Understanding Children’s Travel Behaviour in the Local Environment: The Implications for Physical Activity and Health

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The Fellowship Chairman,
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Roger Mackett has been Professor of Transport Studies at UCL since 1996. He is a member of the Committee on Transportation and Land Development of the US Transportation Research Board, and a member of the Programme Development Group for the NICE (National Institute for Health and Clinical Excellence) public health programme guidance on Physical Activity and the Environment. He was a Specialist Adviser to the House of Commons Education and Skills Select Committee on the inquiry into the Draft Bill on School Transport, and Chairman of the Transport Economists’ Group. He is currently leading research projects examining Children’s Activities, Perceptions and Behaviour in the Local Environment (CAPABLE) and developing a software tool AMELIA to enable transport policies to be more socially inclusive as part of the work of the AUNT (Accessibility and User Needs in Transport) consortium funded under the EPSRC SUE programme.

Abstract

Children walk and cycle less than they used to. This has implications for their amount of physical activity and hence for their health. This lecture will draw upon some recent research into these topics, which has been led by the speaker. The research has involved the use of a variety of techniques including fitting children with GPS monitors and accelerometers, and asking them to complete activity and travel diaries, questionnaires, interviews and mapping exercises. From these research instruments it has been possible to show how walking and playing contribute to children’s quantity of physical activity and to examine the factors that influence whether they are allowed out without an adult, where they go, and how intensively they walk. From this it is possible to understand more about how children walk and play and how they use the local environment. The findings from this work should contribute to the design of environments that encourage children to walk and play more, and so lead happier and healthier lives.
Physical activity is related to health. Those who do not work in the health field tend, I think, to assume that this is a simple relationship; I am told by those who work in the health field that it is, in fact, extremely complicated. The simple working assumption I am making is that the more physical activity you do, the better it is for your health. I am going to talk about the elements within the oval in the diagram and look at the effects of travel behaviour and activities on the quantity of physical activity. I am not exploring the relationship between physical activity and health because I do not work in the health field, although there are plenty of people who do, some of whom are in the audience here.

I am going to start by talking about some concepts. We are very interested in independent movement by children, in other words, children going out and deciding for themselves where to go, what to do and so on. I think that it is generally accepted children do less of this now: they do not go out as much as we did when we were young, when we played by the river and all sorts of similar things. There is plenty of evidence that children are going out much less without adults, and also that we have increased car use by children. We can link the reduction in walking and cycling and the opportunity to protect children by escorting them, through the increased use of the car. (Figure 2)

I deliberately chose a rather long title in order to be all-embracing and to cover all of the things that I wanted to bring together. When I was asked to give this lecture I thought that it would be a good idea to think through the research that we had done and show what we had discovered. It is very much exploratory research in a field which I moved into through a chain of circumstances.

The origin of this work was a project that we carried out for the Department for Transport about ten years ago, looking at ways of reducing the number of short trips by car. One thing we realised was that a large proportion of these trips are carried out on behalf of children, carrying children from one place to another, to and from school etc. Then, fortuitously, an opportunity came up to obtain some funding, so we decided to do some research in this area, looking at children’s travel.

I would like to explain how I think travel behaviour and health fit together. There are links between where people live, how they travel, their forms of travel, where they go to, and the activities they go to (the shops, the schools and so on). This travel behaviour affects the amount of walking and cycling and that contributes to their volume of physical activity, as do some of the other activities. These all occur in the environment, and the type of environment that they are in will affect the amount of physical activity, the amount of walking and cycling and so on. (Figure 1)
I think that we can identify three sorts of travel by children: there is mandatory travel, parent-centred travel and child-centred travel. The mandatory is the trips that they have to do, which is go to and from school, and that trip is determined by where they live and go to school, but there different ways that they can walk, cycle and so on, but that is likely to be decided by the parent. Children do a lot of things which are essentially parent-centred. It is a form of childcare: if you have a child whom you perceive is too young to be left at home, then you have to take the child with you, even if the trip has nothing to do with him or her; for example, parents go shopping and they take the child with them. If a parent goes to collect one child, they may have to take the second child with them. This can become very complicated. And then thirdly, the most interesting type of travel is when children decide for themselves: this is what we are really interested in, where children make decisions, for example, choosing where and when to go; it is all part of their learning experience about how to cross the road, how to find their way about, make explorations, and so on. There are issues which are much more interesting than those associated with either of the other two types of trip because there the child is not in control. (Figure 3)

