



Young adolescent pedestrians' and cyclists' road deaths: analysis of police accident files

Prepared for Road Safety Division, Department for Transport

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Executive Summary

As part of its strategy to halve the number of children's road deaths by the year 2010 the Department for Transport (DfT) commissioned TRL to study the accident circumstances for fatally injured child casualties aged 9-15 using police accident files. The objectives of the study were:

- to classify the circumstances of each accident and the social circumstances, educational development and health attributes of the child fatalities;
- to identify populations with a relatively high risk of accident involvement;
- to determine how fatal accident victims do or do not differ from the general population and where counter measures should be aimed to be most effective.

The pattern of the circumstances of the fatal accidents recorded in the police files was similar to that indicated in a variety of studies of child pedestrian and cyclist accidents. Boys were more likely than girls to be involved in an accident, especially as a pedal cyclist. A high proportion of the accidents were on main roads: almost half of the child fatalities were involved in accidents on A-roads. Twenty percent of the pedestrian fatalities occurred on dual carriageways, and nearly half of the accidents were on roads with a speed limit above 30mph.

Most of the accidents occurred when the child was out playing or at leisure and relatively few accidents happened on the journey directly to or from school. This was consistent with the time of the accidents. Young adolescents were at greatest risk during the early evening. An early morning peak for pedal cyclists was related to the young adolescents using their bicycle on a paper round.

The study provided new information on the pattern of accompaniment among child fatalities. Two-thirds of the fatally injured children were accompanied and most were with friends (57%). Less than 10 per cent of the child fatalities were accompanied by an adult. Most fatalities occurred when children were in a small group, with one or two other children of the same age and sex. Girls were more likely to be accompanied at the time of the accident than boys: overall 45 per cent of the male fatalities were alone at the time of the accident compared to 28 per cent of the females.

Although the information in the police files was primarily directed towards looking for any evidence of lack of care by the driver, it also provided a picture of child behaviour. The reports suggested that quarter of the child pedestrians had crossed the road without looking both ways and/or crossed at an inappropriate location. The majority of child fatalities in this age group were not taking part in extreme risk activities, but there were some examples of this especially among cyclists, riding at speed out of junctions or being towed by a vehicle. One in ten pedestrians ran into the road whilst playing chase or another game, although, only one was believed to have run in front of the car deliberately. Other pedestrians crossed against traffic lights or at unsafe location. Over a third of

cyclist fatalities were involved in a collision after riding off the pavement and across the road. Cyclists were particularly vulnerable when moving across the road or turning right. The study showed that many of the cyclist fatalities did not appear to look behind or signal their intended manoeuvre clearly enough. In other cases the cyclist's poor riding position was highlighted.

Generally, the behaviours described were not untypical of those observed of adult pedestrians or cyclists. This suggests that in some cases the young adolescent might have lacked the skill or experience to complete the behaviour safely.

Limited data were available from police files on socio-economic group and disability of the child so the following findings are indicative and require further study. There was insufficient evidence to determine whether the young adolescent fatalities were from lower socio-economic groups. However, analysis of ACORN categories indicated that there were no significant differences in the proportions of fatalities in the categories most likely contain children aged 9-15. This suggests that the relationship between accident risk and low socio-economic group may decline or diminish in this age group. Relatively few fatalities were reported as having a disability, but it is possible that this is an underestimate as temporary or permanent disability was not routinely reported in the police files.

Countermeasures aimed at young adolescents should reflect the following factors highlighted by this study. Children in this age group are in a transition period between the training they received at earlier ages, involving recommended crossing drills, and the apparently less constrained crossing behaviour of adults. It is important to differentiate between their need for further specific 'training' and their need for more general awareness of risk.

The frequency with which accidents appear to be associated with lack of concentration on the crossing task suggests that it would be useful to try to raise adolescents' awareness of risk. Children of this age are not involved in transport activities in which they influence risk directly except cycling. It is possible that this may result in overconfidence in drivers' abilities to counter any errors they make as pedestrians. Distractions are present in a variety of forms so it may be more effective to focus on a general message, rather than highlighting particular distractions.

The evidence of alcohol involvement, although only in a relatively small number of incidents, suggests this should be given particular attention. The frequency of inappropriate use of dual carriageways should also be addressed. It is not obvious that engineering or speed reducing measures would be of any greater benefit to this age group than to the general pedestrian population.

1 Introduction

Road accidents are the leading cause of accidental injury death amongst children and young people (Accidental Injury Task Force, 2002). In 2002, 101 children (0-15 years) were killed whilst walking or cycling (DfT, 2003).

To address this problem, the Government published its road safety strategy and casualty reduction targets '*Tomorrow's Roads – Safer for everyone*' in March 2000 (DETR, 2000). The strategy focused upon halving the number of children killed or seriously injured by the year 2010. The Government aims to do this through a combination of engineering, enforcement and education measures: engineering measures to improve residential roads, such as traffic calming; enforcement measures targeted at getting drivers to reduce their speed; and education measures to develop road-user skill (Department of Transport, 1996).

Monitoring of progress towards the casualty reduction target showed that children aged 11 to 15 years had the slowest rate of decline in numbers of pedestrian deaths and serious injuries in recent years. Child pedestrians in their early teens are particularly vulnerable: those aged 11, 12 and 13 are most likely to be killed or seriously injured. For pedal cyclists it is males aged 12 to 14 years and females aged 10 to 14 years that are most likely to be killed or seriously injured.

As part of the Department for Transport's (DfT) programme to investigate the road behaviour of young adolescents, TRL was commissioned to carry out a programme of research into adolescent road users. This programme of research encompassed three related projects: the study of attitudes and behaviour of adolescent road users (see Elliott and Baughan, 2002; Elliott, 2004); the behaviour of adolescent children in groups (see Chinn, Elliott, Sentinella & Williams, 2004); and a study of the accident circumstances for fatally injured casualties, aged 9-15, described in this report.

The objectives of the latter study were:

- to classify the circumstances of each accident and the social circumstances, educational development and health attributes of the child fatalities;
- to identify populations with a relatively high risk of accident involvement;
- to determine how fatal accident victims do or do not differ from the general population and where counter measures should be aimed to be most effective.

This report provides an analysis of police fatal accident files and focuses upon pedestrian and pedal cyclist accidents.

2 Methodology

The study reviewed two sources of records to identify the accident circumstances and characteristics of the fatally injured children:

- police fatal accident reports; and
- Coroners' records.

2.1 Police fatal accident reports

TRL collects the fatal road accident reports from police forces in England and Wales for the Department for Transport. The police normally retain files for a period of between 3 –7 years, to allow reasonable time for enquiries from parties involved in civil litigation, before they are destroyed. It is these files that are no longer required by the police, which are collected by TRL for research.

Details of road accidents between 1986 – 1995 from 42 police forces in England and Wales detailed in the reports have been recorded in the 'Intermediate-level database' (IDB) (Minton, 2000). This database is linked to the national road accident database (STATS19), which was used to identify the cases.

The original police reports were then obtained from the archive for analysis. As accidents rather than casualties were selected, some of the accidents involved the death of more than one child or included other seriously injured casualties.

2.1.1 Content of police fatal accident files

The content of the files varied, but might contain the following items:

- An accident report book or form. This varied in format between the forces but in all cases recorded the accident statistics for STATS19. Some books contained additional space to record names and addresses of the witnesses, the driver's initial explanation, a summary of the accident or other information connected to the investigation.
- Notification of the coroner's verdict.
- A record of any conviction (offence and sentence).
- Post-mortem report.
- Communication between police officers on the case about whether charges should be brought against the driver. Letters to and from the Crown Prosecution Service (CPS) were also available if the CPS had been consulted about the case.
- Details of the offences the driver was charged with.
- Summary of Evidence, written by the reporting officer to a senior police officer, which included a recommendation about whether charges should be brought against an individual.
- List of witnesses.
- Witness statements, including statements from an accident investigator and/or vehicle examiner.
- Driver's statement or transcript of the interview with the driver.
- Plan of the accident site.
- Map of the location of the accident.
- Photographs of the scene and vehicles involved in the accident.
- Correspondence with the family of the victim.
- Newspaper articles.
- Requests from the media.
- Requests from solicitors for copies of evidence for use in civil proceedings.
- The coroner who dealt with the inquest.

2.2 Accessing the Coroners' records

A pilot study was conducted to explore the value of using coroner's records to supplement the IDB sample.

TRL wrote to 12 Coroners in Berkshire, Hampshire, Buckinghamshire, Oxfordshire, Avon and Surrey, and received a positive response from eight. They agreed to allow a researcher to visit their offices, or where the archives were stored, by appointment to examine specific files.

TRL researchers made four visits to the coroner offices in Surrey, East Berkshire, Avon and Hampshire to examine the files for 11 cases.

2.2.1 Coroners' files

The police provide the coroner with a copy of their evidence. Thus, the coroner's file contains the majority of the information described above. However, an accident report book or form will not normally be included. In addition to the information provided by the police, the coroner may ask his officer to obtain supplementary information about the deceased in the form of statements from the deceased's family or other witnesses. The purpose of the coroner's inquest was to determine the cause of death, for example from natural, accidental or unlawful causes.

The coroners' files examined in the current study contained little additional information about the child. One coroner explained that he usually explored the background and actions of the child at the inquest. A transcript of the inquest was available for four of the 11 cases and was examined in detail but did not provide any supplementary information. Additional items of information that might be found in the coroners' files were:

- the occupation of the deceased's father;
- the deceased's medical history;
- the cause of death (obtained from the coroner's certificate after inquest); and
- the place of birth (within UK or outside).

In cases where there was a prosecution of the driver for causing death by dangerous or reckless driving, the coroner's file did not contain any witness statements as the inquest had been integrated into the trial proceedings. The file would be held by the Crown Court in those circumstances.

