

<b>Institution: University College London</b>
<b>Unit of Assessment: 14 – Civil and Construction Engineering</b>
<b>Title of case study: Children’s physical activity: stimulating policy debate and health improvements</b>
<p><b>1. Summary of the impact</b></p> <p>Research led by Professor Roger Mackett of the Department of Civil, Environmental and Geomatic Engineering at UCL on children’s physical activity has been used by central and local government, other public bodies and various advocacy groups to encourage children to be more active. It has been used to support policy documents and proposals aimed at improving children’s health and wellbeing. It has led to improvements in the health, welfare and quality of life of many UK communities through, for example, their greater use of walking buses, which also contributes to reduced CO<sub>2</sub> emissions.</p>
<p><b>2. Underpinning research</b></p> <p>Research into children’s physical activity, looking particularly at the benefits of walking to school and the contribution of play, was carried out in two EPSRC-funded projects led between 2001 and 2006 by Roger Mackett (Professor of Transport Studies at UCL since 1997). The projects, on which Mackett was Principal Investigator, also involved researchers from the Universities of Exeter and Oxford, Hertfordshire County Council, and Herts Health Promotion as Co-investigators. All the research was carried out at UCL under Mackett’s supervision.</p> <p>The first of these projects, ‘Reducing Children’s Car Use’, ran between 2001 and 2003. It addressed the issue identified in Mackett’s earlier work for the Department for Transport (1998-2000) that many short car trips in Britain result from meeting the needs of children. Making large numbers of trips by car has possible serious implications for children’s health because of the lack of physical activity, and may contribute to car dependency in later life. The UCL-based research took the innovative step of fitting accelerometers to 200 children for four days and requiring them to complete travel and activity diaries. Mackett’s group devised a taxonomy scheme for the children’s activities, allowing the number of calories consumed per minute on each activity to be calculated. The research showed that not only did children use more calories when walking than they did in the car, but that the older children aged 12-13 used more calories walking to and from school in a week than they did in two hours of PE and games lessons (the recommended standard levels of physical activity for children) [6]. It was also shown that children use more calories in free play than in equivalent organised activities, and that they tend to walk when they go out to play, but are taken by car to organised activities. This research provided useful evidence to explain the increase in obesity amongst children. A specific intervention that was examined as part of this project was walking buses, in which groups of children walk to school under adult supervision. The research found that nearly half the trips made on walking buses were previously made by car, and that children transferring from a car to using a walking bus were involved in an extra 22 minutes of physical activity per day [7].</p> <p>The second project, titled ‘Children’s activities, perceptions and behaviour in the local environment’ (CAPABLE), ran between 2004 and 2006, and sought to monitor and explore children’s interactions with the local environment. In order to achieve this, the research team added GPS monitors, as well as various qualitative indicators such as children’s drawings and interviews with parents, to the tools used previously (diaries and accelerometers) to understand both the quantity and the quality of children’s activity by identifying differences in their behaviour in different environments and under different circumstances. Boys, for example, were found to move about more than girls [1,5]. It was also shown that children moved in much straighter lines when they were accompanied by an adult than they did when they were with other children, suggesting that greater adult supervision of children outside the home may be reducing children’s exploratory behaviour and interaction with local environments [5].</p> <p>The data sets collected on the two projects were combined and analysed in 2012 to show the hypothetical benefits to children of a switch to year-round British Summer Time. These benefits accrue particularly from the findings of the research that children tend to be more active when evenings are light [4], and that children who walk to school are more active at other times [3].</p>

Mackett has been able to incorporate a strong international-comparative perspective on the earlier research through his contribution between 2007 and 2009 to a project funded by the Norwegian Research Council comparing children’s car use and physical activity in Britain, Denmark, Finland and Norway [2]. Mackett provided the data for Britain and participated in the discussions leading to the conclusions that children in Britain use active travel less than in the other countries. In 2009 Mackett joined a project led by the Policy Studies Institute to examine how children’s independent mobility has changed over the past 40 years and how it varies around the world. The results are currently being published. They show that children’s independent mobility has continued to decrease in England over the period 1990-2010, but at a slower rate than in the period 1971-1990 and that children have less freedom to go out without adult supervision than in most other countries.

