Institution: University of Bristol

Unit of Assessment: 26 - Sport and Exercise Sciences, Leisure and Tourism

Title of case study: Building new capacity to increase children's outdoor play

1. Summary of the impact

Many children and young people are not sufficiently active to achieve a range of physical and mental health benefits. Extensive research undertaken at the University of Bristol has developed gold-standard methods of quantifying the important contribution that time spent outdoors and greater child independence make to children's daily physical activity. This work has provided unique data to support the development of a new, low-cost approach to adapting residential streets in Bristol for regular outdoor play. The Bristol model has been adopted nationally to provide street-play opportunities in the most disadvantaged areas. It is building capacity to promote outdoor play in a range of public- and third-sector agencies at local, regional and national levels. As a result, children are spending more time outdoors and undertaking increased physical activity, while both children and adults are engaging in more social interaction on residential streets. The model has also been showcased internationally, supporting a cultural shift towards reintroducing the street as a place for children's outdoor play. This shift is necessary to combat the marked decline in street play and child independence which has occurred in recent decades.

2. Underpinning research

More time spent outdoors is related to lower incidence of childhood obesity and is therefore an important area for intervention. The need for environmental interventions in halting the rise in obesity was central to the influential 2007 UK Government Foresight Obesity report. Despite this acknowledged need, methodological limitations restricted investigation into children's use of the environment and hindered the development and evaluation of environmental interventions. Research undertaken at the University of Bristol has played a major part in addressing both of these problems.

The Bristol research was conducted between 2006 and 2013. It has been led by Dr A. Page (Lecturer (L)/Senior Lecturer (SL) in Exercise and Health Science 1994-2011, Reader in Physical Activity and Public Health 2011 to present) and Professors A. Cooper (L/SL/Reader in Exercise and Health Science 1997-2011, Professor of Physical Activity and Public Health 2011 to present) and R. Jago (L/SL/Reader in Exercise and Nutrition 2005-2012, Professor of Paediatric Physical Activity and Public Health 2012 to present) in the Centre for Exercise, Nutrition and Health Sciences (ENHS). It has been funded by research grants totalling £2.3 million from the British Heart Foundation, the Medical Research Council, the World Cancer Research Fund and the Department of Health. The research has produced a body of internationally recognised work using objective data to quantify the extent to which time outdoors relates to higher levels of children's physical activity and that their independent mobility is a strong predictor of increased time spent in active outdoor play. Specifically the research has contributed in the following ways:

i. Developing new methods to quantify time spent outdoors and physical activity

Page and Cooper identified that the development of lightweight personal Global Positioning System (GPS) receivers would enable the outdoor location of an individual to be objectively recorded (rather than self-reported recall), and that if this information was integrated with accelerometer data (an objective assessment of physical activity) it would be possible to record the level and location of the person's daily physical activity. Using these methods, Page and Cooper have, for the first time, been able to accurately quantify differences in children's level of activity outdoors and indoors. They have shown that physical activity levels were two to three times higher outdoors than indoors [1].

ii. Emphasising the importance of streets for children's outdoor physical activity

Further analysis of GPS and accelerometer data within a Geographic Information System (GIS) allowed the time spent in different locations, and the physical activity level within those locations, to be determined. This demonstrated that while children are more active in green spaces such as parks than in non-green spaces, only a small proportion of children's time outdoors (less than 11%) is spent in green space. Time spent on built surfaces and streets therefore contributes more to children's daily physical activity and represents a very important, but previously under-emphasised

source of activity [2].

iii. Demonstrating the contribution of independent mobility and parental license to children's outdoor physical activity

Alongside the use of GPS and accelerometer data, the Bristol team has investigated the determinants of outdoor active play – a crucial step in developing effective interventions. This work includes a new measure and conceptualisation of children's independent mobility (IM: ability to visit destinations in their neighbourhood unsupervised by adults) [3]. This new measure has been shown to be a particularly important predictor of outdoor play [4]. To augment data provided by the PEACH and PEAR projects [7,8], Jago and Page used qualitative methods within the 3Ps and TAPP projects [9,10] to explore children's freedom to roam, investigating the competing pressures that parents face in balancing the benefits of active outdoor play to their child's health against potential risks. They found that children particularly value freedom from adult control and the unstructured nature of active outdoor play and report concern about being restricted by lack of suitable play spaces [5]. Parents also report that taking part in activity with their children is difficult to achieve, particularly during the school week [6].

iv. Underpinning development and evaluation of environmental interventions to increase time spent active outdoors

The methods highlighted above have been extended to include adults and support the development and funding of a series of flagship interventions. Examples include: a) the MOVE project (ESRC funded; Cooper co-applicant), where combined accelerometer and GPS data are being used by adolescents within geography classes to stimulate greater engagement with the outdoor environment and to increase time spent outdoors; b) Project ENABLE in London (NPRI-funded; Cooper co-applicant), which investigates the unique opportunity of whether movement of families into the Olympic Village will increase use of the outdoor environment for physical activity; c) the Bristol Biomedical Research Unit (NIHR-funded; Cooper lead for sedentary theme), where GPS receivers combined with accelerometers are being used to increase outdoor activity in individuals with type 2 diabetes; and d) The Street Play project (Department of Health funded; Page academic lead), which will roll out nationally a street-play intervention based on this research, targeting areas in the top 10% for deprivation. This type of funding is only awarded to schemes guaranteed to generate national impact.