The coroners offices visited did not hold computerised records that enabled easy access to their records and in most instances the information required to retrieve a file was the name and the date of death of the fatally injured road accident casualty. This information would need to be obtained from the police after identifying the case number in STATS19 or using information from the coroner's certificate after inquest. This approach means more recent cases than those available from the IDB could be accessed through Coroners, but it would be costly and time consuming, due to files being available in only small numbers and in paper format in Coroners' offices. It was, therefore, agreed that this study would focus upon analyses of police accident case files.

2.3 Developing the coding frame

Factors related to accident risk have been identified from studies of children's road accidents. These include:

- exposure to the traffic environment;
- social factors such as family size and structure (which have been linked to inadequate supervision); and
- the physical environment, with greater risk in densely populated and residential areas carrying through traffic (see reviews Christie, 1995a; White *et al.*, 2000).

Research has shown that child pedestrians in lower socio-economic groups (Sharples *et al.*, 1990; Christie, 1995b) or from some minority ethnic backgrounds (for a review see Thomson *et al.*, 2001) have higher accident rates. The risk factors highlighted by the literature were included in the coding frame.

Behavioural factors such as problem behaviour and delinquency have also been linked to accident risk (Junger, 1995; West *et al.*, 1999). A child's 'inadequate understanding of what are safe and dangerous places to cross, inadequate judgement of when it is safe to cross, impulsive crossing without looking and active risk-seeking behaviour' have also been highlighted (West *et al.*, 1999: 7).

A qualitative study of young teenagers in Scotland identified two types of risky pedestrian behaviour: 'common risk' behaviours such as running across the road or not using a pedestrian crossing and 'extreme risk' behaviours such as dodging cars and holding onto the back of buses while roller-blading (System Three, 1998). Most casualties were the result of 'common risk' behaviours.

The coding frame included an open field ('child action') to gain information on the behaviour of the child at the time of the accident, such as whether the child looked before crossing, ran across the road or waited for the lights on the pedestrian crossing to change to green. A similar field was included to collect information on the driver's action, such as whether they saw the child and took evasive action. Other fields gave information on the journey purpose of both the child and driver and the accompaniment of the child at the time of the accident. The age and sex of people accompanying the child were included to investigate group composition at the time of the accident.

Previous research has highlighted the relationship between alcohol and pedestrian accident involvement (Clayton *et al.*, 2000). Therefore a variable to gain information on possible impairments due to alcohol or drugs was added for both the child and the driver of the vehicle.

Ten records selected from the IDB (five pedestrians and five pedal cyclists aged 9-15 years) were also examined to identify common types of information collected by the police, as part of their investigation. This included information about the condition of the bicycle, description of clothing worn by the child and whether the cyclist was using lights in the dark. The coding frame also sought information about car passengers in case these were included in the sample.

The initial coding frame developed for this study consisted of four main parts:

- the child;
- the driver;
- vehicle; and
- the accident site.

Child variables

This category included descriptive variables such as age, ethnicity and sex. Household variables such as the marital status of the carer, socio-economic group of the carer, family size and structure are recorded. The address of the child was also recorded to enable ACORN categorisation for socio-economic group and comparison with the census. CACI Ltd use postcodes to produce the ACORN directory (CACI, 1993). The system classifies all postcodes into six categories to give an average social classification for residents covered by each postcode. The cause of death and the time interval between road accident and death were also recorded.

Information was also recorded on who was with the child at the time of the accident in terms of number, sex, relationship to child and age (older, younger or same age) and whether there had been any physical contact. Other variables relating to the child at the time of the accident were included such as any disability or distraction (e.g., talking to others, wearing headphones, using a mobile phone). The nature of the child's clothing – whether light or reflective – was also recorded. Playing truant was recorded as this may give an indication of any risk taking or problem behaviour. Whether the child had consumed alcohol or taken a medicinal or illegal drug was also recorded.

For pedal cyclists, in addition to the above, variables on cycle helmet wearing, use of cycle lights if dark, condition of the cycle (faulty or not), cycling position (e.g., standing/seated, holding the handlebars or not) and cycling location were included.

Driver variables

This category also included descriptive variables such as age, sex, ethnicity and socio-economic group of the driver. The driver's home address was recorded to enable ACORN categorisation for socio-economic group. The number of passengers together with their age and sex were recorded.

Impairment indicators for the driver included whether he or she was tested for alcohol and (if so) the breath test result, and any medication or illicit drugs being taken. Journey variables recorded for the driver were journey purpose, time since home, familiarity with the route, length of intended journey and whether the route taken was a 'rat-run'.

The record also detailed any offences for which the driver was prosecuted and the outcome in court. Joyriding was included for car passenger accidents as an indicator of deviant behaviour.

Vehicle variables

The make, model, engine size, colour, type and age of the vehicle involved were recorded to validate the IDB information. Other variables recorded included: the first point of contact of the child on the vehicle, damage to the vehicle and any vehicle defects. The speed of the vehicle was recorded using the police investigator's report or the lowest reasonable estimate from an independent witness.

Accident site

Variables to record the location of the accident included the road, town, postcode, ward and district to enable subsequent comparison with the census data.

Environmental variables included descriptive variables such as the road type, land use around the accident site, whether any parking was present, damage to the road surface. Variables concerning any measures introduced for traffic calming, road crossings within 50m, barriers between road and footpath were also recorded, as were traffic variables such as the volume and average speed at the accident site.

Housing variables around the accident site included the predominant housing tenure, age of housing on the road and housing types (e.g., terraced, with or without driveways).

The name of the coroner dealing with the inquest and the coroner's verdict were also recorded.

2.4 Developing the child accident database

The information collected using the coding frame was entered into a database, which was linked to the STATS19 data for each accident.

2.5 Comparison of IDB with STATS19 Database

The cases in the IDB are drawn from a number of years and from those police force areas that are co-operating with TRL. To establish its validity as a subset of all road accident casualties it was thought necessary to make some general comparisons with STATS19.

In the STATS19 database for England and Wales between 1987 and 1995 there were 1208 fatal accidents involving pedestrians and pedal cyclists aged 9-15 years.

Eleven of the original 303 cases identified from the IDB could not be included. In four cases, on examination of the police file the child fatality was found to be aged over 15. The other seven files had been recalled by the Police Force concerned. Thus the STATS19 sample was compared with the 292 fatally injured casualties in the IDB sample for the same period. There were 826 pedestrians and 382 pedal cyclists in the STATS19 sample and the corresponding numbers in the IDB were 202 and 90. Table 1 shows that the IDB held 24 per cent of the child pedestrian and pedal cyclist fatalities aged 9-15 years, whose accidents occurred from 1987-1995 in England and Wales.

Table 1 Proportion of STATS19 child fatal accidents in the Intermediate Level Database (IDB) by year

Year	Number of fatalities		Percentage of STATS19
	STATS19	IDB	
1987	179	4	2%
1988	152	1	<1%
1989	164	7	4%
1990	151	32	21%
1991	133	52	39%
1992	119	62	52%
1993	97	45	46%
1994	110	55	50%
1995	103	34	33%
Total	1208	292	24%

The low numbers of files pre-1990 was because many police forces had already destroyed files of this age when the project started and the retention policy for files varies between police forces. Minton (2000) details the recovery rate of files from each police force.

2.5.1 Comparison by age and sex

Table 2 gives the proportions for the male and female fatalities in the IDB and STATS19 samples by class of road user and age group.

The proportions of fatal pedestrian and pedal cyclist casualties are similar for both samples with 69 per cent pedestrian casualties in the IDB and 68 per cent in STATS19. The overall proportions for male (IDB = 69% and STATS19 = 70%) and females in both samples are broadly similar, as is that for the age groups within each sex.

Loglinear analysis was used to examine the statistical significance, if any, in the variation of the proportions within the table. The analysis confirms the existence of significant interactions between casualty sex, age and mode up to perhaps the three-way level (probability that 3-way interaction was zero = 0.06) but the four-way interaction was not significant (probability that 4-way interaction was zero = 0.43). Further the model that best explained the data included no significant interactions between the data sample variable and the other variables. From this it may be assumed that the IDB sample is consistent with STATS19 database for sex, age group and road user class.

2.5.2 Comparison by area

The regional classification in Table 3 corresponds to that of the DfT Government Office Regions (DOT, 1997). The distribution of fatalities by region was allocated according to the police force area.

Table 3 gives the proportion of fatal pedestrian and pedal cyclist casualties aged 9-15 in England and Wales in the STATS19 database compared to those found in the IDB in each of the DfT Government Office Regions (DOT, 1997).

There were no statistically significant differences between the proportion of cases in the IDB sample and STATS19 sample.

2.5.3 Comparison by road class

Table 4 gives the proportion of fatal child pedestrian and pedal cyclist casualties by road class at the accident location.

Table 3 Fatal child casualties by region

DfT region	IDB sample(292)			STATS19 sample(1208)		
	Pedes-trian	Pedal cyclist	All	Pedes-trian	Pedal cyclist	All
Northern	3%	3%	3%	7%	4%	6%
North West	20%	9%	16%	17%	14%	16%
Yorkshire/Humberside	8%	12%	9%	11%	9%	10%
West Midlands	11%	11%	11%	13%	12%	13%
East Midlands	11%	12%	11%	9%	9%	9%
Eastern	10%	22%	14%	8%	15%	11%
Greater London	13%	8%	12%	11%	7%	10%
South West	6%	2%	5%	8%	8%	8%
South East	13%	14%	13%	10%	15%	12%
Wales	4%	6%	5%	6%	7%	6%
N	202	90	292	826	382	1208

Table 4 Proportion of child fatalities by road class

Road class	IDB sample(292)			STATS19 sample(1208)		
	Pedes-trian	Pedal cyclist	All	Pedes-trian	Pedal cyclist	All
A	51%	43%	49%	53%	47%	51%
B	14%	13%	14%	12%	14%	13%
C	9%	13%	10%	9%	11%	10%
M	-	-	-	1%	-	1%
Unclassified	26%	30%	27%	25%	28%	26%
N	202	90	292	826	382	1208

The proportions of casualties in the IDB and STATS19 database are similar: there are no statistically significant differences between the IDB sample and STATS19 data.