If you look in the National Travel Survey it will tell you that children cycle a lot less than they used to, but sales of bicycles are very high because cycling is not only a way of making a journey for children, it is a recreational activity, which is good, but it does make sorting out the data rather complicated. Is window-shopping a trip because you are walking along, or is it an activity because you are looking in the shop windows? It does make the whole survey and analysis process much more complicated. I think it is probably true that the separation of travel and activity is much less for children than it is for adults.

We obtained some money for a project called Reducing Children’s Car Use for just over three years funded by the EPSRC, that is the Engineering and Physical Sciences Research Council, under their Future Integrated Transport programme. Remember integrated transport? That was a very popular phrase about 1997/98. We looked at children in Years Six and Eight (that is aged ten to eleven and twelve to thirteen), all in Hertfordshire. We were looking at the effect of car use on children’s quantity of physical activity and car dependency, and we also looked at interventions to increase the amount of walking. Having done that, we obtained some more funding from EPSRC to conduct a project, that has just finished, called CAPABLE: Children’s Activities Perception And Behaviour in the Local Environment. This looked at children in Years Four, Five, Six and also some in Year Seven. We extended the fieldwork to Lewisham in London to do some comparison work and looked at how children use the local environment, the effects of parental supervision on the children’s use of the environment and developed methods to measure these. (Figure 5)

This is the core of what I am talking about: it comes from both the projects, particularly the second one. The methodology is very much exploratory, demonstrating a number of interesting phenomena. We collected all sorts of information: characteristics of the children, the characteristics of the parents and
their attitudes, and we did some interviews to find out what the children did, who went with them, where they went and how active they were. So what I want to do first of all is to talk about the fieldwork we did to collect the data and then I will talk about some of the results. (Figures 6)

We asked the children questions by using questionnaires, shown above. I know you cannot read the detailed questions but this is the questionnaire that we used which was filled out by about a thousand children in Lewisham and in Hertfordshire. We had no trouble getting them to fill it up. We also sent a questionnaire to the parents. It is actually four pages although the slide only shows one page and that is rather fuzzy. We can match up the two questionnaires: we look at the views of the child and the views of the parent and put the two together, including parental perceptions of what the child does. It included for example, interesting things such as the age at which the child is allowed out on his or her own. (Figure 7 and 8)

We measure how active children are by using motion sensors or activity monitors: the slide shows one called an RT3 which the child wears in a pouch around his or her waist. These are very reliable and deliver interesting results because you can download the data and it gives you a trace over the day. In the slide, this is from seven in the morning till seven at night, and shows how active the child was. We can obtain a picture of how active the child was over the day. For this child, on a school day, we can see him or her going to school, play time or physical education (PE), lunchtime, and going home from school. (Figure 9 and 10)

At the same time, these children kept diaries. We spent a long time trialling our design of the diary because any travel diary is tricky and if you are asking children...
as young as ten to complete it, you need something fairly clear. In the diary, we asked them what they did, what time they left, where they went to, what time they got there, how they travelled, and the form of travel. We used this diary in both the earlier project and the later one, but we added, in the second one, a question about whom they went with so that we know whether they were by themselves or if they were with an adult, with other children, or with both of them. (Figure 11)

We obtained rich data which we could then map onto the RT3 data: we could identify what they were doing, where the activity was, and how active they were. We had to devise a classification system for the activities which took quite a long time as the children could write what they liked and obviously a child’s description of an activity can be quite interesting. We ended up with 56 categories of activities. From that we can work out how active they are in doing all these different activities in terms of activity calories per minute, which we call ‘intensity’. (Figure 12)

We asked them to keep travel and activity diaries…

In the second project, we fitted the children with GPS (global positioning satellite) monitors. The US Department of Defence has a system of satellites circulating around the world and you can link into them with one of these devices and it will tell you, with an accuracy of about ten metres, where you are. The sort shown in the slide stores that information. Over a period of time, effectively about a day because of battery life, you obtain a trace of where you have been for the whole period. Some of my colleagues may smile at that because they know it does not always work quite as well as that, but that is the theory. As they have clocks in them we know exactly where they were and when. You can obtain a trace of their movements. (Figure 13)