In summary, since 2006 Page and Cooper have developed the world's largest body of research using GPS and accelerometry to objectively quantify time spent active outdoors and the importance of the built environment for children's physical activity. These methods have been integrated with survey and qualitative data (Jago and Page) to identify the major contribution that both child independence and parental license make to children's active outdoor play. The methods have been adopted by a range of national and international research projects to implement and evaluate new environmental interventions. These interventions promote increased time spent active outdoors, which delivers significant health gains for children.

3. References to the research

Research outputs underpinning the case (papers in peer-reviewed journals)

[1] Cooper, AR, Page, AS, Wheeler, BW, Hillsdon, M, Griew, PJ & Jago, R. (2010) 'Patterns of GPS measured time outdoors after school and objective physical activity in English children: the PEACH project', *International Journal of Behavioral Nutrition and Physical Activity*, **7**. DOI 10.1186/1479-5868-7-31 ***30 citations (November 2013)***

[2] Wheeler, BW (*then at Bristol*), Cooper, AR, Page, AS & Jago, R. (2010) 'Greenspace and children's physical activity: A GPS/GIS analysis of the PEACH project', *Preventive Medicine*, 51 (2): 148-152. DOI 10.1016/j.ypmed.2010.06.001 ***29 citations (November 2013)***

[3] Page, AS, Cooper, AR, Griew, P & Jago, R. (2010) 'Independent mobility, perceptions of the built environment and children's participation in play, active travel and structured exercise and sport: The PEACH Project', *International Journal of Behavioral Nutrition and Physical Activity*, 7. DOI 10.1186/1479-5868-7-17 ***16 citations (November 2013)***

[4] Page, AS, Cooper, AR, Griew, PJ, Davis, LH & Hillsdon, M. (2009) 'Independent mobility in relation to weekday and weekend physical activity in children aged 10-11 years: The PEACH project', *The International Journal of Behavioral Nutrition and Physical Activity*, 6**:** 2. DOI

10.1186/1479-5868-6-2 ***26 citations (November 2013)***

[5] Brockman, R, Jago, R and Fox, KR. (2011) 'Children's active play: self-reported motivators, barriers and facilitators', *BMC Public Health*, 11(7). DOI 10.1186/1471-2458-11-461 ***4 citations (November 2013)***

[6] Thompson, JL, Jago, R, Brockman, R, Cartwright, K, Page, AS & Fox, KR. (2010) 'Physically active families – debunking the myth? A qualitative study of family participation in physical activity', *Child: Care, Health and Development*, 36(2): 265–274. DOI 10.1111/j.1365-2214.2009.01051 ***6 citations (November 2013)***

Research grants led by members of ENHS underpinning the case

[7] **The PEACH project: Personal and Environmental Associations with Children's Health.** The PEACH Project. **National Prevention Research Initiative**. Environmental determinants of physical activity and obesity in adolescents £243,850. 3 years from 1/5/06. Cooper (PI), Page, Fox, Hillsdon (then at Bristol), Jago. Further funding **World Cancer Research Fund**. "Personal and Environmental Determinants of Eating Behaviours and Obesity in Adolescents ($PEACH_{EB}$)". £143,893. 3 years from 1/11/07. Cooper (PI), Page, Jago, Hillsdon, Thomspon

[8] **The 3 Ps Project**: "Examination of parental and peer influences on the physical activity patterns of 10-11 year old children". The Bristol 3Ps Project. **British Heart Foundation**. £145,451. Jago (PI), Fox, Page, Thompson

[9] **The Active Play Project (TAPP).** The contribution of active play to the total physical activity of primary school children. **British Heart Foundation studentship** (Brockman). £77,853. 3years from 01/01/2010

[10]**The PEAR project:** Physical Environment and Activity Relationships in adolescents**.** The PEAR Project. **Medical Research Council**. £793,000. 3 years from 01/03/11. Page (PI), Cooper

[11]**The Street Play Project: Department of Health**. Innovation, Excellence and Strategic Development Fund. £1,000,720. 3 years from 01/04/2013. Partnership bid with University of Bristol (Page PI), Play England & Playing Out Community Interest Company (CIC)

4. Details of the impact

This research has been instrumental in increasing children's outdoor play on residential streets by:

1. Underpinning new interventions to increase children's active outdoor play

In 2007, a range of dissemination activities took place (including stakeholder events and media briefings) to showcase research quantifying the contribution that time spent outdoors can make to children's physical activity [1] and demonstrating that children spend the majority of their time on built surfaces rather than in green spaces [2]. In 2008-9, people who attended these events in Bristol used this evidence as a basis for developing a new intervention to open up their streets for children's play. The intervention involves simple signs and stewarding by local residents to close selected residential streets to through-traffic after school (from 3.30 to 5pm) so that children can play safely with minimal disruption to cars. After this was successfully piloted, the residents set up a new social enterprise Community Interest Company called 'Playing Out CIC' (www.playingout.net). Using combined GPS and accelerometer data, Page and Cooper provided pilot data to demonstrate that a measureable increase in physical activity of approximately 10-15 minutes per day of moderate-to-vigorous physical activity (MVPA) could be obtained during these street closure or 'playing out' events.

