

Attitudes to walking and cycling among children, young people and parents: a systematic review

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ABSTRACT

Introduction

Promoting walking and cycling as a part of everyday activity is seen as a strategy for tackling obesity and chronic disease. Policy needs to be based on evidence about people's views of walking and cycling as well as effects of interventions.

Methods

We searched systematically for, and applied a framework analysis to, studies of the views of children, young people and parents about walking and cycling. The findings were synthesised and compared with the findings of an effectiveness review of interventions for encouraging walking and cycling as an alternative to motorised transport.

Results

The synthesis of views described a culture of car use, fed by a fear and dislike of local environments and parental responses that emphasised children's safety at the expense of developing their independence despite children expressing responsible attitudes towards transport choices. Comparison with effectiveness literature found that most evaluated interventions targeted only the public's fear and dislike of local environments.

Conclusion

Interventions need to address pedestrian and cyclist safety, perceptions of risk, and parental norms regarding children's independence.

INTRODUCTION

There is currently widespread policy concern about the **low level** of physical activity and the increasing incidence of obesity and chronic disease in the UK. The promotion of walking and cycling is a promising way to increase physical activity across the population by integrating it into daily life. These public health goals are consistent with cross-sectoral interest in the wider benefits of a shift away from car travel to non-motorised transport.

The recent systematic review by Ogilvie et al [1, 2] has provided a comprehensive summary of the evidence of effectiveness of interventions intended to promote walking and cycling (active transport) as an alternative to travel by car. They found relatively few interventions rigorously evaluated for their impact with children, young people or parents. The interventions **included those in the following categories:**

- 1) Behaviour change programmes, e.g. social marketing, where messages about active transport are targeted at individuals.
- 2) Publicity campaigns, e.g. mass-media advertising.
- 3) Infrastructural or engineering measures, e.g. traffic calming and cycle routes.

Ogilvie et al [1] concluded that there is some evidence that behaviour change interventions can bring about a shift to walking and cycling among motivated groups; **the evidence regarding publicity campaigns and engineering measures is inconclusive.**

However, looking at effectiveness alone is limited. Other study designs, especially studies of people's views, are valuable sources of data to inform public health interventions. Such 'qualitative' research is often capable of opening up the so-called 'black box' of quantitative trials and epidemiology, to expose why interventions work or do not work.[3] In particular, it can help to identify and develop promising interventions.[4-6]

This paper reports a systematic review of studies of the public's views of walking and cycling as modes of transport, which was commissioned by the Department of Health for England.

METHODS

Research questions and user involvement

For systematic reviews to be relevant to policy and practice, **the involvement of potential users in the review process is of value.**[7, 8] User involvement in this review was sought through an advisory group, including policy specialists, practitioners and researchers, representing a number of organisations.

The Advisory Group's remit was to advise the research team on the scope of the in-depth review and to refine the research questions, including the relevant populations and aspects of walking and cycling. At its first meeting, we presented the Advisory Group with a summary of the research conducted in the UK since 1995. This research 'map' was designed to answer the initial question:

- What research has been undertaken about the public's views of walking and cycling as modes of transport?

A consensus emerged in the Advisory Group that there was a need to **understand** what works for children, young people and parents. Thus, the final (in-depth) review question was:

- Do children's, young people's and parents' views illuminate the findings about effectiveness of interventions to promote their walking and cycling?

Group members were also asked to identify potentially relevant research, to comment on draft documents, and to help to produce recommendations for policy and practice.

Searching

We located studies using searches on seven major databases (CSA, IBSS, PubMed, Geobase, HMIC, HELMIS, and Transport), two databases including grey literature (Dissertation Abstracts, the British Library catalogue), and 31 websites containing databases of relevant material. Searches combined terms relating to views studies and terms relating to health promotion and transport. A list of all sources searched can be found in the full report at <http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=942>; **full search strategies are available from the authors on request**. In addition, we hand-searched two conference proceedings (European Transport Conference, Velo-City) and two journals (*Transport Policy*, *Transport Reviews*) for the years 2000-2005. We asked the Advisory Group to help identify relevant research, and contacted experts in the field. Finally, we scanned the reference lists of included studies for relevant references, and searched citation indexes (SCI/SSCI) for authors of included studies.

