in the previous four weeks and who had not previously planned to increase their participation in sport in the following twelve months were considered to be in the *precontemplation* stage.
- Those who had done no sport in the previous four weeks but who reported having previously planned to increase their participation in sport in the following twelve months were in the *contemplation* stage.
- The *preparation* stage included respondents who had done between one and three days of sport in the previous four weeks (i.e. less than once per week on average). Respondents in this stage were active but not regularly.
- Those who had done between four and eleven days of sport in the previous four weeks were in the *action* stage. Individuals in this category met the criterion of undertaking sport on average at least once a week (a key measure of sport participation in England) but less than three days per week.

- Finally, those who had done twelve or more days of sport in the previous four weeks (i.e. on average at least three days per week) were deemed to be in the *maintenance* stage. It is reasonable to assume that individuals undertaking sport at this frequency would have been regular or very regular participants for a sustained period of time because people are unlikely to make a direct switch from being non-participants to regular participants.

The approach used to classify the follow-up sample relative to the TTM was identical to that adopted for the baseline sample with one exception. The online survey did not ask respondents about their planned participation behaviour and therefore we were not able to distinguish between precontemplators (not thinking about taking up sport) and contemplators (thinking about taking up sport) for the follow-up sample. We have therefore couched these two inactive groups under 'pre-preparation'.

RESULTS

Overall change in TTM stages

Following their attendance at one of the seven events in 2014, there was a reduction in the proportion of individuals in the early and middle stages of the TTM and a corresponding increase in the proportion of people in the latter stages. The pre-event and post-event statistics for the follow-up sample are shown in Table 2. No post-event data is available about split between precontemplation and contemplation.

<TABLE 2 HERE>

The proportion of individuals in the first three stages declined by five percentage points from 18% to 13%. Prevalence in the action and maintenance stages grew by two percentage points and three percentage points respectively. These findings indicate a general improvement in the sport participation behaviour of the sample in the context of their positioning within the TTM.

Movement between TTM stages

Table 3 illustrates the movement that occurred between the specific stages. We have combined individuals identified as either precontemplators or contemplators from the baseline at-event surveys under 'pre-preparation' in order to allow direct comparison with their post-event profile. Each row in Table 3 sums to 100%.

<TABLE 3 HERE>

Overall 70% of the baseline pre-preparation sample had progressed to preparation (15%), action (40%) or maintenance (15%). Evidence of progression is also evident in the case of the baseline preparation sample (58% moved to action and 23% to maintenance) as well as the action sample (34% moved to maintenance). The majority of the baseline maintenance sample (77%) stayed in the same stage post-event. Perhaps not surprisingly, the likelihood of movement to maintenance is highest among the baseline action sample (because people in this stage already participated on a regular basis) and lowest among the pre-preparation sample (because people in this stage were not previously active in sport at all). Limitations of the small event sub-samples aside, the follow-up modal stage changed from action (pre-event) to maintenance (post-event) in the case of the taekwondo and wheelchair

tennis events. The modal stage for the remaining five events remained the same between the baseline and follow-up surveys.

Net change from baseline TTM stage

Across the overall sample, 25% had progressed from their baseline stage, 59% had stayed in the same stage whereas 17% had regressed to some extent. The net change for the overall sample was therefore +8% (i.e. 25% progressed minus 17% regressed). As per the data in Table 3, the net change within each baseline TTM stage is as follows: pre-preparation +70%; preparation +69%; action +23%; and, maintenance -24%. Logically there is no regression in the case of pre-preparation and no progression in the case of maintenance because these are the bottom and top stages respectively. Therefore the statistics for these two stages relate to the percentage of people who either progressed only (pre-preparation) or regressed only (maintenance). The net change among the baseline preparation sample of +69% is the difference between the 81% who progressed and the 12% who regressed. Similarly, 34% of the baseline action sample progressed while 12% regressed giving a net change of +23%.

At five of the seven events the net change was positive i.e. the rate of progression was higher than the regression rate. These included the wheelchair tennis (+30%), taekwondo (+18%), track cycling (+18%), triathlon (+4%) and diving (+2%) events. In the case of respondents who attended the IPC athletics event, the progression was offset entirely by regression, whereas regression outweighed progression for the canoe slalom event (-8%). However, the event-specific findings are indicative only and should be treated with some caution given the sub-sample sizes involved.