3 Results

This section of the report summarises the findings for 292 child fatalities: 202 pedestrians and 90 pedal cyclists involved in 291 accidents.

3.1 Characteristics of the child casualties

3.1.1 Age and sex

Around three in five of the pedestrian fatalities and seven in eight pedal cyclist fatalities were boys, indicating that

Table 2 A comparison of the IDB and STATS19 samples by sex, age group and class of road user

	IDB sample(292)							STATS19 sample(1208)							
	Male			Female				Total	Male			Female			
	9-11	12-15	All	9-11	12-15	All	9-11		12-15	All	9-11	12-15	All	Total	
Pedestrian	23%	38%	61%	27%	61%	88%	69%	27%	34%	61%	29%	57%	86%	68%	
Pedal cyclist	11%	28%	39%	3%	9%	12%	31%	10%	29%	39%	6%	9%	14%	32%	
All	34%	66%	100%	30%	70%	100%	100%	37%	63%	100%	34%	66%	100%	100%	
N	69	133	202	27	63	90	292	313	535	848	124	236	360	1208	
As % of total sample (row)	24%	46%	69%	9%	22%	31%	100%	26%	44%	70%	10%	20%	30%	100%	

boys were more likely than girls to be involved in a fatal road accident as shown in Table 5.

Table 5 Class of road user by sex

	Casualty type					
	Pedestrian (n=202)		Pedal cyclist (n=90)		All (n=292)	
	Number	Per cent	Number	Per cent	Number	Per cent
Male	123	61%	79	39%	202	69%
Female	79	88%	11	12%	90	31%

Chi-square (1) = 21.1, $p < 0.01$.

The majority of girls were fatally injured whilst walking: only 12 per cent of female fatalities were pedal cyclists compared to 39 per cent of male fatalities.

The majority of fatalities in the sample were aged 12-15. Pedestrian accidents peaked at age 12 for boys and age 14 for girls as illustrated in Figure 1. Among pedal cyclists, accidents peaked at age 14 for girls and 15 for boys. Almost 18 per cent were aged 12 (i.e., likely to be in the first year of secondary school) and a similar proportion were aged 14.

3.2 Accident site

A number of variables that describe the accident site are recorded in STATS19 including class of road, type of carriageway, speed limit and availability of pedestrian crossing facilities within 50m. Table 6 presents the proportions of the fatalities by the road class and type at the accident location.

Just under half of the child pedestrian casualties were fatally injured on A-roads and around one-quarter were involved in an accident on unclassified roads. The majority of the pedal cyclist (88 per cent) and pedestrian (78 per cent) fatalities occurred in accidents on single-carriageway roads. More pedestrians than cyclists were injured on dual-carriageway roads. Table 7 shows that nearly half the children (44%) were fatally injured on roads with a speed limit over 30 mph.

Table 6 Proportions of fatalities by road class and type

Road class	Pedestrian		Pedal cyclist				
	Dual carriage -way	Single carriage -way	All	Dual carriage -way	Single carriage -way	All	
	(n=44)	(n=158)	(n=202)	(n=11)	(n=79)	(n=90)	(n=292)
A	19%	32%	51%	12%	31%	43%	49%
B	-	14%	14%	-	13%	13%	14%
C	1%	8%	9%	-	13%	13%	10%
Unclassified	1%	25%	26%	-	30%	30%	27%
Total	22%	78%	100%	12%	88%	100%	100%

Table 7 Speed limit of road

Speed limit	Pedestrian (n=202)	Pedal cyclist (n=90)	All (n=292)
30	55%	56%	56%
40	21%	10%	17%
50	2%	2%	2%
60	16%	26%	19%
70	4%	7%	5%
Total	100%	100%	100%

A quarter of pedestrian fatalities and 16 per cent (10) of pedal cyclist fatalities were involved in accidents near crossing facilities such as zebra, pelican or pedestrian refuge as shown in Table 8. Two pedestrians were fatally injured whilst crossing near a school crossing patrol.

Additional information about the accident site is often recorded in the police files, usually by the police accident investigator in their report. Unlike STATS19 variables, this information was not systematically recorded so the results are indicative, rather than conclusive. The following results are taken from the tables given in Appendix A.

Photographs and descriptions of the accident site highlighted that nine per cent (20) of the pedestrian fatalities occurred at sites where there were safety railings by the side of the road. For nine pedestrian and four pedal cyclist (i.e., 5 per cent and 6 per cent respectively) of those

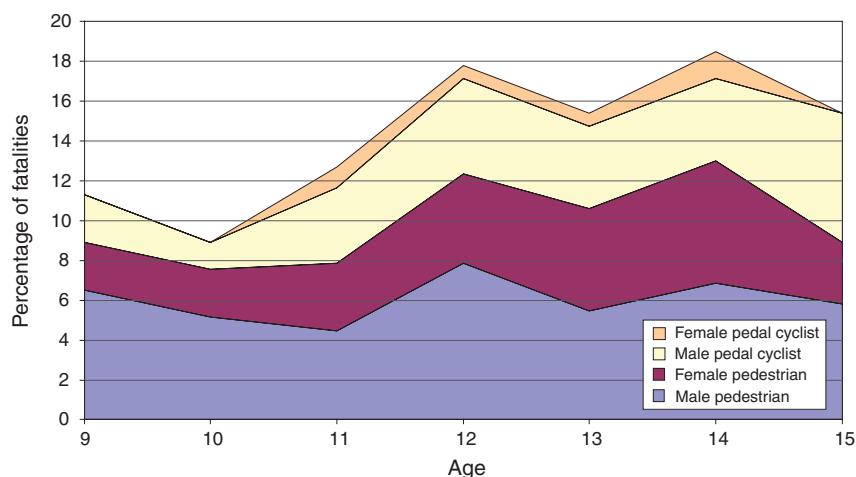


Figure 1 Age and sex of child fatalities

Table 8 Pedestrian crossing facilities

Pedestrian crossing facilities within 50m	Pedestrian (n=202)	Pedal cyclist (n=90)
None	75%	84%
Zebra	2%	3%
Zebra controlled by school crossing patrol	<1%	–
Pelican	9%	7%
Other light controlled crossing	7%	4%
School crossing patrol	<1%	–
Central refuge	4%	<1%
Footbridge or subway	1%	–
Total	100%	100%

known) fatalities the land use at the accident site was described as ‘school’. Around two-fifths of the accidents occurred in solely residential areas (44 per cent). Obstructive parking, which would interfere with sight lines, was recorded for 11 per cent (22) of the pedestrian and 10 per cent (9) of the pedal cyclist fatalities.

Table 9 gives the proportions of the child pedestrian and pedal cyclist fatalities by traffic volume where known (n = 137). It indicates that the majority of the fatalities occurred on roads when the traffic flow was ‘light’.

Table 9 Proportions of fatalities by traffic volume

Traffic volume	Pedestrian (94)	Pedal cyclist (43)	All (137)
Heavy	19%	23%	21%
Moderate	19%	7%	15%
Light	62%	70%	64%
Total	100%	100%	100%

Twenty-three of the 28 children fatally injured in heavy traffic were on A-roads, of which 12 were dual carriageways.

Almost all (99 per cent) of the child pedestrian and pedal cyclist fatalities were killed on through roads and only one pedestrian and one pedal cyclist fatality occurred in a *cul-de-sac*.

3.3 Time of accident

3.3.1 Month of accident

The proportions of fatalities killed during each month of the year are illustrated in Figure 2.

The largest proportion of the accidents involving the child pedal cyclist fatalities occurred in the school summer holiday months of July and August. In contrast, the largest proportion of accidents in which the child pedestrian fatalities were involved occurred in October when the half-term breaks occur and the evenings are darker earlier. For both pedestrian and pedal cyclist fatalities the lowest proportions were involved in accidents during January. Figure 3 illustrates the proportion of fatalities occurring during darkness by month.

3.3.2 Hour of day

Figure 4 shows the distribution of the pedestrian and pedal cyclist fatalities by time of day

For pedestrians the proportion of accidents occurring in the morning is low, rises to a peak in the late afternoon, then falls slightly before rising again in the early evening and then falling to a minimum at midnight. The proportion of accidents involving pedal cyclists was more varied throughout the day although peaks occurred at similar times during the day to the pedestrians. In contrast to the pedestrians there are fewer pedal cyclists after 9pm but a higher proportion of pedal cyclists involved in accidents in the early morning. The reason that all seven of these children were out cycling in the early morning was job-related. The highest peak for pedal cyclist fatalities was after school, possibly linked to leisure activities.

3.4 Journey purpose

The purpose of the child’s journey at the time of the accident was determined from the witness statements.

Figure 5 indicates the journey purpose for 81 pedal cyclist and 196 pedestrian fatalities.