Inclusion criteria

Studies were included in the descriptive map presented to the Advisory Group if they:

- were conducted in the UK;
- were published from 1995 to 2005; and
- accessed people's ideas about, or experiences of: walking and cycling initiatives; what influences whether they walk or cycle; and their ideas about what could be done to promote walking and cycling.

All study designs were eligible for inclusion, as long as they investigated people's views. For the in-depth review focussed on children and young people, the definition of young people was up to age 21.

Description of studies

Two reviewers independently applied framework analysis to code each included study, and then met to compare their analyses and arrive at a consensus. The methods and quality of each study were also coded by two reviewers independently employing a standard data extraction tool.

Focus of studies

We applied framework analysis [9] to all the studies included in the map. Hypotheses were derived from the background literature about the factors influencing people's

transport choices, and their views regarding these factors. We also drew on background literature about social determinants of health,[10] tackling inequalities [11] and theoretical models in health promotion.[12, 13] Together these suggest that the most promising interventions will be multifaceted, and target determinants at the following interrelated levels: the individual (e.g. knowledge, attitudes, self-esteem), the community (e.g. social support networks, family relationships), and the wider society (e.g. social class, access to resources and services). The levels of influence and hypotheses together provided an initial framework for coding the studies. In addition, new topics (e.g. theft) were incorporated as they emerged from the data. The resulting topics included both known advantages and disadvantages of walking and cycling (e.g. health, environmental benefits, costs, convenience) and variables which may influence the relevance of these factors (e.g. journey type, age, gender). We recorded the number of studies in which people identified each factor as potentially or actually influencing their behaviour.

Methods of studies

Studies were described in terms of their aim and rationale, design, sampling strategy, recruitment and consent procedures, description of the sample, data collection methods, data analysis methods, and methods of the study and their appropriateness for eliciting the views of children, young people and parents.

Quality assessment of studies

All studies reviewed in depth were assessed using ten criteria addressing four main quality issues.[14] Two relate to the quality and reporting of the study's sampling methods (identification of the sampling frame, and of the methods used to obtain the sample). Four relate to the quality of the description of the sample in the study (the total number of participants, their ages, sex, and socio-economic status). Two relate to the reliability and validity of the tools used to collect data. Finally, one criterion relates to whether studies used appropriate methods for helping people to express their views, and another the relevance of the study to the review question. Each study scored 0, 0.5 or 1 point on each criterion; only studies with a total of 7 points or more were included in the synthesis of findings.

Synthesis of views evidence

The framework analysis was taken further to review in depth the findings of studies addressing the views of children, young people and parents. Tables grouped factors according to whether they might influence behaviour individually, or through families, the community, wider society or the environment. Factors of influence within these levels were noted, as were demographic data; who expressed the view (child, young person or parent); children's age and sex; the socio-economic status of the area; urban, suburban or rural location; and whether the view expressed was about walking or cycling. Findings relating to these factors and circumstances were summarised and collated from all the contributing studies to provide as complete a picture as possible. We drew on these summaries of findings to describe the range and nature of views, and find associations and discrepancies between these views with a view to providing explanations for the findings. Our explanations were presented as overarching themes, from which we developed implications for interventions.

Comparison with effectiveness evidence

The findings of our views synthesis and those of the synthesis of evaluations of interventions in the review by Ogilvie et al [1] were then compared. We tabulated the implications for interventions which had been developed from the views synthesis against the characteristics of evaluated interventions.[6] This enabled us to identify which influences on walking and cycling from the views studies have been addressed by evaluated interventions. It also enabled us to investigate whether more effective interventions have addressed factors identified by the views studies, and which recommendations for intervention development derived from the views studies have yet to be addressed by interventions evaluated in the outcome studies.