We fitted them with GPS monitors…

We carried quite a lot of work to find the most appropriate sort of equipment. The slide shows the lightest equipment we could find; there was other equipment that was better in terms of collecting data but was so heavy that the child could not wear it. In the United States they have some equipment that weighs half a kilogram which is very good but I tried it on my children and they said, ‘You carry it’ which rather defeats the object of the exercise, and they could not run with it because it was so heavy. In fact, the person who invented it has said that they have had…
difficulties because children are saying that it is not ‘cool’ to wear that equipment. But no child involved in our work in Hertfordshire was unhappy wearing the equipment as it was just like a big watch, so it was seen as satisfactory. We did not dare ask the children in Lewisham to wear them. There is a lot of street crime in Lewisham and we did not want these children being mugged for our equipment. So we only did this in quiet, low-crime Hertfordshire.

The GPS provides a trace which provides a fairly good picture of where the child goes; in this case this was from home to school in Cheshunt. We do not know exactly where the child lives, only the postcode area, so when it says home on the map, that is an approximation. But it gives a pretty good trace showing where that child went and we can, of course, relate that to what they were doing from the diaries. (Figure 14)

For example, this is a child playing football, then walking home and then playing out around where he lives. (Figure 15)

We can plot these things in three dimensions if we want to; for example we can colour code by what the activity was and use the length of the bar to reflect how active the child was in terms of calories being used per minute. So we have good picture, literally, of a boy walking along, and when he gets to football he is much more active as we see from the longer lines. There is a lot of other analysis we can do. (Figure 16)

I have identified a few themes to look at this evening: looking at how things have changed over time, why children travel, the effect of car use on their physical activity, children’s independence, i.e. being allowed out by themselves, and then, at the end, putting it all together. (Figure 17)

This graph is based on figures from the National Travel Survey. It shows that children are walking less. It shows travel to school: the green is walking and red is car and you can see that in the last 20 years for both younger children and older children, there has been an observable decrease in walking and an observable increase in the amount of travel by car. One of the reasons for it is because (again based on data from the National Travel Survey) people travel further to school than they used to 20 years ago. This is probably partly due to school selection policy. What we do know is that children are, on average, travelling quite a bit
further to school and that is one of the reasons, but not the only one, why they are more likely to be travelling by car to school. (Figure 18)

Actually travelled a long way to school. I am not sure what that proves but it is an interesting phenomenon. (Figure 20)

One of the reasons that the children are taken to school by car is not because the parents are bad or anything like that at all, but because the child is dropped off from a car which is going on to another journey. For only about a third of the trips to take the children to school by car, was the journey being made purely for that purpose. In most cases, the child was being taken by car because the parent, generally (but not always) a mother, was dropping them off on the way to work. In other cases because there was more than one child, they were going on to another school, and sometimes on to shopping. I could discuss this in detail but it does seem to me there is an assumption about the journey to school that leads to a lot of criticism being made of mothers who are taking their children to school by car, whereas it is much more complex than that, to do with the complexity of their lifestyles and various other factors. (Figure 21)

Now you might think that is partly because people used to live nearer to school than they do now, but we asked the parents about that. We asked how far their school was from where they lived when the same age as their child was at the time of completing the questionnaire: less, about the same, or more than their child’s? Overall, they said it was more: they believe that they used to travel further to school than their child does, despite the fact that more children are now travelling by car. I suspect this is false memory syndrome on behalf of parents a lot of whom, of course, walked and who believed they

One of the reasons that the children are taken to school by car is not because the parents are bad or anything like that at all, but because the child is dropped off from a car which is going on to another journey. For only about a third of the trips to take the children to school by car, was the journey being made purely for that purpose. In most cases, the child was being taken by car because the parent, generally (but not always) a mother, was dropping them off on the way to work. In other cases because there was more than one child, they were going on to another school, and sometimes on to shopping. I could discuss this in detail but it does seem to me there is an assumption about the journey to school that leads to a lot of criticism being made of mothers who are taking their children to school by car, whereas it is much more complex than that, to do with the complexity of their lifestyles and various other factors. (Figure 21)