Overall more of the child pedal cyclist fatalities (14 per cent) were working at the time of the accident than

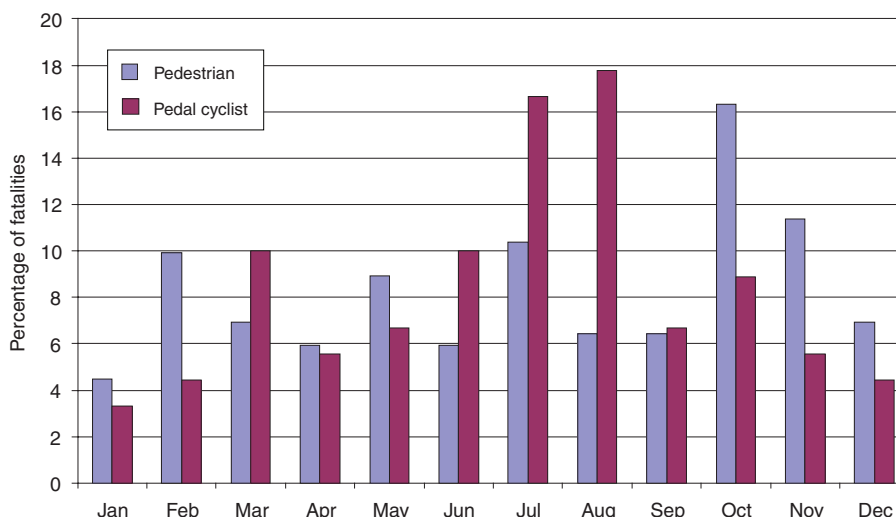


Figure 2 Monthly variations among the child fatalities

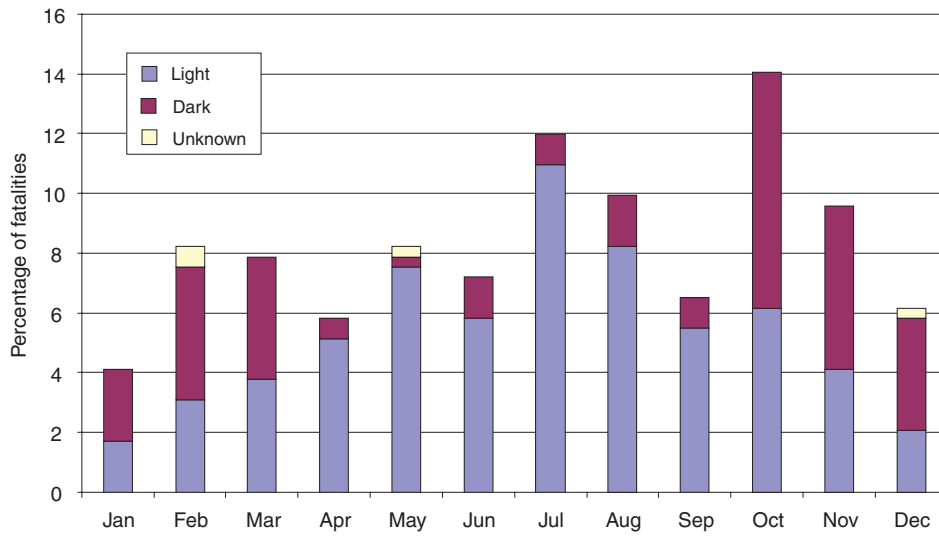


Figure 3 Light conditions by month

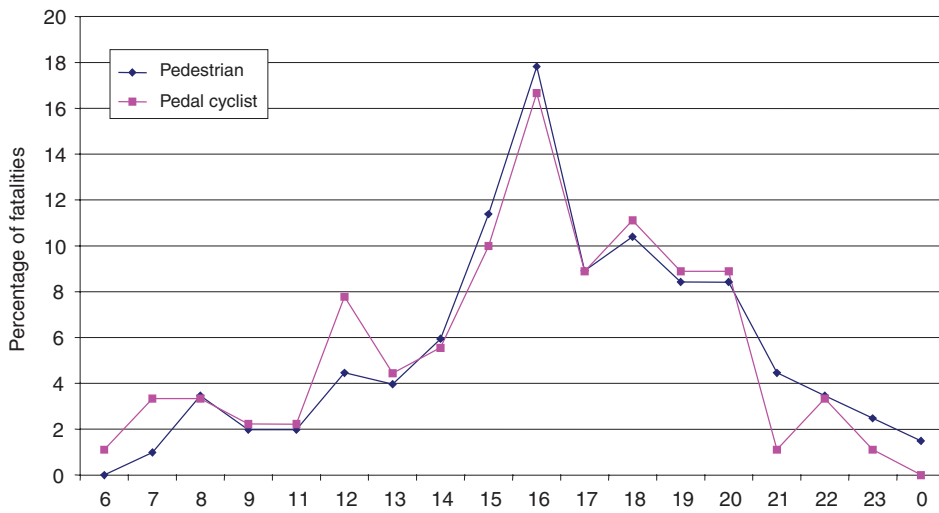


Figure 4 Hourly variations among the child fatalities

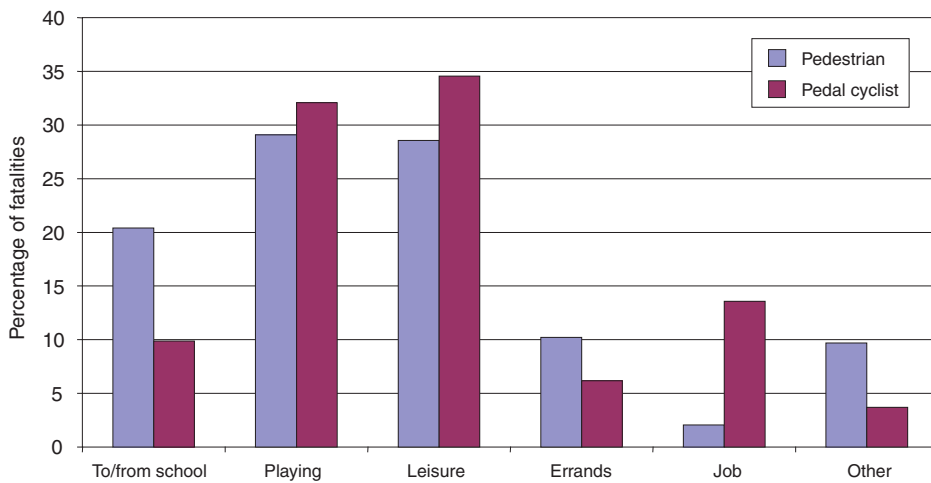


Figure 5 Journey details for the child fatalities

pedestrians (2 per cent), mostly on paper rounds. At the time of the accident two-thirds of the pedal cyclists and just over half of the pedestrians (58 per cent) were either playing or at leisure. School journeys were more prominent among pedestrians than cyclists, as were journeys for 'other' purposes. The 'other' category for journey purpose includes those 21 children for whom the purpose was unknown. Examples of 'other' reasons for a journey included: visiting the dentist, making a telephone call, and taking part in a school run.

A higher proportion of older children were injured on the school journey: 12 per cent of 9-11 year old fatalities were injured on the journey to or from school, compared to 18 per cent of 12-15 year olds.

Figure 6 shows the purpose of the child's journey for the 123 male and 79 female pedestrian fatalities related to age.

A higher proportion of younger boys aged 9-11 were playing at the time of the accident than older boys or girls,

however this finding is based upon small sample sizes so may not be reliable. Few pedestrians were working at the time of the accident, although a sizable minority of boys and younger girls were running errands.

Figure 7 shows the purpose of the child's journey for 79 male and 11 female pedal cyclist fatalities related to age.

Although the numbers are small, especially for the female fatalities, some tentative comments can be made. For all groups, travel to and from school accounted for a relatively small proportion of journeys compared with leisure and/or play. The female pedal cyclist aged 9-11 who was cycling home from school had taken part in cycle training. Details of any cycle training other children may have undertaken was not recorded in the police files.

3.5 Light conditions and clothing

The police routinely recorded details of light conditions at the time of the accident and in some cases provided details

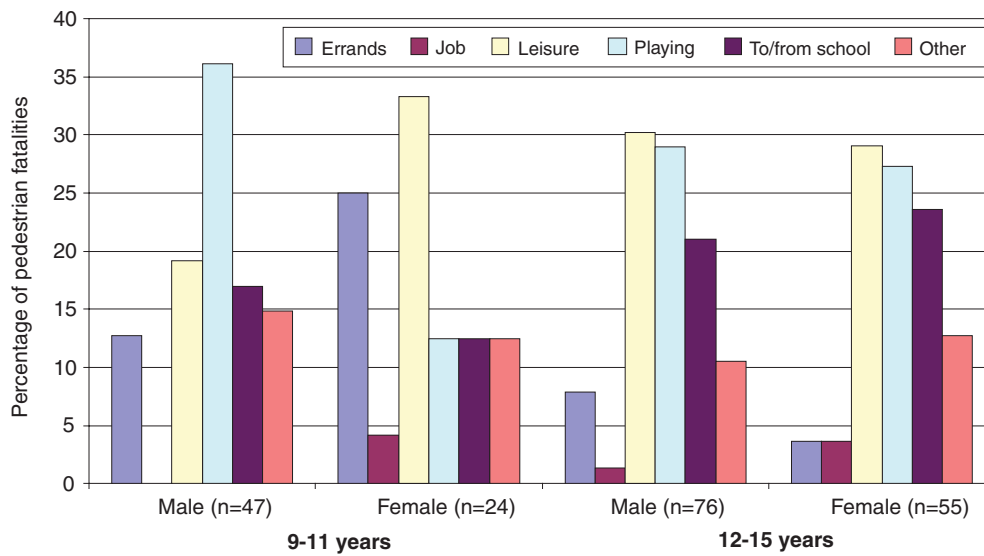


Figure 6 Journey details for the child pedestrian fatalities by age and sex

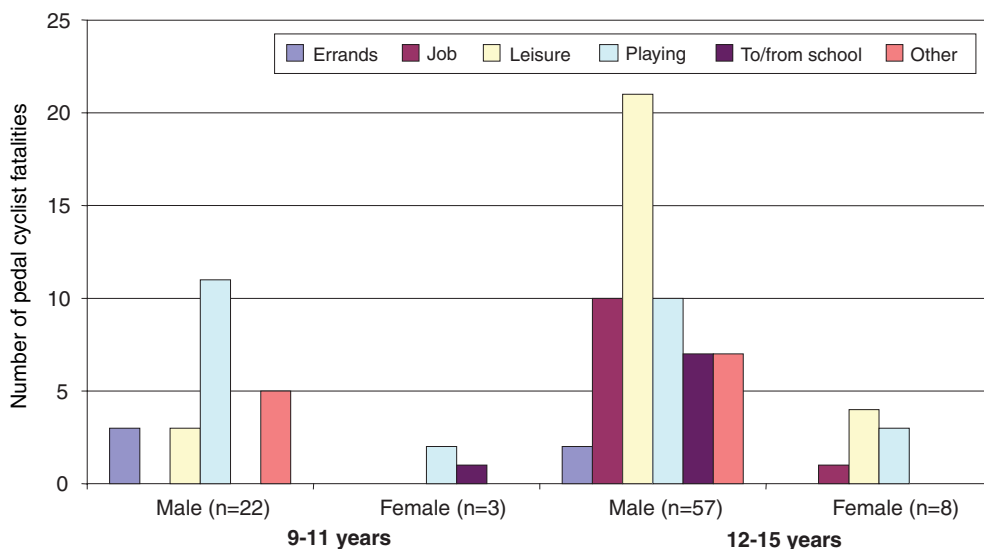


Figure 7 Journey details for the child pedal cyclist fatalities by age and sex

of the child's clothing, especially if the driver of the vehicle involved in the accident claimed not to have seen the child. This section relates to the light conditions for the 287 fatalities where this was known. Also presented is an analysis of the clothes worn by the fatality at the time of the accident.