RESULTS

Included studies

Our searches identified a total of 6,484 unique records. Following screening of these records, we systematically identified, retrieved and described 106 reports of 97 UK studies of people's views. Of these, 34 studied the views of children, young people and parents, and were assessed for their quality (see 'Quality assessment of studies' above). The 16 studies judged to be higher quality were reviewed in-depth. [15-30]

These studies covered a range of topic areas and included children (up to age 10, N=8), young people (aged 11-21, N=10) and parents (N=5). A diverse range of methods was used to elicit participants' views, including questionnaires (N=12), discussion or focus groups (N=9), and individual interviews (N=5). Six focussed on walking, and one on cycling; the remaining nine studies elicited views on transport in general. Three studies were process evaluations of UK-based interventions designed to increase walking and/or cycling. In total, studies included at least 8,776 respondents. **We present here a summary of the results; full analysis can be found in the technical report (<http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=942>).**

Themes: factors of influence

A list of themes found in the views studies, categorised by type and level of influence, is presented in Tables 1-4. For reasons of space, Tables 1-4 present only themes found in more than one study.

Table 1. Factors of influence in the views studies (N=16): wider societal and environmental level

Barriers and problems	Number of studies	Facilitators and benefits	Number of studies
Dangerous traffic	12	Needed facilities	12
Weather	10	Environmental aspects	10
Convenience	9	Convenience of walking/cycling	8
Existing facilities	8	Traffic jams	8
Distance	7	Costs	7
Length of time / speed	5	Length of time / speed	5
Cost	4	Weather	3

Timing / time of day	4	Road sharing	2
Hills	3		
Complexity of journey	2		
Time of year	2		
Comfort	2		

Table 2. Factors of influence in the views studies (N=16): community level

Barriers and problems	Number of studies	Facilitators and benefits	Number of studies
Fear related to safety / accidents	10	Opportunity for sociability	10
Lack of sociability	8	Improved safety / reduced accidents	7
Cultural factors	7	Accompanied travel	5
Crime	7	School / local authority influence	4
Time pressure	6	Time pressure	3
Quality of surroundings	6	Training	3
Gender differences	5	Quality of surroundings	3
Peer pressure	5	Gender differences	2
Travelling alone	4	Peer pressure / status	2
School influence	3		

Table 3. Factors of influence in the views studies (N=16): family level

Barriers and problems	Number of studies	Facilitators and benefits	Number of studies
Needing parental permission	9	Having parental permission	5
Car use for protection	4	Parental approval	2
Parental responsibility	3		
Parental disapproval	2		
Parental perception of children's abilities	2		

Table 4. Factors of influence in the views studies (N=16): individual level

Barriers and problems	Number of studies	Facilitators and benefits	Number of studies
Preferences and choices	11	Prefer to walk or cycle	12
Limited independence	7	Improved physical health / physical activity	9
Impact on physical health / effort / fatigue	6	Psychosocial health	6
Psychosocial health	5	Enjoyment / fun	6

Car use	4	Car use	5
Acceptability	3	Independence / autonomy	4
Comfort	3	Gender differences	4
Road behaviour	2	Road behaviour	3
Age	2	Journey type	2
Enjoyment / fun	2		
Embarrassment	2		
Journey type	2		

Data were also extracted on the principal findings for each theme. Tables 5-6 provide summary examples of the findings relating to barriers and facilitators encountered at one of the levels (wider society and environment).

Table 5. Example of detailed findings: wider social and environmental barriers and problems related to active transport

Theme	Findings
Traffic	Both children and parents see traffic as a restriction on children's and young people's walking and cycling. The danger presented by busy traffic is a concern,[17, 19, 21, 26, 30] although as regards cycling this may be perceived as less important by cyclists than non-cyclists.[21] Driver behaviour is dangerous and disrespectful to other road users.[18, 19, 21, 24]
Weather	Bad weather is widely regarded as a disincentive to walk or cycle.[15, 20, 26]
Convenience	Car travel is generally perceived as more convenient than walking or cycling, particularly by parents.[19, 20, 26, 30]
Existing facilities for pedestrians & cyclists	The lack of facilities, particularly engineering infrastructure such as cycle parking and pedestrian crossings, is a significant barrier.[20, 21]