This is from the diaries of the children in the first of our two projects, although we have repeated the exercise with the second project and we obtain much the same results. What we have here is the activities
the children do over a week classified by whether they walk; go by car or other forms of travel, generally bus or bicycle. If we highlight those walking and going by car, it can be seen that, overall, they go to about the same number of places by the two forms of transport, but the place they walk to most is to school. On the other hand the car tends to be for things like going out on trips with the parents. There is quite a difference between the type of trip that they make by car and those that they walk. (Figure 22)

If we look at another part of the table you can see they do not do a lot of going out to play in the streets or the park. A lot of children’s after-school time is not spent going out to play; it is spent going to football club, ballet class, Scouts, Brownies and so on. Just thinking of my own children: one day is swimming, another day is Brownies, another is Beavers, then we have athletics, and we have dancing; it goes on and on, but our lives are not as complex as some. Children, rather than going out to play, go to lots of these very structured activities; the point is, when they go to play, they tend to walk; when they go to the other activities, they tend to go by car. One of the reasons children travel by car more now than they used to is this transition from playing to these organised structured activities, and that, I think, is one of the real problems we have. (Figure 23)

From the activity monitors we can show that walking is better than going by car because for every minute walked the children use 2.3 activity calories compared with 1 when travelling by car. Bus is quite good because bus trips have a fair bit of walking in them. Cycling is, of course, good from this point of view but the cycling data are not very reliable for two reasons: (1) because there are hardly any children cycling in our survey and (2) because cycling does not record very well on our monitors due to the way a bicycle is ridden. But certainly the message is that walking is good for you, and we can quantify the extent to which it is better than car. (Figure 24)

If we look at some of the activities we recorded, it can be seen that the best thing children do is PE and games, which is not surprising, because if PE and games lessons do not make children active, what does? The next thing is unstructured ball games, for example going out to kick a football around. Then comes structured ball games. This is very popular with the play lobby, because we have some evidence that suggests that going out to play is better for children in terms of activity calories than things like organised sport. I think that this is because, in organised sport a lot of the time is spent changing into special clothes and being told how to do things, instead of actually doing them. Next comes walking, which is amongst one of the best things they can do, and then other unstructured activities and the school break, which goes against arguments in favour of reducing the length of school break. The things which are worst are sitting in lessons doing nothing active and just being at home. Children are much more active at other people’s homes than at their own, so if a child goes to someone else’s home they are very active: they are playing with their friends, bouncing on the bed and so on, but at home they are much more sedentary. (Figure 25)

When we saw that walking is one of the best things to do in terms of calories consumed we thought “That is
great because now we can argue that if we get more children walking to school, they will use a lot more calories. However, the amount of time they spend a day walking to and from school is not large: an average of about 6% of the calories they consume in total was spent travelling to and from school. So, even if lots of children did switch to walking it would not make a huge difference in terms of total number of calories spent. The other problem is, of course, most children who can walk to school already do so. I do not think there are all that many children who could switch because either they live close enough and they already walk, or they live so far away that walking is not really an option.

We can break the analysis down into the younger and the older children and girls and boys to show the different levels of intensity for car, bus and walking and bicycle: we should really always divide them up into boys and girls and younger and older because they have different characteristics, but that would usually be too much information to present here. (Figure 26)

We believe it is good to walk to school but we could not provide a convincing way to demonstrate it. Then we hit on the idea of taking the two hours of PE and games, which is the recommended standard, and looking at the activity calories that the children spend in two hours of PE and games lessons a week compared with or travelling to and from school by car, bus or walk. We find that if they walk to and from school, they use more calories than they would in two hours of PE and games. This result, whilst not true of the younger children, was quoted in The Times and various newspapers. But walking to school being better for you than PE and games lessons is not really the right message because it seems to imply that you should not do PE and games lessons because they are a waste of time. It was a popular result, a soundbite, and I am now told there are schools claiming that if children walk to school, that contributes to the quantity of physical activity they are supposed to do. (Figure 27)