3.5.1 Light conditions

Table 10 shows the number of pedestrian and pedal cyclist fatalities who were involved in accidents in daylight or darkness.

Table 10 Proportions of fatalities by light conditions

	<i>Pedestrian</i> (N=201)	<i>Pedal cyclist</i> (N=86)	<i>All</i> (N=287)
Daylight	119	68	187
Darkness	82	18	100
% of fatalities involved in an accident during hours of darkness	41%	21%	35%

Over one-third of the child fatalities were involved in accidents during the hours of darkness. For the pedestrians this proportion was higher at 41 per cent, but for the pedal cyclists this proportion was much lower at 21 per cent. Of the 18 pedal cyclists involved in accidents in darkness, only one was reported to have had lights displayed on their bicycle.

3.5.2 Children's clothing

Some details of the clothes the children were wearing at the time of the accident were available for six of the pedal cyclists and 21 of the pedestrians. Table 11 lists the clothes worn by a sample of pedal cyclists and pedestrians by daylight and darkness.

These descriptions highlight that few children wore safety clothing whilst cycling or walking in the dark. The pedal cyclist wearing the yellow waterproof leggings and reflective tabard was delivering evening newspapers when he was involved in an accident on a dark unlit rural road in heavy wind and rain. The reflective strips on the newspaper bag were worn. Both cyclists wearing a reflective bag were on paper rounds. Only one pedal cyclist was recorded as having worn a cycle helmet and in this case the cycle helmet came off during the accident. This was a very severe impact; a VW Transporter Van fitted with bull-bars and travelling at 60mph was involved in the collision with the child.

3.6 Accompaniment

3.6.1 Alone or with others

Table 12 gives the number of the fatalities by age and sex for those who were alone at the time of the accident and for those who were part of a group. The majority of children were accompanied at the time of the accident: over half of the fatalities were with other children at the time of the accident (57%), whilst nine per cent was in a group with an adult. An adult was defined as someone aged 18 or over. In 14 cases the accompanying adult was the child's parent.

Table 11 Clothing worn by the fatalities

Clothes that the pedestrians were wearing:

Daylight

Blue anorak, beige trousers
Blue denim jeans and jacket
Checked trousers
Dark clothes
Pink coat
Lime green T-shirt with yellow stickers on back
White cropped top and long navy skirt
Dark coat with luminous 'bits'
Black and white dress and yellow slippers
Shorts, blue top, socks and trainers
Carrying orange paper bag

Darkness

Black jeans, blue/black coat, black trainers with a white flash
Dark clothing (- five cases)
Dark denim jeans, light blue striped top
Football kit
Light denim top and jeans
Black bomber jacket, jeans and blue trainers
Dark school uniform
White/light shirt
Dark clothes with reflectors on trainers
Dark blue trousers, black jacket and blue jumper

Clothes that the pedal cyclists were wearing:

Daylight

Grey trousers, navy jumper, brown anorak
Light top dark jeans white trainers
Jeans, light coloured jacket, reflective bag
Red top, blue trousers, white trainers

Darkness

Yellow waterproof leggings and yellow tabard over dark blue anorak
Denim jeans, black coat

Table 12 Number of child fatalities by age and sex and accompaniment

<i>Sex</i>	<i>Age</i>							<i>All</i>	<i>% Total</i>
	9	10	11	12	13	14	15		
<i>Alone</i>									
Male	8	5	10	13	12	12	19	79	28%
Female	1	1	3	5	4	4	0	18	6%
<i>With other children</i>									
Male	12	13	11	20	14	18	15	103	37%
Female	5	3	7	6	10	16	9	56	20%
<i>With an adult</i>									
Male	4	1	1	4	1	2	0	13	5%
Female	1	3	2	3	2	1	0	12	4%
Total	31	26	34	51	43	53	43	281	100%

The table in Appendix A shows that the majority of children accompanying the fatality were friends.

Figure 8 shows that younger girls, aged 9-11, were more likely to be accompanied by an adult than boys the same age (23 per cent and 9 per cent respectively), however, these findings are based upon small sample sizes and may not be reliable. Older girls, aged 12-15, were more likely to have been accompanied by other children than boys were.

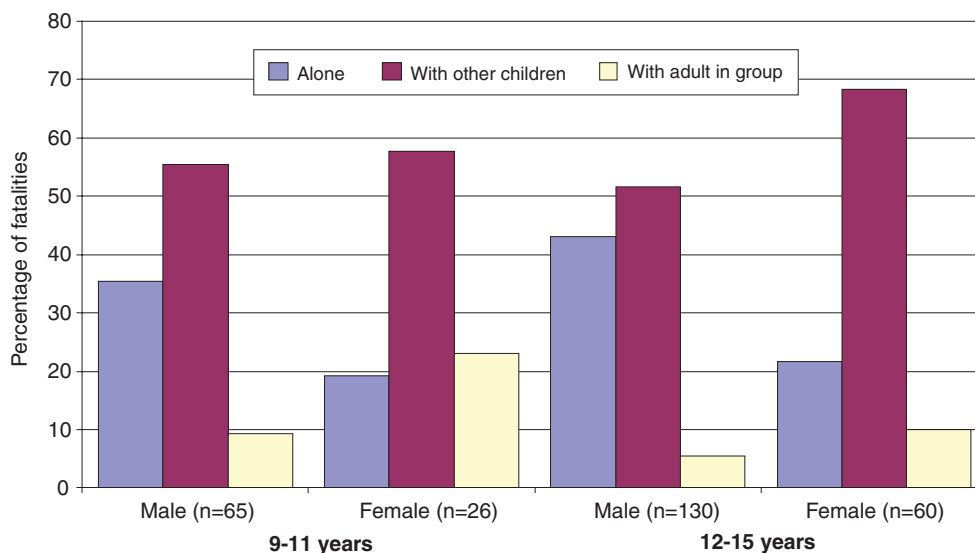


Figure 8 Accompaniment by sex and age group

Overall, 41 per cent of the male fatalities were alone at the time of the accident compared to 21 per cent of the females. In 11 cases accompaniment was unknown.

Table 13 indicates the number of male and female child fatalities by road user class and accompaniment. It indicates that pedal cyclists were more likely to have been alone at the time of the accident than pedestrians were.

Table 13 Number of child fatalities by road user class and sex and accompaniment

	Pedestrians			Pedal cyclists		
	Male (n=119)	Female (n=75)	% All (n=194)	Male (n=76)	Female (n=11)	% All (n=87)
Alone	40	13	27%	39	5	51%
With other children	71	52	64%	32	4	41%
With an adult	8	10	9%	5	2	8%

3.6.2 Group composition

For the 184 fatalities who were accompanied at the time of the accident the comparative ages of their companions have been recorded and are shown in Table 14.

Most of child fatalities were in a group with one or two friends. Half of the 43 pedal cyclist fatalities were in a group with children of the same age, two were the eldest of the group and five were the youngest of the group. Seven were in a group with at least one adult and seven others were in a 'mixed' age group or some of their companions' ages were unknown. In comparison, a third of the accompanied pedestrians were in a group with children of the same age (32 per cent). Eleven pedestrians were the eldest member of the group and 14 were the youngest. Nine per cent (18) were with at least one adult and around a quarter (27 per cent) were in a 'mixed' age group or some of their companions' ages were unknown. Thus, for the accompanied fatalities, pedal cyclists were more frequently a member of a group of children the same age

and the pedestrians to be a member of a group of children of mixed ages.

Three-quarters of the accompanied fatalities were in a child group in which their companions were all of the same sex (119/159). Four-fifths (83 per cent) of the pedal cyclists and 72 per cent of the pedestrians were in these 'single sex' groups at the time of the accident. Figure 9 shows that the proportion of fatalities in a group of children of the same sex did not vary by age group.

3.7 Child behaviour

Information available in STATS19 about the behaviour of the child casualty is restricted to variables such as pedestrian movement (crossing from the driver's nearside for example) and vehicle manoeuvre (for pedal cyclists). Therefore, the police files were analysed to investigate how the child became involved in the accident and explore, for example, why the child may have 'entered the carriageway without due care'.

The police files indicated that the police investigation of a road death was primarily concerned with whether the driver of the vehicle had committed an offence (Stone, unpublished). Therefore, the amount of data available about the child's behaviour was limited, especially in cases in which the driver had clearly committed an offence.

Table 15 gives the frequencies of the behaviours identified. It should be noted that the child may have exhibited other behaviours but this may not have been observed by witnesses or reported by the police.

3.7.1 Pedestrian behaviour

Figure 10 uses the behaviours identified in the analysis to show the links between them and illustrate common behaviours. The strength of the arrows in Figure 10 reflects the number of cases suggesting the link (see Table 16).