Table 6. Example of detailed findings: wider social and environmental facilitators and benefits related to active transport

Theme	Findings
Needed facilities	Numerous facilities which do or would help people to walk and cycle more were mentioned in the studies, including: safer pedestrian crossings;[22, 24, 25, 27, 28] more walking paths and pedestrian areas;[24, 26, 27, 29] speed bumps and speed restrictions for traffic;[15, 18, 24] cycle lanes;[21, 24, 26] and secure cycle parking.[21, 29, 30]
Environmental aspects	Walking and cycling are seen as environmentally beneficial, more by younger children than by older children or parents.[19, 20, 26, 27]
Convenience	Walking and cycling are perceived as convenient modes of transport.[21, 26, 29, 30] This perception is held more by children and young people than by their parents. Walking is more often seen as convenient in urban areas, and cycling in more rural areas.
Traffic	Controls on traffic are perceived by both children and parents as

	facilitating walking and cycling. This includes speed limitation [18, 27] and re-routing traffic away from areas such as schools. [27]
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Synthesis of views

Five overarching explanations of transport choices were derived from the themes identified through framework analysis.

1. Culture of car use

This heading subsumes the perception of cars as more convenient than walking and cycling, the status of car ownership and the perception of cars as ‘cool’, and the view of car ownership and use as integral to a normal adult lifestyle, which militate against the use of active transport. Whilst the impact of this culture is strongest on parents and older young people, it is already manifest in the views of young children.

2. Fear and dislike of local environments

Fear of the local environment includes **barriers present in the social environment** such as those relating to safety, traffic, the need for appropriate facilities and concerns about theft and other crime, **as well as negative features of the natural environment**. This fear was expressed by both children and parents and can take many forms, from immediate practical worries to a diffuse perception of walking and cycling as involving exposure to hostile surroundings.

3. Children as responsible transport users

Children expressed clear and definite views, often diverging from their parents’, relating to their transport preferences, the environmental impact of different transport modes, and the benefits of walking and cycling in terms of safe accompanied travel, sociability and health and fitness.

4. Parental responsibility and behaviour

Both children and parents mentioned the pressure on parents to fulfil expectations about being a ‘good parent’ by ensuring their children’s safety. Children viewed their parents’ car use as part of a pattern of behaviour whereby children’s independence is limited in the name of safety.

5. Contextual factors

The views of children, young people and parents differ depending on, among other factors, age, sex and location (urban, suburban or rural). Any interventions designed to increase walking and cycling may have to be tailored according to these factors.

Implications for policy, research and development

The final stage of synthesis was to draw out implications for interventions from the findings of the views studies, utilising the broad topics identified in the thematic synthesis. These implications were then compared with the findings of Ogilvie et al’s review,[1] both the interventions identified as soundly evaluated and effective, and the interventions which may be promising but have not been soundly evaluated. The goal was to identify effective interventions that are appropriate for UK populations, appropriate interventions needing more rigorous evaluation, and to suggest other interventions based on people’s views.

1. Culture of car use

The views studies highlighted the culture of car use as an important influence, implying that educational or marketing-based interventions may gain from more explicitly addressing the perception of car travel as normal. Our findings suggest that such interventions should be targeted towards younger children, since these preferences are already well-established by early adolescence.[18, 19, 20, 26, 30]

No interventions sought directly to change children's or parents' preference for car use, or perceptions of the high status of car ownership and use. However, some behaviour change interventions [31-33] addressed perceptions of car travel as more convenient than walking or cycling; these interventions were successful with motivated population subgroups.

Parents' and older children's emphasis on the convenience of car travel may relate to cultural or preference-related influences as much as to structural factors. In particular, the perception of walking and cycling as less convenient may indirectly reflect an association of these modes with low social status. Nonetheless, behaviour change programmes are likely to be more successful if they are undertaken in conjunction with structural and environmental interventions to make walking and cycling more convenient.