We looked at the intensity of the activities, shown down the left hand side of this slide, against the method of travel used to reach the event. For PE and games, other lessons and school break, the mode of travel to school is used. We can see that the children who walked to all those activities are using more calories when they get there than the ones who went by car. (Figure 28)

We took the analysis further and divided the children into two groups: on the graph the ones in green are
the ones who spend more time walking in a week than they do in the car and the ones in red are the ones who spend more minutes in the car than they do walking: it is a simple partition based on whether they spend more minutes walking or more minutes in the car. If we look at the intensity, i.e. calories per minute, we find the same phenomenon as before. In other words, there is evidence here of the children in our sample who walk more being more active in doing other things. We do not know what the underlying reason is here, but we suspect there are two sorts of children: those who tend to walk and are active and those who sit in the car and are not active, and we suspect that it is probably related to what their parents do. In other words, the parents who take their children by car a lot also do not encourage them to be active, whereas the other parents walk a lot, get their children to walk and encourage them to go out. This is an interesting area to explore further. (Figure 29)

Let us move on to children’s independent travel. This is based on surveys done in Lewisham on 383 Year Seven children, who are those in the first year of secondary school. Lewisham is in south east London, and varies in character from inner city to pleasant suburban. (Figures 30 and 31)

We were looking at the effects of being allowed out and which factors relate to this. For example, this slide shows the percentage of the children who are allowed out alone against the number of adults in the household. All together about 74% of these children are allowed out alone and the other 26% are not, and we can see that boys tend to be let out more than girls. Interestingly, we found that more of the children with only one adult at home, presumably a single parent, are allowed out than those living with two parents at home. (Figure 32)

We also found that for girls whether or not they are allowed out on their own tended to be related to having an older sibling, but it made no difference for boys. (Figure 33)

We also found that if they have a communal play area outside, which may be visible from the home, they are more likely to be allowed to go and play in a way that children who do not have that sort of space are not. In other words, there seems to be a relationship between activities in a communal play area, which might be grass or it might be a playground of some sort, and whether or not they are allowed out on their own. (Figure 34)
More children with access to a local park were allowed out alone compared than those who do not have access to a local park. (Figure 35)

It can be seen that, of the boys who are allowed out alone, 95% go to local shops, whereas only 77% of those who are not allowed out alone go there. In almost all cases, the left hand figure is higher than the right. It does seem that if children are allowed to go out alone, they are more likely to go to these sorts of places and therefore arguably do more interesting things, and have more interesting lives, than those who are not allowed out and therefore are kept indoors unless with an adult. (Figure 37)

For girls, there is much less difference between those who are and those who are not allowed out alone; however, only half the girls who are not allowed out alone go to the park, whereas most of those who are allowed out alone go there, which may have important implications for physical activity. (Figure 38)

I am now going to talk about the surveys using the GPS monitors for the sample from Cheshunt, which is in eastern Hertfordshire, using children of Years Four, Five and Six, that is aged eight to eleven, fairly evenly split between boys and girls. We have a
reasonably compete data set for 162 of these children: it is not a huge number but we were asking them to complete diaries, wear the activity monitors and the GPS monitors which is quite demanding on them. (Figure 39)

This slide shows the percentage of trips to events that were walked. We can see that about 36% of their trips are walked, and, interestingly, the girls are walking more than the boys which slightly surprised us. We find that the type of trip for which they do the greater proportion of walking is, not surprisingly, going out to play (in yellow in the graph), followed by going to school. The one they walk to least is shopping which is the one they mainly do with their parents, and that is the one they tend to go on by car because the parents want to go by car and so they take the child along. (Figure 40)

Looking at the types of things that they walk to with an adult, it tends to be, first, schools (in red in the graph) and, second, shopping. When the children go with an adult, they tend to go either to school because they are being escorted or because they are going out with a parent on the type of trip that parents do. They do not tend to walk with an adult to playing: that is the yellow strip. (Figure 41)