Baseline precontemplators versus contemplators

Recent research by Ramchandani *et al.* (2017) proposed an alteration to the traditional TTM in order to incorporate precontemplation and contemplation levels of individuals within each stage of the framework. Overall 49% of our sample had not previously contemplated doing more sport in the next twelvemonths when they were first surveyed at an event (i.e. they were precontemplators) whereas 51% were already contemplating doing more sport in the same time frame. The baseline prevalence of contemplators was higher among pre-preparation (60%), action (58%) and preparation (54%) whereas more than half of those in maintenance were precontemplators (57%).

Contemplators were more likely to demonstrate progression following their event attendance relative to precontemplators (30% v 20%) and the difference between progression and regression was also comparatively better among contemplators (12% v 5%). These findings indicate that the likelihood of change in participation behaviour being influenced is greater when individuals are already thinking about increasing their activity levels.

Event influence and other factors

We now examine the extent to which those respondents who had progressed from their baseline stage attributed this change to their experience of attending a particular event, as well as the relative impact of external factors. Among the 25% of the overall sample who had progressed, 80% reported that their event attendance had been influential in leading them to undertake more sport - 11% stated the event they had attended had been 'very influential', 26% 'moderately influential', and 43% 'slightly influential'. The average event influence score among this cohort was 1.29, out of a minimum score of 0 (not at all influential) and a maximum of 3 (very influential). Using a similar scoring system, we calculated the impact of other factors that may have contributed to the positive change in participation behaviour.

The data in Table 4 illustrates that attending one of the seven events in this research was an important contributor to progression between the TTM stages. However, it was clearly not the only factor, with respondents reporting being affected, to a greater or lesser extent, by wider influences including other events as well as access to information, taster sessions and sports people. What this means essentially is that events are part of a wider array of factors that impact on changes in participation behaviour, but it is difficult to isolate the event influence and attribute changes to a specific event.

<TABLE 4 HERE>

Demonstration and festival effects

This section considers the inspirational aspects of the specific event attended by respondents who exhibited progression along the TTM and reported that the event had to some extent influenced their change in participation behaviour. The two mechanisms of event-related sport participation legacy identified by Weed *et al.* (2009) are the demonstration effect and the festival effect. Based on analysis of qualitative feedback provided by respondents, we infer that the dominant effect was one of demonstration, in the sense that the aspects cited linked mainly to the skill and ability of the athletes and quality of the competition. However, there were traces of a festival effect generated for a minority of respondents in connection with the event atmosphere and venue. In a few isolated instances the inspirational aspects cited by respondents could be regarded as having elements of both demonstration and festival effects. Some selected quotes from respondents that support our judgement of their qualitative feedback are presented in Table 5.

<TABLE 5 HERE>

DISCUSSION

The findings in context

The evidence from this research points to a small net positive staged change in sport participation behaviour among a relatively small sample of people following their attendance at a major sports event in the UK in 2014. The net increase in reported participation levels in this research is consistent with participation increases identified in Australia by Wicker and Sotiriadou (2012) and by Frawley and Cush (2011) in the aftermath of the 2006 Commonwealth Games and the 2003 Rugby World Cup respectively. Ramchandani *et al.* (2015) also found post-event net increases in participation levels of audiences across nine single-sport non-mega events in the UK between 2010 and 2012. Accepting the small event sub-samples, our analysis indicates subtle variations in the nature and scale of net changes in sport participation behaviour following attendance at events featuring different sports. Net increases of varying scale (between 2% and 30%) were found in the case of five events, no net change was found for one event, whereas for one event there was net decrease. Sport-specific variations (increases and decreases) were also noted by Veal *et al.* (2012) after the 2006 Melbourne Commonwealth Games and previously by Veal (2003) post the 2000 Sydney Olympic Games. These fluctuations are reflective of the mixed evidence about the sport participation legacies of sports events emerging from literature reviews (Mahtani *et al.*, 2013; McCartney *et al.*, 2010; Weed *et al.*, 2009, 2015).

Progression in relation to the TTM was found to be evident in the case of individuals in the pre-preparation, preparation and action stages (see Table 3), but was understandably not quantifiable for people in the maintenance stage. The likelihood of progression appears to be strongest where prior contemplation for behaviour change was prevalent, which resonates with recent research by Ramchandani *et al.* (2017) and Potwarka (2015), both of which were concerned with changes in attitudes rather than behaviour. The Ramchandani *et*

al. (2017) study found that from an attitudinal perspective "events can further fuel the existing desire of contemplators within each of the TTM stages to increase participation, whereas the catalytic effect among precontemplators within each stage is arguably less potent". Potwarka's (2015) application of the Theory of Planned Behaviour to examine individuals' intention to become more physically active in response to the 2010 Vancouver Winter Olympics revealed that those who intended to become more active also expressed a positive attitude toward that behaviour.