**3. References to the research**

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2. Fyhri A, Hjorthal R, Mackett R, Fotel T and Kyttä M (2011) Children’s active travel and independent mobility in four countries: Development, social contributing trends and measures, Transport Policy, 18, 703-710. [doi.org/fm63j7](https://doi.org/10.1016/j.tranpol.2011.05.007)
3. Goodman A, Mackett R L and Paskins J (2011) Activity compensation and activity synergy in British 8-13 year olds, Preventive Medicine, 53, 293–298 [doi.org/cc66m8](https://doi.org/10.1016/j.ypmed.2011.05.007)
4. Goodman A, Paskins J and Mackett R L (2012) Day length effects on children’s physical activity and participation in play, sports and active travel, Journal of Physical Activity and Health, 9, 1105-1116 (URL: <http://journals.humankinetics.com/jpah-back-issues/jpah-volume-9-issue-8-november/day-length-and-weather-effects-on-childrens-physical-activity-and-participation-in-play-sports-and-active-travel>).
5. Mackett R L, Brown B, Gong Y, Kitazawa K, Paskins J (2007) Children’s independent movement in the local environment, Special Issue of Built Environment on ‘Critical approaches to designing environments/environments designed for children’ 33, 454-468 [doi.org/fhdp8s](https://doi.org/10.1080/09697260701431888)
6. Mackett R L, Lucas L, Paskins J and Turbin J (2005) The therapeutic value of children’s everyday travel, Transportation Research A, 39, 205-219. [doi.org/bfn35b](https://doi.org/10.1016/j.tranra.2005.05.007)
7. Mackett R L, Lucas L, Paskins J and Turbin J (2005) Walking buses in Hertfordshire: Impacts and lessons, Report, Centre for Transport Studies, UCL. Available on request.

References 1, 5 and 6 best demonstrate the quality of this research.

**Research grants:** The two EPSRC projects mentioned above were funded for £317,058 (GR/N33638/01 – Reducing children’s car use) and £385,026 (GR/T09378/01 - CAPABLE)

**4. Details of the impact**

The research outlined above has had multifarious impacts: it has influenced central and local government policies relating to play and school transport; contributed to public discourse about, and engagement with, the same issues; and improved health, welfare and quality of life in many UK communities through, for example, their greater use of walking buses.

**Stakeholder engagement:** Mackett has communicated his research findings to government and community stakeholders through more than 25 invited presentations since 2008. These have included conferences and seminars for professionals involved in children’s travel and play, including the Play Research Network (1 Feb 2008), Play Scotland (19 Nov 2008), the Health and Consumers Directorate General of the EU (11 Feb 2011), the West Midlands Region School Travel Advisors (3 March 2011), and at invited seminars in Romania (10 November 2008) the USA (20 Feb 2009) and New Zealand (5 Nov 2012).

**Informing policy advocacy:** The Sustainable Development Commission, formerly the UK government’s independent adviser on sustainable development, cited Mackett’s research on calories burned by children undertaking various activities and using various modes of travel in its 2011 report ‘Fairness in a Car-dependent Society’, quoting various results as part of the discussion about obesity [a, pages 29, 67]. Advocacy groups such as Sustrans and Living Streets, and local groups, frequently cite Mackett’s research as evidence for action to be undertaken to increase children’s physical activity. For example, Sustrans quoted Mackett in an October 2011 submission on road safety to the parliamentary Transport Select Committee [b], while Living Streets cited his

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work in an expert paper included in NICE public health guidance on promoting walking and cycling, issued in November 2012 [c]. 'State of Play', published by the Association of Play Industries for use by advocates of children's play and the play equipment industry, quotes Mackett in outlining the benefits of play for children's health and in claiming that children tend to walk when they go out to play. They use this **evidence to argue for safer streets and places for play** [d, page 11]. Play England, a charity supported by government departments and industry, which seeks to promote the vision in the UN Convention on the Rights of the Child, used Mackett's research to **argue for the health benefits of children's play**, and Play Wales used the research to **provide evidence for public health specialists, primary care teams and healthy school co-ordinators about the benefits of children's play** [e, pages 4-5; f, page 2].

**Influence on policy documents and guidelines:** In 2008, the National Institute for Health and Clinical Excellence (NICE) produced 'Guidance on physical activity, play and sport for pre-school and school age children' for health and transport policy makers and practitioners, which includes a cost-effectiveness analysis of four interventions to increase child and adolescent physical activity. One of the interventions considered was walking buses to school: **evidence from Mackett's research was used by the NICE team to demonstrate that this was the most cost-effective intervention** [g, pages 5-12, 27-29]. Additionally, the research on the benefits of play has been **widely taken up by central and local government**. It was cited in the document 'Fair Play: A Consultation on the Play Strategy, A Commitment from the Children's Plan' issued by the Department for Children, Schools and Families and the Department of Culture, Media and Sport [h], which says: "Active play is also one of the best ways for children to burn calories outside of PE lessons." [h, page 10]. This consultation was **used to develop the National Play Strategy**, published in December 2008 and which set out the government's 10-year vision to deliver more and better play opportunities for children in England.

**Implementation by local authorities:** Conwy Active for Life, published by Conwy County Borough Council (2011) "to strategically prioritise effective delivery mechanisms to ensure that Conwy is a county where physical activity is at the heart of the community", cites Mackett's research about the benefits of various types of play for children [i, page 12]. Figures from the Reducing Children's Car Use study published in 2004 are used to **calculate of the number of calories consumed walking and cycling to school** in the School Travel Health Check (STHC) tool which is **used by local authorities and schools to set priorities, outcomes and milestones** to improve active and sustainable travel to school [j]. In 2011, the STHC was used by 29 local authorities, 4,626 schools, and over 1.5 million pupils, for example in Plymouth, Bristol and Cornwall [k]. The STHC was also used in the 2012 South East Dorset Multi-Modal Transport Study [k], which led to the adoption of School Travel Plans in Bournemouth to encourage more walking and cycling to school and has been used by Dorset County Council to set targets for walking and cycling. This strategy to increase walking and cycling by children will require a budget of £2.042m over 15 years [k].