This shows the distribution of events that children walk to without an adult. School is the main type of walking trip that children make without an adult. When they go out by themselves many of girls’ trips are also out to play, while many of the boys walk to after-school clubs without an adult. The girls are more inclined than the boys to walk to the shops. I have a daughter aged ten who has recently discovered shopping as a phenomenon and when she says, ‘I want to go shopping’, I say ‘Why? What do you want to buy?’ She says ‘Nothing, I just want to go shopping’. I see shopping as an activity where the purpose is to buy something but my daughter sees it as something where you go and look, not necessarily to buy. (Figure 42)

This shows at the intensity and the different types of walking they do. We find is the thing that they are most energetic at, where they use the most calories, is walking to school (that is the red bar). There are two reasons for this. The first is that they may be late for school and school is something you have to get to and, second, they tend to be with adults. The least active is going out to play. For playing they are much more likely to be going out without an adult, and one thing that we have found is that children are much less energetic when they are not with an adult than they are with one. This is not a reason why they should...
always go out with an adult, I hasten to add. The child going out to play is much more relaxed about things. (Figure 43)

This graph on the left shows the calories used when the children are not accompanied by an adult while the one on the right shows the calories used when they are accompanied. You can see that, in most cases, the lines on the right hand side are higher than the equivalent ones on the left. In other words, when they go with an adult they walk along energetically, whereas when they are with other children or just by themselves, they tend to be much more relaxed about things. In particular, girls, when they go shopping, are very relaxed: it is not an active activity. This is not a criticism: I am not suggesting they should not go shopping; we want them out doing things but when they are being taken out by an adult, most of them are being metaphorically dragged along the street. On the other hand, when they go out by themselves and with their friends it is much more sauntering about. (Figure 45)

Another aspect that we have to looked at is the angle of movement. From the GPS trace we can work out the average number of degrees turned each minute. I term this ‘sinuosity’, which is how much they wiggle about as they walk along. We find, interestingly, that despite the fact they are using less energy and they are much slower, the children’s movement patterns meander a lot more when they are not with adults. In other words, the children are pottering about, not going very far very fast and they are wiggling about a lot. I am not quite sure what we make of that but it is an interesting phenomenon to observe and it does not surprise me that boys are do more of this wiggling about than girls. (Figure 46)
Having put this all together, we can map it out. Of course there are many GPS points and the data are not perfect. The map above shows colour-coded activity levels, with empty circles showing the low activity, the blue the moderate activity, and the red the high activity. (Figure 47)

We can produce animations of specific activities (see www.casa.ucl.ac.uk/capableproject/maps). This still from the animation shows the activity levels of a child walking home from school. The child started walking home on the street, then went across the playing field being very active and then became less active. (Figure 49)

Similarly, we can look at what the children do. These are the unstructured activities, the playing activities, dog walking and some other quite interesting activities. We have not analysed it all yet, but it can be seen that the children do interesting things. (Figure 48)

This is a case of a mother and child walking the dog: they walk along, speed up a bit and become a bit more active and then slow down, becoming slower and slower until as they reach home. (Figure 50)

This is a child playing football and running round. We see a good picture of how he is running round, and when he has finished playing football he goes off towards the car park, but he returns to the field, perhaps he has forgotten something, and then he goes back to the car park. Now the odd thing about this is the fact that while he is playing football and clearly running around a lot he appears to be very inactive; we need to investigate that one further but those are just three examples of the sort of thing we can do. (Figure 51)

I am going to finish here. I have not followed a linear path from logical objectives, through analysis, to conclusions but there are a lot of findings here. We
know that children are walking less than they used to and are less active because of more car use and being allowed out less. There is a complex relationship between car use and physical activity. Being allowed out without an adult is a very important phenomenon, and we found that children tend to potter around much more when there is no adult there. (Figure 52)

Where to next? We have to do further analysis of the existing data with statistical testing where we can. Then there are further things we could look at: measuring the local environment better, comparing different areas, and seeing if children behave in different ways in different environments. We also want to look at whole households, not just the children because parental behaviour seems to be an important influence, and then we can extend the method to other population groups like the elderly. (Figure 53)
Discussion

Rod Kimber

That was a fascinating picture. To have data set out in such a systematic way to be able to test hypotheses is excellent. I am sure there will be interesting questions so let us get straight to them.