2. Fear and dislike of local environments

As well as barriers arising from the natural environment such as weather and hills, which were mentioned in several studies,[15, 20, 26] negative perceptions of the social environment were widely reported. Parents cited risks from traffic and 'stranger danger' as a reason to drive children from place to place, particularly to school.[16, 18, 23] Implications for policy suggest a need to improve the environment, and to encourage accurate perceptions of risk.

Interventions trying to change accident rates by engineering work (i.e. changes to the physical environment) produced ambiguous results. Two studies conducted in England [34, 35] reported reductions, and a third [36] reported an increase in accidents, **although these changes were not shown to be statistically significant.** The need for appropriate facilities for walking and cycling was addressed in a controlled evaluation in Delft, in the Netherlands, in which an improved and extended cycle network was installed.[37] A positive shift toward cycling was observed, **but was not shown to be statistically significant.**

Only one intervention study directly measured perceptions of risk. The study of school travel plans in Camden and Islington [38] assessed parental fears of traffic danger, abduction danger and bullying after one year. These fears were not significantly reduced in the intervention group compared to the control group. None of these interventions resulted in a significant increase in walking or cycling.

Addressing perceptions of safety in designing new interventions is likely to be challenging for two reasons. First, as noted above, environmental interventions to improve the safety of walking and cycling are often ambiguous in effect. **No interventions which work by improving safety have been shown to be effective in promoting walking and cycling.** Second, perceptions of safety do not appear to be highly correlated with measured rates of accidents or crime. For example, Department

for Transport statistics on child deaths and serious injuries in Great Britain indicate that rates for child pedestrians and cyclists fell by 49% and 54% respectively between 1994-98 and 2005;[39] whilst cycle mileage by children decreased by 18% over the same period, pedestrian mileage increased by 5%.[40] Although these figures indicate that both modes have become substantially safer in recent years, our data suggest that parents are still concerned about the safety of walking and cycling.

These reservations aside, this analysis provides several prompts for future intervention research. Researchers should continue to evaluate the safety effects of infrastructural interventions, and their effects on attitudes to the local environment. Behaviour change and publicity campaigns should emphasise that walking and cycling are not intrinsically dangerous activities, and promote perceptions of local environments as safe where this is appropriate. Concerns about safety from accidents particularly need to be addressed amongst younger children, and those about safety from personal attack amongst older girls and in urban locations. **Interventions could also attempt to address perceptions of natural factors such as weather as barriers to walking and cycling.**

3. Children as responsible transport users

Our findings indicate that children and young people may be particularly receptive to messages emphasising the environmental benefits of walking and cycling, their in promoting health and fitness, and the opportunities they offer for social contact with friends and family.[15, 19, 20, 21, 26, 27] Since children's (particularly younger children's) perceptions of walking and cycling are substantially more positive than adults', adapting existing interventions to incorporate children's own perspectives is a promising direction.

None of the evaluated interventions was specifically tailored to children's and young people's perceptions; only one uncontrolled study [41] evaluated an intervention which emphasised environmental benefits and was implemented in schools as well as community settings.

4. Parental responsibility and behaviour

Our findings indicate that parents perceive a trade-off between ensuring children's safety and fostering their independent mobility.[15, 18, 30] Intervention design needs to take this perception into account, and, where appropriate, to address social norms which discourage parents from allowing their children to walk and cycle. It may also be of value to encourage children to engage critically with these norms.

As noted above, the relation between perceived safety and objectively measured risk is unclear. Parents who express concerns about the safety of active transport may believe that car travel is less dangerous than walking or cycling, or may wish to accompany their children to minimise the risk of traffic accidents, abduction or attack. If the latter, these concerns might be addressed by accompanying their children on foot or by bicycle – or having another trusted adult accompany them – and do not imply that the car must be used. This example suggests that parents' concerns about the safety of active transport may reflect social pressures to be a 'good parent' by adopting cultural norms defining safety, as much as assessments of the risks associated with different transport modes. Children and young people themselves frequently query the restrictions which are placed on their mobility in the name of

safety.[19, 23] Many parental concerns are well-founded, and ensuring that walking and cycling are safe should remain a priority. However, addressing these concerns also requires attention to expectations and norms about parenting.