Event attendance appears to be an important contributor for moving individuals along the TTM continuum, alongside a range of other factors (see Table 4). This finding is given credence by previous research concerning single-sport non-mega events in the UK, according to which the attribution of positive changes in activity behaviour to a single event is not clear-cut due to the range of other factors that audiences may experience with the passage of time (Ramchandani *et al.*, 2015). However, the profile of the audience at the events included in this research (see Table 2), coupled with evidence from the literature about events of similar sporting scale and importance primarily attracting 'sporty' audiences (Ramchandani and Coleman, 2012; Ramchandani *et al.*, 2014; Ramchandani *et al.*, 2017), means that any staged progression is most likely to occur from action to maintenance. It is no surprise then that the demonstration or trickle-down effect is the primary mechanism by which any sport participation legacy supported by these events occurs (see Table 5). This confirms the assertion of Weed *et al.* (2009, 2015), who highlight that sports events have the potential to bring about increases in sport participation frequency and re-engagement of lapsed participants assuming that the demonstration effect is properly leveraged. However, evidence of concerted efforts to leverage event-induced sport participation is scarce. Research in relation to two medium-sized single-sport events held in Canada - The 2005 Pan American Junior Athletic Championships and 2005 Canadian Figure Skating Championships - found a

distinct lack of leveraging strategies and tactics as well as a number of missed opportunities by event organisers and other key stakeholders to stimulate sport participation (Taks *et al.*, 2014; Misener *et al.*, 2015).

Practical applications

Using the TTM stages of change as a guide, our results provide some useful evidence that might inform leveraging efforts to increase participation in sport, mainly in relation to individuals in the early and middle stages of the model. This is because it appears that rather than those in the pre-contemplation, contemplation and preparation stages, the events studied were dominated by audiences from the action and maintenance stages. Consequently, organisers of major sports events should consider ways in which to alleviate any practical and emotional barriers that prevent those in the early and middle TTM stages of change from attending events. One potential strategy to attract individuals disengaged from sport to events might be to offer rewards or incentives such as the opportunity to meet elite athletes and hear about how they got started in sport. For pre contemplators in particular, efforts to promote sport, and physical activity more generally, in conjunction with the publicity around major sports events may concentrate on the process of "consciousness raising", by highlighting the positive consequences associated with making the desired behaviour change (e.g. improved health and wellbeing), which may facilitate progression to 'contemplation'.

Promotional messages linked to events could also consider signposting sedentary individuals to opportunities to participate in sport with other inactive people at a level that is appropriate to their skill and ability, in order to encourage them to move towards 'preparation' and beyond. Reaching out to and engaging individuals positioned in the early and middle stages of the TTM is likely to require a joined-up approach, in order to generate a festival effect. From the perspective of those in the latter TTM stages of action and maintenance,

attendance at major sports events provides a demonstration effect and helps to ensure that positive behaviours are reinforced and continued.

Weaknesses of the TTM

In the same way that we have previously justified the use of the TTM as the framework for our research, it is important to acknowledge the deficiencies of the model. As noted by Mair and Laing (2013), the TTM is usually applied to a treatment or campaign occurring or re-occurring over time, rather than a one-off, short duration event or activity. Aligned to this view, the events included in this research were not actually stage-based interventions designed to stimulate increases in participation among spectators. Rather the authors through the lens of the TTM attempted to explore the extent to which the events led to increased participation as an unintended legacy. Therefore, any movement between the stages ignores the social context in which change occurs and the relative influence of other life events.

Another criticism of the TTM relates to the methods used to measure the stages of change, which is that the criteria used to assign an individual to a particular stage is not always standardised or validated. Indeed, the effectiveness of any stage-based intervention is dependent upon accurate classification of one's stage of change (Bridle *et al.*, 2005). Whilst this is correct, we attempted to mitigate this concern by categorising respondents using an identical approach to Ramchandani *et al.* (2017) in order to ensure consistency of approach and facilitate comparability of results. Moreover, by employing an adapted version of the TTM proposed by Ramchandani *et al.* (2017), we were able to overcome a weakness of the traditional stages of change, in order to examine changes in sport participation behaviour among pre contemplators and contemplators within the middle and latter stages.