2. Increasing awareness and building partnerships

This pilot data was used by Playing Out CIC in partnership with Active Bristol to encourage a cross-department collaboration within Bristol City Council (BCC: Health, Children & Young People's Services, Sustainability and Transport) which led to a change in policy and in the legal interpretation of transport regulations. This created a new Temporary Street Play Order (TSPO) [a] which allowed regular street closures on the basis of a single, annual application. Previously, closures were restricted to two or three times per year. The wide support for the 'Playing Out' model from both the traditional and social media brought the research to the attention of Play England who used the research highlighting the importance of time outdoors to support the case for outdoor play [b] and promote their national Love Outdoor Play campaign.

3. Increasing funding potential and sustainability for third-sector agencies

The underpinning research [1-4] was used in evidence briefings for Bristol City Council [c] which led to increased and longer-term public health funding for Playing Out CIC to deliver street play in 2010. The evidence also helped enhance the funding potential of the play sector more broadly by providing quantitative evidence which had been lacking. As Cath Prisk, Director Play England asserts: *"There is very little quantitative evidence to support the work of the play sector. This is why we've joined up with ENHS as their research has showed that children spent up to 30% of their time outside engaged in 'moderate to vigorous physical activity'. If we could look to build up this kind of robust evidence base it would give ourselves and community based organisations access to further funding"* [d, 2012].

4. Influencing national policy

Page was invited to present a policy briefing on research findings [1,2,4] to senior representatives of the Departments for Transport and Health at two meetings in 2011 and 2012. In response to this, a partnership involving the University of Bristol, Play England and Playing Out CIC was invited to submit a bid to the Department for Health's Innovation, Enterprise and Strategic Development fund. The bid was to roll out the Playing Out model for street play nationally, alongside a national campaign to promote street play and the provision of a web-based hub to support residents in developing play opportunities in their communities. The success of this bid [e], which is the largest single bid ever awarded by the fund, confirms the acceptance of time spent outdoors as an important public health target. The underpinning evidence [1,3,4] was also used in the press release [f] to launch the national Free Range Kids campaign initiated by Sustrans in 2011. This seeks to directly influence policy and practice to encourage children to increase their independent use of the environment. Examples of the impact of the Free Range Kids campaign include political impact via the Early Day Motion 1954 (signed by 161 MPs) [g] and instrumental impact by, for example, the provision of over 25,000 packs for parents to help them increase their children's outdoor play. The importance of street play for children's physical activity and health was recognised in the Annual Report of the Chief Medical Officer 2012 [h]. This report includes the Bristol street play model as a case study and cites ENHS research [5] to signal a shift in national health policy highlighting street play as a significant source of children's physical activity.

In summary, the impact from the underpinning research has significantly benefited children by providing 304,200 new, regular outdoor play opportunities. This translates to an additional ten minutes of MVPA per day. To put this into context, a ten-minute per day change in weekday MVPA increases the proportion of children meeting national health guidelines of 60 minutes per day of MVPA by 9% and children achieving guidelines are 35% less likely to be in the top quartile for waist circumference. Beyond increased physical activity for children, wider benefits include the provision of 1,020 street-play champions within UK communities. They will be supported by over 400 professionals from voluntary and public-sector agencies who will receive new training in delivering street play [e]. The reach of the impact continues to expand rapidly, with the underpinning evidence increasingly highlighted to support policy and practice beyond the UK. For example, Quebec has cited outputs [1] and [7] in making the case for outdoor play being essential to youth health and development, while the 'Healthy Children-Healthy Spaces' collaboration has showcased the Bristol Playing Out model in its campaign to get children active in Canada [i].

5. Sources to corroborate the impact

[a] Temporary street play order
[b] Play England World Without Play Report. January 2012
[c] Bristol City Council City Essential evidence No 36. Independent mobility 2/10/09
[d] Play England. Letter from Cath Prisk, Director Play England
[e] Award details for Street Play Project. Department of Health. Innovation, Excellence, Strategic Development Fund Street Play Programme
[f] Policy briefing and press release to support Free Range Kids campaign
[g] Early Day Motion 1954. Free Range Kids Campaign
[h] Annual Report of the Chief Medical Officer 2012. Department of Health.
[i] Quebec en Forme Free play outdoors an essential part of youth development. Spring 2012.