No intervention studies directly addressed such expectations and norms. The only intervention to encourage children to think critically about car use in their own families was the programme in Adelaide,[42] which encouraged children participating in the school-based part of the intervention to relay the lessons learnt to other members of the household.

DISCUSSION

The synthesis of views from qualitative research reveals a culture of car use, fed by a fear and dislike of local environments and parental responses that emphasises children's safety at the expense of developing their independence, despite children expressing responsible attitudes towards transport choices.

Strengths and limitations of the review

Previously, syntheses of the public's views and effectiveness evidence prepared simultaneously have been integrated in a cross-study-type synthesis.[6] This is the first time that a views synthesis has been integrated with an effectiveness synthesis prepared and published by another research team. As such, it provides a novel way of extending the existing evidence base.

However, the scope of Ogilvie et al's review of interventions [1] was not identical to that of our review. First, while the review of interventions benefited from including international literature, our review of views studies included UK-based studies only. Second, the review of interventions **included only** population-wide strategies reporting a shift away from car transport towards walking and cycling. **Third, our cross-study-type synthesis included only interventions evaluated in controlled trials, whilst Ogilvie et al's review imposed no such limitation.**

The use of summary scores for critical appraisal in research syntheses is not uncontroversial.[43] Our quality assessment process resulted in the exclusion of 18 lower-quality studies from the review. The choice of a different cut-off point for defining quality would have resulted in a different mix of studies. In particular, most of the excluded studies focussed on cycling.

CONCLUSIONS

In this review, we looked at a range of views concerned with factors influencing walking and cycling among children, young people and parents. There were four themes which stood out clearly: a strong culture of car use, fear and dislike of local environments, children as responsible transport users, and parental responsibility for children.

These findings indicate strong public support for structural measures such as cycle lanes and traffic calming, although further intervention research is needed to establish the effectiveness of such measures. Communicative interventions such as behaviour change programmes and publicity campaigns, for which there is some evidence of

effectiveness, may benefit from taking the public's views into account. In particular, perceptions of walking and cycling as dangerous activities are an important barrier to the promotion of active transport. Whilst research and policy should seek to promote the safety of pedestrians and cyclists wherever possible, our findings suggest that over-emphasising safety may discourage walking and cycling by focussing attention on the risks involved, at the expense of the potential benefits of an increase in physical activity. Parents' concerns about safety, and their perception of a conflict between promoting their children's activity and independent mobility and protecting them from harm, are well-founded. Nonetheless, policy makers should be careful not to exacerbate this conflict, and seek to help parents to achieve a better understanding of the risks involved in not allowing their children to walk or cycle to school.

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Competing interests

None declared.

Authors' contributions

AO and SO conceived the study with the funders and, with GB, designed the study and interpreted the findings. SO facilitated stakeholder participation and designed the analytical framework and method; the latter were further developed by GB. GB designed and conducted the literature searches; TL and KO located the studies. GB, TL and KO quality assessed and extracted data from the included studies. GB prepared the synthesis, supported by SO. GB, SO, TL and KO prepared the first report. TL prepared the first draft of the journal article. AO, GB and SO reviewed the draft article for important intellectual content. All authors approved the final version for publication.

What is already known

- The promotion of active transport (walking and cycling) is a promising way to increase physical activity, especially for children and young people.
- There is limited evidence that interventions to promote walking and cycling are effective; behaviour change strategies may be effective for particular groups.

What this paper adds

- Walking and cycling are perceived by children and young people as less convenient, pleasant and safe than travelling by car.

- Children and young people would like to walk and cycle more and be more independently mobile, but are restricted by their own and their parents' concerns about safety.
- Most evaluated interventions targeted the public's dislike of local environments, but not the culture of car use, nor the tension between children's protection and developing independence.

Policy implications

- Policies to promote walking and cycling are likely to be more successful if they address concerns about safety, and promote the capacity of children and young people to make their own transport choices.

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