A critical assumption of the TTM is that the majority of at-risk populations are not ready for action (Prochaska & Velicer, 1997). This assumption is clearly violated in this

research (and in the preceding Ramchandani *et al.* (2017) study) because the majority of the sample was already in the action or maintenance stages prior to their event attendance. At the same time, it is worth recognising that the TTM was developed originally in the context of smoking cessation and has been adapted to sport and exercise behaviour. The TTM assumptions are hence not directly generalizable to the latter and thus neither are its weaknesses (Nigg *et al.*, 2011)

Health implications

Ultimately the findings from this research are of interest and value to an international audience of health practitioners and researchers. This is because reducing physical inactivity is a desired outcome of investment that resonates with policy makers worldwide given its negative health effect on various diseases and life expectancy (see Lee *et al.*, 2012). Levels of physical inactivity are rising in many countries with major implications for the prevalence of non-communicable diseases and the general health of the population worldwide. According to the World Health Organisation (2010), physical inactivity is estimated as being the principal cause for approximately 21–25% of breast and colon cancer burden, 27% of diabetes and approximately 30% of ischaemic heart disease burden. Physical inactivity costs the UK an estimated £7.4bn each year (HM Government, 2015).

Should events prove to be successful 'interventions' by which increases in sport participation can be leveraged, then there are clearly health benefits for individuals and society that stand to be realised. A recent report by the European Commission (2016) on grassroots sport recognises "the undeniable and important health benefits of sport and physical activity and their crucial role in tackling obesity and other non-communicable diseases" (p. 13), and calls for public authorities in the member states "to encourage the prescription of physical activity by medical professionals, in place of, or in addition to,

prescription medication when appropriate" (p. 14). Davies *et al.* (2016) estimate the value of health benefits associated with regular sport participation in England in 2013/14 to be in excess of £5 billion. A scoping review to assess the relationships between golf and health found that the moderate intensity physical activity provided by golf is associated with physical health benefits that include improved cardiovascular, respiratory and metabolic profiles, and improved wellness (Murray *et al.*, 2016). The health benefits experienced by a sedentary person who takes up even a small amount of activity are far greater than those associated with increasing the amount of activity of an already active person (Sport England, 2016). Moreover, it is understood that older adults who participate in any form of physical activity gain some health benefits, including maintenance of good physical and cognitive function (Public Health England, 2014).

CONCLUSION

Ultimately, any major sports event (of any magnitude) in isolation is not a magic bullet to raise participation in sport (Weed *et al.*, 2009). Patterns of behaviour change for individuals may evolve over time under different conditions, life experiences and individual choices. If this basic point is accepted, then the realistic sport participation legacy of an event is limited to the feel-good factor or basic sense of inspiration/intent to increase participation that they are known to engender, which (without targeted initiatives) may or may not develop into sustained increases in participation. Furthermore, there is the issue of causality and the attribution of any participation increases to a specific event, which is not straightforward to completely divorce from the impact of other influences. Perhaps then it is the stimulation of a desire for being active that events should aspire to achieve and be judged against rather than their ability to deliver measurable behaviour change? Under these circumstances, it is still questionable whether policy makers should be considering major sports events as public

health initiatives in their own right, particularly when the audiences who appear to attend them are primarily sedentary. It is more likely that events can be used alongside other tailored interventions and promotional efforts in order to bring about meaningful changes in participation among spectators as well as the wider population via a festival effect.

In terms of proposing a research agenda going forward, there are five main limitations of this research that should be explored further. First, this study focussed on people who attended events and did not consider people who consumed them via television and other media platforms; therefore the findings cannot be extrapolated to the wider population of event consumers. Second, the findings apply to adults rather than children, and any potential nuances across different demographic groups have not been investigated. Third, the research relies on a self-report methodology, which could be affected by response bias and thereby undermine the validity of the findings. During both phases of data collection, the research attempted to mitigate this issue by ensuring confidentiality of responses. The presence of self-selection bias can also not be discounted completely. Objective measurement of participation such as the approach employed by Craig and Bauman (2014) should be considered in future research efforts. Fourth, rigorous analysis of event-specific changes was not feasible due to the small sub-sample sizes and therefore, where possible, future research should attempt to address this issue in order to compare and contrast the sport participation legacies associated with different sports events more robustly. Fifth, this study has focussed on one of the potential health benefits of major sports events in terms of promoting the primary activity that they showcase i.e. sport. In order to provide a more rounded view of the consequences associated with hosting such events, any potential negative health implications should also be examined. Understanding both the benefits and costs will facilitate more effective, evidence-based, policy decisions for public investment in sports events.

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