**Informing media coverage:** This has helped to further **inform public understanding of the importance of children's activity**. Since 2008, this has included an article on the effects of parental choice of school on children's physical activity levels, in the Daily Telegraph; the risk of children whose parents drive them a lot becoming car-dependent adults, in the New York Times; and a BBC Breakfast television feature on children's independent movement on urban areas. [l]

**Improving children's health through the institution of walking buses to school:** Since the publication of the 2008 NICE guidance on physical activity, play and sport for children (which drew on Mackett's research, as noted above), **walking buses have been set up around the country**. 130 now exist in Staffordshire, for example; a further 60 have been set up in Kent and 30 in West Sussex [m]. The benefits of these buses extend, moreover, beyond positive impacts on children's health and well-being to **environmental benefits arising from reductions in the number of car journeys** made to school: in Thurrock, Essex, for instance, estimates show **walking buses have saved an average of 2160g of CO<sub>2</sub> per mile** [n].

**Preventing school closures:** Campaigners used the research on children's travel to school to help make the case to keep Bearsden Primary School at Bearsden Cross, in East Dunbartonshire, Scotland, rather than move to Castlehill where, it was claimed, more children would need to travel by car [o]. Campaigners said that closure would damage educational outcomes, represent poor value for the council taxpayer and harm the commercial and community heart of Bearsden. The

school was subsequently saved [o].

### 5. Sources to corroborate the impact

- [a] Sustainable Development Commission (2011) Fairness in a Car-dependent Society, available from <http://www.sd-commission.org.uk/publications.php?id=1184>.
- [b] Sustrans' written submission to Parliament cites Mackett, <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmtran/506/506we03.htm>; their website cites outputs [1] and [6]: <http://www.sustrans.org.uk/policy-evidence/related-academic-research/children-and-active-travel>
- [c] Living Streets' expert paper, cites output [6]: <http://www.nice.org.uk/guidance/index.jsp?action=download&o=58975>
- [d] Association of Play Industries (2011) State of Play, A report into the future of UK play provision and the Playbuilder legacy (2008-2011), available from <http://www.api-play.org/upload/public/documents/webpage/Lobbying/API%20state%20of%20play%20report%20WEB.pdf>
- [e] Play England (2010) People make play: The impact of staffed play provision on children, families and communities, available from <http://www.playengland.org.uk/media/120465/people-make-play.pdf>;
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- [j] School Travel Health Check.co.uk, Standard STHC Analysis Output, available from <http://www.sthc.co.uk/Report.aspx>
- [k] Use of School Travel Health Check, available from: <http://www.acttravelwise.org/news/1663>. Plymouth: <http://www.plymouth.gov.uk/sthc>), Bristol (p. 37 [http://www.bristol.gov.uk/sites/default/files/documents/transport\\_and\\_streets/walking/WALKING%20STRATEGY%20-%20FINAL%20VERSION%20-%20JAN11.pdf](http://www.bristol.gov.uk/sites/default/files/documents/transport_and_streets/walking/WALKING%20STRATEGY%20-%20FINAL%20VERSION%20-%20JAN11.pdf)) and Cornwall <http://www.cornwall.gov.uk/default.aspx?page=27198>; Atkins (2012) South East Dorset Multi-Modal Transport Study, available from <http://www.dorsetforyou.com/media.jsp?mediaid=175733&filetype=pdf>
- [l] Raising awareness through the media of the importance of children's activities: BBC Breakfast 8 May 2008; Daily Telegraph, 17 January 2009 <http://fw.to/qf92IOB>; New York Times, 27 March 2009 <http://nyti.ms/HgMuDu>;
- [m] Number and use of walking buses: Staffordshire (<http://www.staffsaferroads.co.uk/walking-bus/guidance-leaflets>), Kent (<https://www.canterbury.gov.uk/parking-travel-roads/walking-cycling/walking-buses/>) and West Sussex (<http://www.westsussex.gov.uk/default.aspx?page=10124>)
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- [o] Save Bearsden Primary (2013) Response to the East Dunbartonshire Council Primary School Estate Review: February 2013, page 26, available from <http://savebearsdenprimary.com/wp-content/uploads/2013/02/Save-Bearsden-Primary-response-040213.pdf>; Save Bearsden School wins on East Dunbartonshire Council's merger proposal (2013), available from <http://forargyll.com/2013/03/save-bearsden-school-wins-on-east-dunbartonshire-councils-merger-proposal/>.