Question

I can see a lot of my own experience reflected in your data - where you were saying about the trips being part of another journey or not, whether it just goes to school or whether it is part of a combined journey. It is the experience that we see in a variety of different schools; the percentage of those trips is an absolutely critical question because it varies hugely between different schools and the breakdown of the population. Did you pick up anything like that? You alluded to it a little bit in terms of the parents, the number of parents in a household and particularly in terms of socioeconomic background, and also in terms of ethnicity. Some of our wealthiest backgrounds often have the highest levels of car use and walking. I do not know if you found any of that in your studies?

Roger Mackett

We did not actually have a question about socioeconomic status: it is quite a hard thing to ask questions about, but we do have ethnicity, so we can look at that and we can, of course, compare Lewisham and Hertfordshire. I am sure you are right: there is a big variation across schools. On the earlier project, we had two researchers, both of whom are female, and they felt very strongly about this. They felt that women were being victimised, being told that they must not drive their cars to take children to school but it was alright for men who want to be able to drive their cars to work, and I do have some sympathy with that. It seems to me that many people who take their children to school by car do it for a good reason in the sense that they do not have a lot of choice. Of course, that choice might be related to where they chose to live and which school they have chosen. Once they have made that decision, they are pretty well captive to using the car. So there is a lot that we could explore.

Question

Postcode?

Roger Mackett

We have postcodes, and we have used the Mosaic database in some of the analysis.

Question

I wonder whether you have got enough data to show whether the trips in households which are new to car ownership differ from households which you might say are mature car owning households. This could have interesting implications for the future as households generally become more car mature.

Roger Mackett

No, we do not have household by household breakdown of length of car ownership. It is an interesting question. We only know how many cars they have now and which adults in the household can drive, and whether a car is normally available for going to school. We do not know how long they have had a car for, so we cannot look at length of use of the car, but it is an interesting question for another study.

Question

On your football issue, were you measuring activity in that example based on the GPS trace rather than the activity monitor?
Roger Mackett

It was the activity monitor that gave a very low value. But when the subject starts to go towards the car it goes up, so it is possible he was not wearing it when playing football. It is possible he took it off although were that the case then we would not get any value at all.

Question

The point I was coming to is that the GPS measures location, the activity monitors measure activity, but both are ways of measuring movement. I suppose there are different uses for different circumstances; while the monitors will tell you about how much the kids are moving around, they will not tell you where they are doing it and the GPS works well where you have got lots of linear movement rather than running backwards and forwards. So you need to think carefully about outcomes and what you are trying to measure.

Roger Mackett

The RT3s worked much better: you obtain data continuously. The GPS gave us all sorts of problems which I did not really go in to. The problem is the equipment is not yet at a point where it does all you want. For example, the children had to charge the battery up every night because there is no equipment which will last without recharging and store enough information, since they use a lot of power to take the signal from the satellite. To have enough batteries to last four days would make it very heavy, too heavy for them to wear, so then it would affect their behaviour. I do not know whether we had more problems than other people who seem to be using them more successfully. Researchers in Bristol seemed to be obtaining better data than we are. It is still very experimental and we have people from the United States and Australia contacting us to find out how we are getting on. There is worldwide interest in what we are doing, but the technology is not yet sufficiently mature to give reliable results.

Question

I wonder if your data gives you an overview of the relative number of trips of different types that children make. One of my concerns is the complete preoccupation with the trip to school when looking at children’s travel. But when looked at from the child’s point of view and the point of view of experiences, for whatever reason, in childhood, there are any number of other trips that are just as significant. Is it because we grown-ups want to get them out of the way during the rush hour that the school trip is the focus? Does your data set give you an overview of the relative proportion of different types of trips?

Roger Mackett

We know most of their trips are not to school and most of their car travel is not to school, but, of course, it is much easier to target the journey to school, because it is a well-defined trip. You can aim material at homes, you can aim it at the schools, but all this other travel is so much more complex and hard to summarise, and it tends not to be looked at. The damage is done if you see it as bad that children are taken around by car. Of course, a lot of it is not for the child’s benefit, it is for the parent’s benefit, as a form of childcare. If you are going to the shops, it is easier to take your child with you if you are not prepared to leave them at home, or you feel you cannot do so. So the children spend a lot of time in cars not going somewhere for their benefit but because the parents need to go somewhere. It is an interesting phenomenon. We do know that most of their travel is not to school and even more of the travel by car is not to school.