As the police investigation of the child's behaviour tended to focus upon the collision and how the child had entered the carriageway, the amount of information about the sequence of

Table 14 Numbers of fatalities in groups and comparative ages of companions

<i>Number of fatalities</i>	<i>Group size (including fatality)</i>	<i>Frequency</i>	<i>Number and comparative age of companions</i>
<i>Pedestrians (N=141)</i>			
(64)	2	35	1 child same age
		7	1 adult
		9	1 younger child
		9	1 older child
		4	1 child whose age was unknown
(31)	3	10	2 children same age
		5	2 older children
		3	1 adult and 1 younger child
		3	1 adult and 1 older child
		3	1 same age and 1 younger child
		2	1 older and 1 same age child
		2	2 younger children
		2	1 older child and 1 child whose age was unknown
		1	1 younger and 1 older child
		(18)	4
3	1 older, 1 same age and 1 younger child		
2	2 older children and 1 younger age child		
2	2 same age children and 1 older child		
2	2 same age children and 1 younger child		
1	1 same age and 2 younger children		
1	2 younger and 1 older child		
1	1 adult and 2 younger children		
1	2 adults and 1 same age child		
1	1 older, 1 same age and 1 child whose age was unknown		
1	1 with 3 children whose ages were unknown		
(28)	5 or more	28	Mixed groups, in 3 cases an adult was present
<i>Pedal cyclists (N=43)</i>			
(22)	2	11	1 child same age
		5	1 older child
		4	1 adult
		2	1 younger child
(14)	3	9	2 children same age
		2	1 older child and 1 child same age
		1	1 adult and 1 child same age
		1	1 older and 1 younger child
		1	2 children whose ages unknown
(6)	4	2	1 older and 2 same age children
		2	3 same age children
		1	2 younger children and 1 child whose age was unknown
		1	1 same age child and 2 adults
(1)	5 or more	1	1 adult, 1 older child and 2 younger children

behaviours leading to this point lessens as you move further away from the event. Therefore, the diagram is easier to interpret backwards from the point of collision.

Of the 202 pedestrian fatalities, 15 cases were excluded from the diagram because the driver was clearly at fault. In five of these cases the driver mounted the pavement in the vehicle and collided with the pedestrian, whilst in nine others the child was using a pedestrian crossing correctly. One child was crushed when a trailer detached from a vehicle and was excluded. Two cases involving the use of a skateboard or scooter were also excluded: one child was seated on their skateboard travelling along the pavement

and could not be seen by the driver reversing out of his drive. The other involved a child riding a scooter downhill and out of a side road into the path of a vehicle. The child appeared unable to slow down and the driver failed to stop after the collision. Another case excluded involved a child on rollerskates, being towed by a friend on his bike. Both these latter two cases were more similar to the behaviour of pedal cyclists. The following findings are based upon the remaining 186 pedestrian fatalities.

Generally, the child was described as having run into the road (n=111). Some of whom were reported to have run into the road without looking properly, whilst others

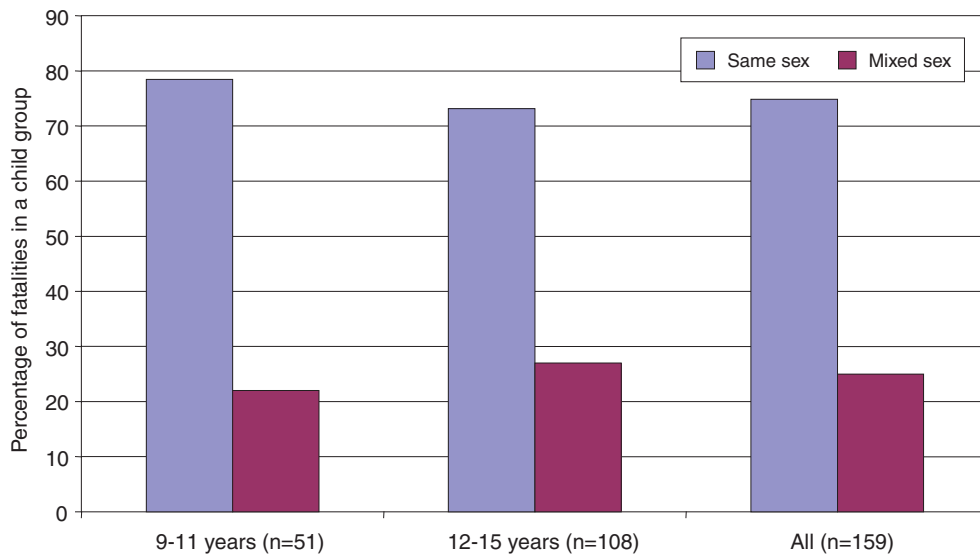


Figure 9 Percentage of fatalities accompanied other children in a mixed or same sex group

Table 15 Child action (multiple responses allowed)

		<i>Pedestrians</i> N=202	<i>Pedal cyclists</i> N=90
1	Run into road	111	
2	Step/walk into road	53	
3	Walking in carriageway (no pavement) with back to traffic	4	
4	Standing offside vehicle talking to driver	2	
5	Fall		
	a. Stumble back	2	
	b. Fell into road	8	15
	c. Catapulted into road after tripping on tree root	1	
	d. Sledge down embankment into road	1	
	e. Jump from bridge into road	1	
6	Alighted from bus	8	
<i>Unsafe place to cross</i>			
7	Cross between parked cars	12	2
8	Cross behind/in front of bus (see 6)	6	
9	Crossing a dual carriageway (not at pedestrian crossing)		
	a. Cross to central reservation	3	
	b. Cross from central reservation	4	
10	Fail to use pedestrian crossing nearby		
	a. Fail to use crossing	4	
	b. Fail to use subway/underpass	3	
	c. Fail to use pedestrian refuge	1	
11	Taking a short cut		
	a. Climb over barrier	2	
	b. Climb down grass slope	1	
	c. Climb through gap in fence	1	
	d. No further description	1	
12	Obscured from driver by		
	a. Parked vehicle (see 7)	12	2
	b. Bus (see 8)	6	
	c. Trees/vegetation	2	2
	d. Street furniture	2	1
	e. Crouching down	2	
	f. Concealed drive/entrance	1	1
	g. In driver's 'blind spot'		4
13	Pedestrian's view restricted	4	
14	Fails to look both ways	47	9
15	No look behind/right		11
16	Looks the wrong way/unfamiliar with road layout	5	
17	Following others	19	13
18	Continues running/does not pause at kerb	2	
19	Misjudges gap in traffic/speed of vehicle/steps in front of vehicle	19	3

Continued

Table 15 (Continued) Child action (multiple responses allowed)

		<i>Pedestrians</i> N=202	<i>Pedal cyclists</i> N=90
20	Crosses against traffic lights	13	5
21	Crosses the road diagonally	4	4
22	Hesitates in road		
	a. Unsure whether to cross/turn back	9	3
	b. Looked back at friends	3	
	c. Attempts to speed up		1
23	Retrieving object in road	5	
24	Hurrying to:		
	a. Catch up with others/cross to friend across road	16	5
	b. Get to destination - home, shop, school, playground, bus stop	10	
	c. Late	1	1
	d. Deliver papers before school	1	
	e. Open gate to allow car to turn into drive	1	
Distraction			
25	Playing		
	a. Unspecified - by road/on verge/embankment	6	
	b. Chase	6	
	c. 'Tarzan'	1	
	d. 'Chicken'	1	1
	e. Running backwards and forward across road	2	
	f. Water fight	1	
	g. Rounders/fetching ball	1	
	h. In stream of water in road from burst pipe	1	
	i. 'Trick or treat'	1	
	j. Mountain biking in woods		1
26	Running away		
	a. From dog	1	
	b. From bullies	2	
	c. From other children they were teasing		1
27	Messing about		
	a. Swinging around pole of pedestrian crossing	1	
	b. Fighting/messing about	9	
28	Anxious		
	a. Being seen smoking by teacher	1	
	b. Going to use phone when told not to	1	
	c. Shouted at/told off	2	
	d. Had just been told her dog had died	1	
	e. Needed bus money	1	
29	Talking	15	3
30	Waving goodbye	1	
31	Impaired		
	a. Alcohol	9	2
	b. Drugs	2	
32	Using a personal stereo	1	3
33	Father driving behind going in different direction distracts cyclist		1
34	Carrying object	1	1

Continued

Table 15 (Continued) Child action (multiple responses allowed)

		<i>Pedestrians</i> <i>N=202</i>	<i>Pedal cyclists</i> <i>N=90</i>
35	Clothing caught in vehicle	1	
36	Rode into path of vehicle	1	14
37	Too fast/out of control		
	a. Scooter	1	
	b. Bike		9
	c. Sledge	1	
38	Wobbling/lose control of bike/veer right/lost balance		17
39	Turning right		20
40	No signal		4
41	Being overtaken by a vehicle		15
42	Cycle from pavement/crossing road		33
43	'Jumping' between pavement and road/'bunny hopping'		3
44	Riding along pavement		3
45	Hit object in road		1
46	Hit kerb/'bump up' kerb		1
47	Riding two abreast		1
48	Poor cycling position		
	a. Riding with eyes shut and arms in air		1
	b. Stood on pedals		8
	c. Not holding onto handle bars		2
49	Cycling erratically		
	a. Snaking/weaving in and out of traffic		1
	b. No further description		1
50	Collided with pedestrians		1
51	Being towed by vehicle (bike/van)	1	1
52	Friend 'piggy backing' on bike		1
53	U-turn on pavement		1
54	Walking pushing bike	1	2

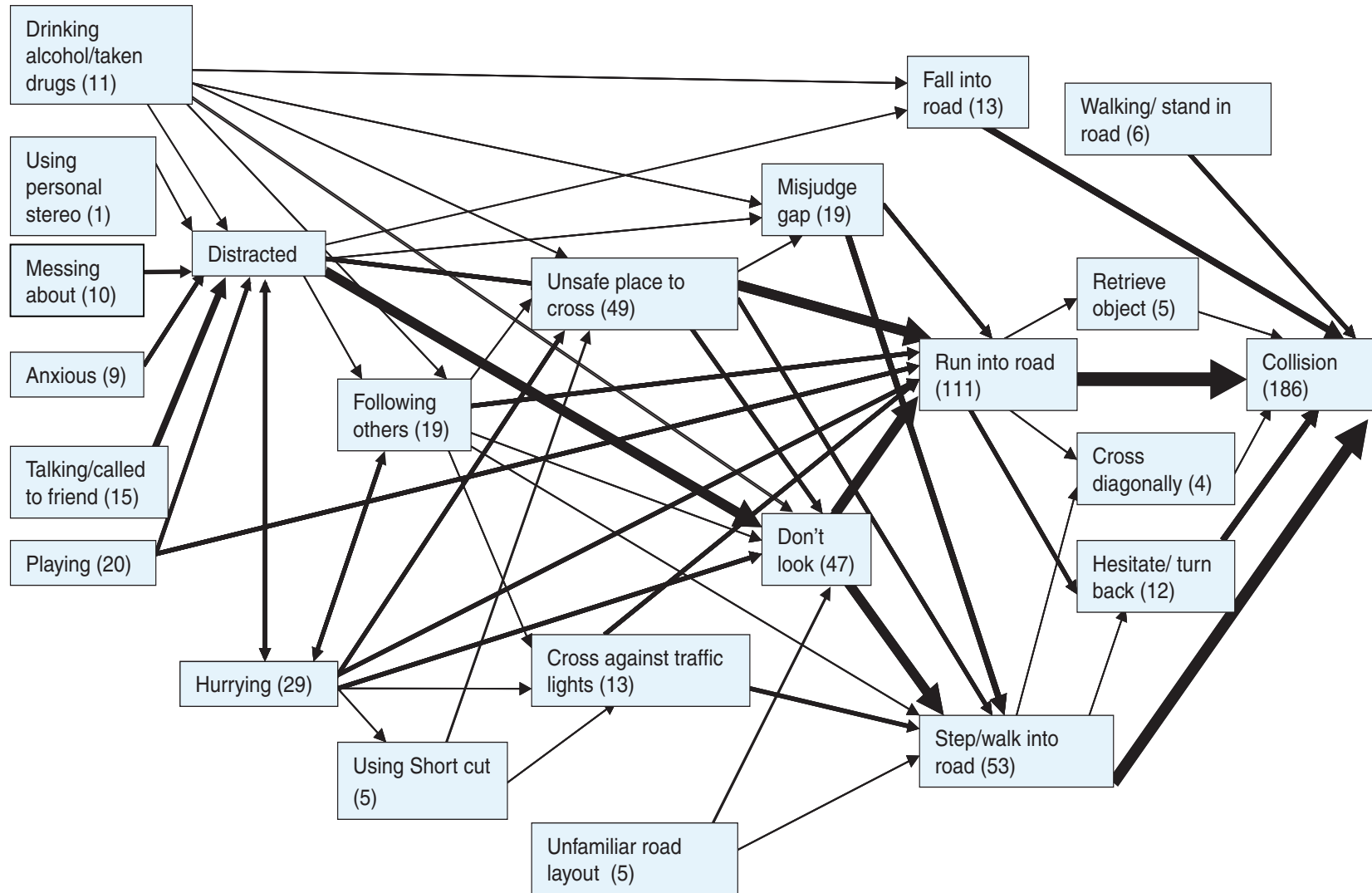










Figure 10 Pedestrian behaviour

Table 16 Key for Figures 10-13

	<i>Number of cases</i>
	1-5
	6-10
	11-15
	16-20
	21-30
	31-40
	41-50
	51+

appeared to have looked but misjudged the gap or speed of the approaching vehicle.

'I saw him come out of the Petrol station, and just run straight across the road, after stepping off the kerb. I saw him look to his left but not his right, then he just ran.' (Witness)

'I remember X said "Now" and stepped straight away into the road, no one else moved...' (Witness)

A number of children were believed to have been in a hurry (16%). Sixteen children were hurrying to catch up with a friend or join them on the other side of the road.

'I heard the smaller of the two boys shout across to the boy on the bike "wait for me"' (Witness)

Other children were late or were rushing to get home, catch a bus or get to another destination (12 cases). Another child was in a hurry to complete their paper round before school. This may have meant the child was distracted and did not concentrate on finding a safe place to cross, look before crossing road or risked taking a small gap in the traffic.

In five cases the child ran into the road to retrieve something that had been dropped, sometimes as part of a game.

Distraction was a common theme which emerged from the reports. Examples of activities that may have distracted the child from crossing the road safely were:

- Messing about/fighting (9 cases).
- Playing – mainly alongside the road, in one case the child may have been playing 'chicken' (20 cases).
- Talking with a friend(s) or calling to a friend(s) on the other side of the road (16 cases).
- Using a personal stereo (1 case).

Other children might have been distracted because they were worried about other things (9 cases). Reasons for anxiety included being bullied, being chased by a dog, being told the child's dog had died and needing bus money to get home. In five cases the child may have been worried about being caught or having doing something wrong (smoking, going to the phone box when they had been told not to or taunting other children).

Nineteen children followed other people into the road, apparently often without looking or thinking about whether it was a safe place to cross. In 12 cases the child may have realised they had made an error and hesitated in the road, possibly deciding whether they should turn back or continue across.

In a quarter of the cases the child crossed the road from an 'unsafe place' such as between parked cars (12 cases) or in front/behind a bus (6 cases). Consequently, many of the children may have been obscured from the drivers' view. In eight cases it was highlighted that the child did not use a pedestrian crossing, refuge or subway nearby. In one of these cases the pedestrian location was coded by the police on the STATS19 form as being 'on the pedestrian crossing' when this was actually the position the child was found after being carried some distance by the vehicle.

Five children climbed over barriers, or down a slope/verge to cross the road. Although several of these routes were established 'short cuts', they were not places drivers would expect pedestrians to cross. Four cases involved the child attempting to cross a dual carriageway, using the central reservation to wait for a gap in the traffic.

Other accidents involved the child crossing at a safe place, such as a pedestrian crossing, but using the crossing incorrectly. Ten children crossed without waiting for the traffic lights to stop the traffic or ran straight across without pressing the button. One child did not wait for the traffic to stop at a zebra crossing.

The majority of the pedestrian accident reports examined involved the child crossing the road. However, 13 cases involved the child falling into the road. In one case the child lost his footing on a slippery grass verge after moving out of the road because he was being overtaken by a Heavy Goods Vehicle (there was no pavement). Two children had fallen or jumped into the road whilst playing. In other cases the child stumbled into the road whilst talking to friends or had fallen into the carriageway 'drunk'.

The child had been drinking alcohol or had taken drugs before the accident so impairment could have been a factor in 11 of the accidents. This may explain why the child apparently misjudged the speed of the vehicle or the gap needed to cross the road safely, crossed without looking properly, crossed at an unsafe place or fallen into the carriageway. In these cases the child tended to be older, aged 14 or 15. Younger pedestrians, aged 13 or less, were more often distracted through play, hurrying or had followed others across the road.

Two cases involved a child walking in the carriageway of a road (no pavement), in the dark, with their back to the traffic. Others involved the child talking to the driver whilst standing in the road on the off-side of the vehicle.

The children in the cases studied were often not following the behaviour outlined in the Highway Code. This was especially evident in the pedal cyclist accidents.

3.7.2 Pedal cyclists' behaviour

The police investigation of the pedal cycle accidents determined what manoeuvres the driver and pedal cyclist had been undertaking prior to the collision. If the driver

was overtaking the pedal cyclist the police were interested in whether the driver had given the pedal cyclist sufficient room. If the pedal cyclist appeared to have been turning right, issues about whether the pedal cyclist had indicated their intention to turn right and had looked behind them and out into the junction were relevant as the following quote highlights.

'All of a sudden, the cycle veered to the righthand side of the road, the girl never looked behind her, she never signalled her intention to pull right across the road.'
(Driver)

The police were interested in whether the manoeuvre had been carried out safely, as outlined in the Highway Code.

Figures 11 to 13 illustrate the behaviours of 88 child pedal cyclists. Two cases in which the driver was clearly at fault have not been included. One case was a 'hit and run' and the other involved the driver losing control of their vehicle on a bend and hitting the pedal cyclist. The cyclists' behaviour has been grouped into:

- Figure 11: Turning right and/or being overtaken.
- Figure 12: Cycling on or from the pavement.
- Figure 13: Cycle or fall into the path of a vehicle.

A quarter of the cases reviewed involved the pedal cyclist making a right turn manoeuvre. In 13 cases the child was involved in a collision as they moved across the carriageway to the centre of the road on the approach to a junction, whilst in seven cases the pedal cyclist was turning right out of a junction. In three cases it was noted that the child had not signalled prior to pulling out and in six cases the child had failed to look. Similar behaviours were reported when a driver was overtaking the pedal cyclist and the pedal cyclist veered to the right, perhaps because they intended to turn right or because they wobbled (13 cases). Two children wobbled after standing on the pedals and were hit by a driver overtaking; another child wobbled because he was carrying a tennis racket.

Another manoeuvre that was common in the accidents reviewed was crossing the road. One in three accidents occurred when the child crossed the road from the pavement on their bicycle. In nine of these cases it was reported the child failed to look before entering the carriageway. Other pedal cyclists looked and risked crossing the road in front of the vehicle as the following witness describes:

'X was still on the pavement when he looked. He speeded up to try and cross before the cars...' (Witness)

In five cases the child cycled across a pedestrian crossing but failed to wait for the lights to change in their favour. Seven cyclists fell before rejoining the pavement, in two cases either because they hit something in the road or fell 'bumping' up the kerb.