Question

My question is more from my experience as a school governor of about six years in a school in south London and I am very surprised when you say the parents who drive their children to school have little choice other than use the car. That certainly has not been our experience for a suburban primary school in London, in a typically Catholic area. The catchment area is 2km or less where virtually everybody could potentially walk to school; yet there is a very high proportion of parents who drive their children, and it seems the common pattern. Can the figures for this in Hertfordshire be replicated in Lewisham?
Roger Mackett

We could certainly look at that but I do not think there is much scope for getting children out of cars. As I say, many of them do walk already; in fact, half the children walked to school in our survey and that is also seen in the National Travel Survey. I am saying that a lot of the children who do go by car do so for these other reasons: to do with being dropped off by a parent on the way to work and so on. Not many trips are being made just to take the child to school; these would be the ones that you could most easily switch from the child going by car to the child walking.

Question

At 3.20pm you see a lot of cars arriving quite a few minutes beforehand and just waiting by the school waiting to pick up the kids, so it does not suggest they are rushing away from somewhere to somewhere.

Roger Mackett

You certainly do see some: I know it happens round our children’s school. There does not have to be a huge number of them to be very annoying. It is something we need to look at. I do not think there is a huge number of children that could switch, but maybe you are right, maybe there are more than I think, or it may be specific to the area.

Question

I think one thing that might be interesting to explore, if your data collection method allowed it is: who is choosing the mode, or how much influence do these children have in the choice? Presumably the younger the child the less choice they have if they are being taken more or less forcibly by a parent, either for a child-related reason or a parent-related reason. The older the child becomes the more autonomous they become, and maybe options narrow at that point because presumably these children are not old enough to be choosing to drive themselves, but they have other independent modes becoming available to them which they are allowed to use. But I wonder in that circumstance, how much peer pressure applies and how much parental example applies? One thing that is very interesting about cycling, if I can just give you this example, is that at one time cycling used to be the poor person’s mode and the better off you were, the more access you had to other means of travel and you abandoned the bike. Now that is completely reversed: if you look at London now, there is virtually no cycling in Newham which is a relatively socially disadvantaged borough, but there are huge amounts of cycling in Richmond and Kingston which are relatively affluent because it is a conscious lifestyle statement that people there are making. Presumably that rubs off on the next generation and I wonder whether you would need a lot more sample studies to pick those spatial variations up.

Roger Mackett

We would, but one of the things we have done, which I did not talk about at all, is to conduct some interviews, particularly with children in Lewisham, about the question of who makes the decision on where they go and so on, but I did not have time to cover all that. It is one of the reasons why we are very interested in the idea about who makes the decision on how much children are allowed out. There are two issues: one is the car and the other is allowing children out by themselves. There is evidence that they are allowed out less than they were a generation ago. Some of you may know a very interesting book ‘One False Step’ by Mayer Hillman, John Adams and John Whitelegg. I did some comparisons between our data and their data. They showed the decrease in the age at which children are allowed out on their own between 1970 and 1991; and if our figures are comparable, and I am not sure that they are, it does seem to have bottomed out. That is it has not gone down much more, perhaps because it cannot do so because of the large number of children who are now not allowed out alone. The big growth in car use was in the late 1980s. There has been growth over time, but it has not been a constant growth.

Question

Is that to do with second car ownership?
Roger Mackett

It probably is, yes.

Question

One of the interesting things you pointed out was about women being lambasted for their journeys and I wonder if you know from your data the proportion of women who are in full time work? Because I know other people have expressed an opinion that one of the reasons there has been a change in taking children to school by car is the dramatic rise in women in full time work, or going back to work. So this idea of dropping children off on the way to work is now much more focused on female activity. How much of the effect is related to women going back to work around the late 80s?

Roger Mackett

We do know whether the women are working full time, part time or not employed, so we could look at that.

Rod Kimber

On that note, I think we ought to wind up. It has been a very interesting talk, Roger, and I think it shows all sorts of promise for the future. Many thanks.