Other child pedal cyclists cycled or fell into the path of a vehicle. Thirteen children were reported to have cycled at speed out of a junction and into the path of a vehicle, whilst another rode out of a concealed driveway. It was reported that one cyclist was 'drunk' and cycling erratically before losing control and falling off his bike.

Another cyclist who had been drinking alcohol was in a collision after crossing from the pavement.

Other risky behaviours carried out by the pedal cyclists included snaking/weaving in and out of traffic (1 case), holding onto a trailer and being towed along (1 case), jumping from the pavement into the road/'bunny hopping' (3 cases), and riding alongside another cyclist (1 case).

The cyclist's riding position was highlighted in 11 cases: eight children were standing on the pedals, often to pedal uphill, two were cycling without holding onto the handlebars and one cyclist was cycling with his arms in the air and eyes shut. In two cases the child's stability on the bicycle was investigated to explain why they may have fallen from the pavement into the road.

Possible antecedents to the manoeuvres were rarely investigated. This may be because fewer pedal cyclists were accompanied and consequently, there were fewer witnesses with knowledge of the child's previous behaviour. There was some evidence in 11 cases that the child may have been distracted either because they were talking to friends on the other side of the road (3 cases), playing or being chased (3 cases) or were using a personal stereo (3 cases). It was suggested that one child may have been distracted by their parent travelling in a car behind them and signalling to travel in a different direction. Six pedal cyclists were believed to have been in a hurry to catch up with a friend or were late.

Thirteen cases involved the pedal cyclist following a friend's manoeuvre. In one of these cases the cyclist following had a hearing impairment, another child with a hearing impaired child was involved in a collision turning right. In both these cases it was suggested that the hearing impairment might explain why the child had cycled into the path of the vehicle. A third pedal cyclist with impaired hearing was involved in an accident where the driver failed to stop so it is unclear whether the impairment was a factor in the accident.

These analyses highlighted that although many of the children took risks only a minority were engaged in 'extreme risk' activities such as playing chicken or weaving in and out of traffic on their bicycles. The behaviours of the young adolescents were not untypical of those of older pedestrians or cyclists.

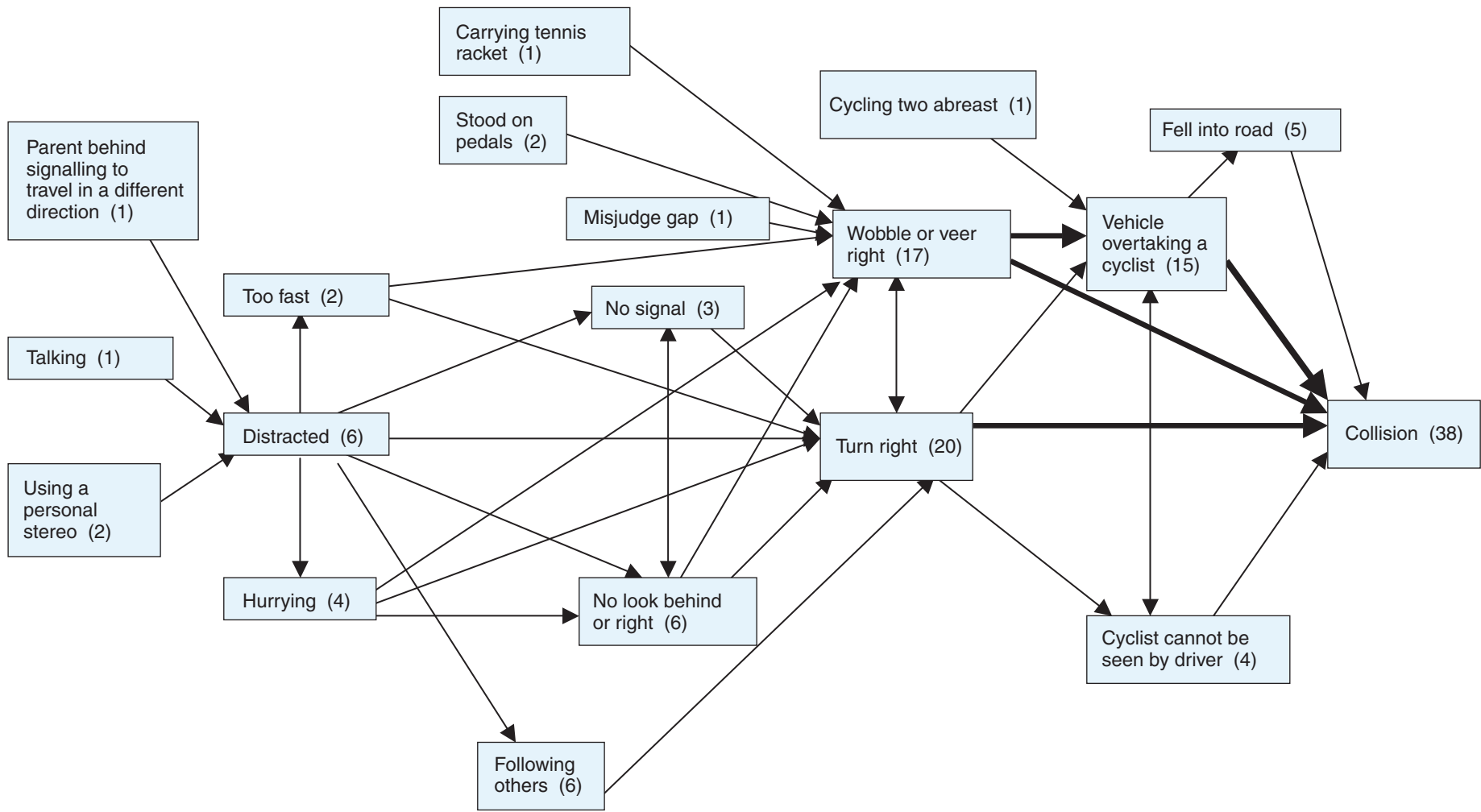


Figure 11 Turning right and/or being overtaken

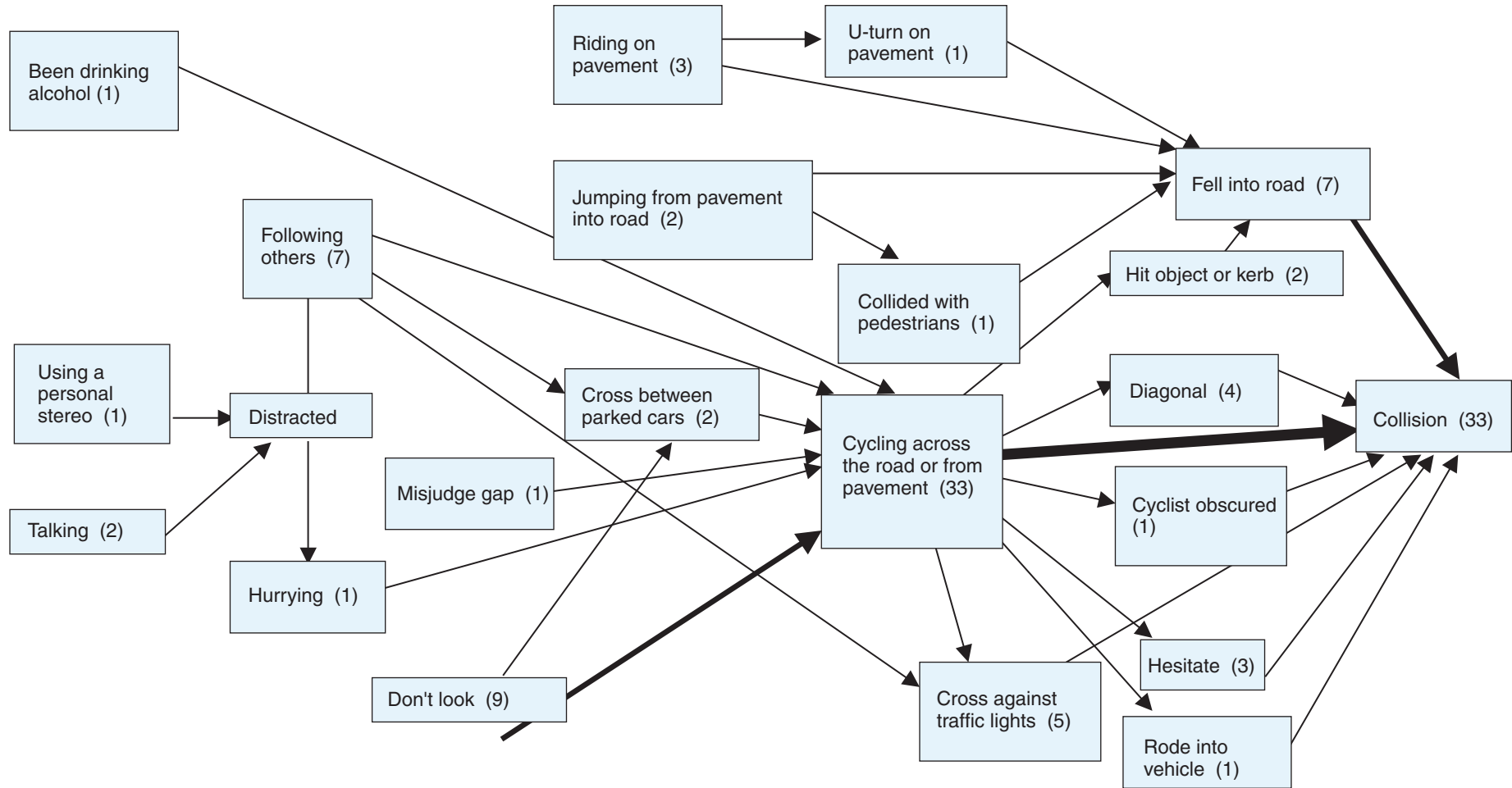


Figure 12 Cycling on or from the pavement

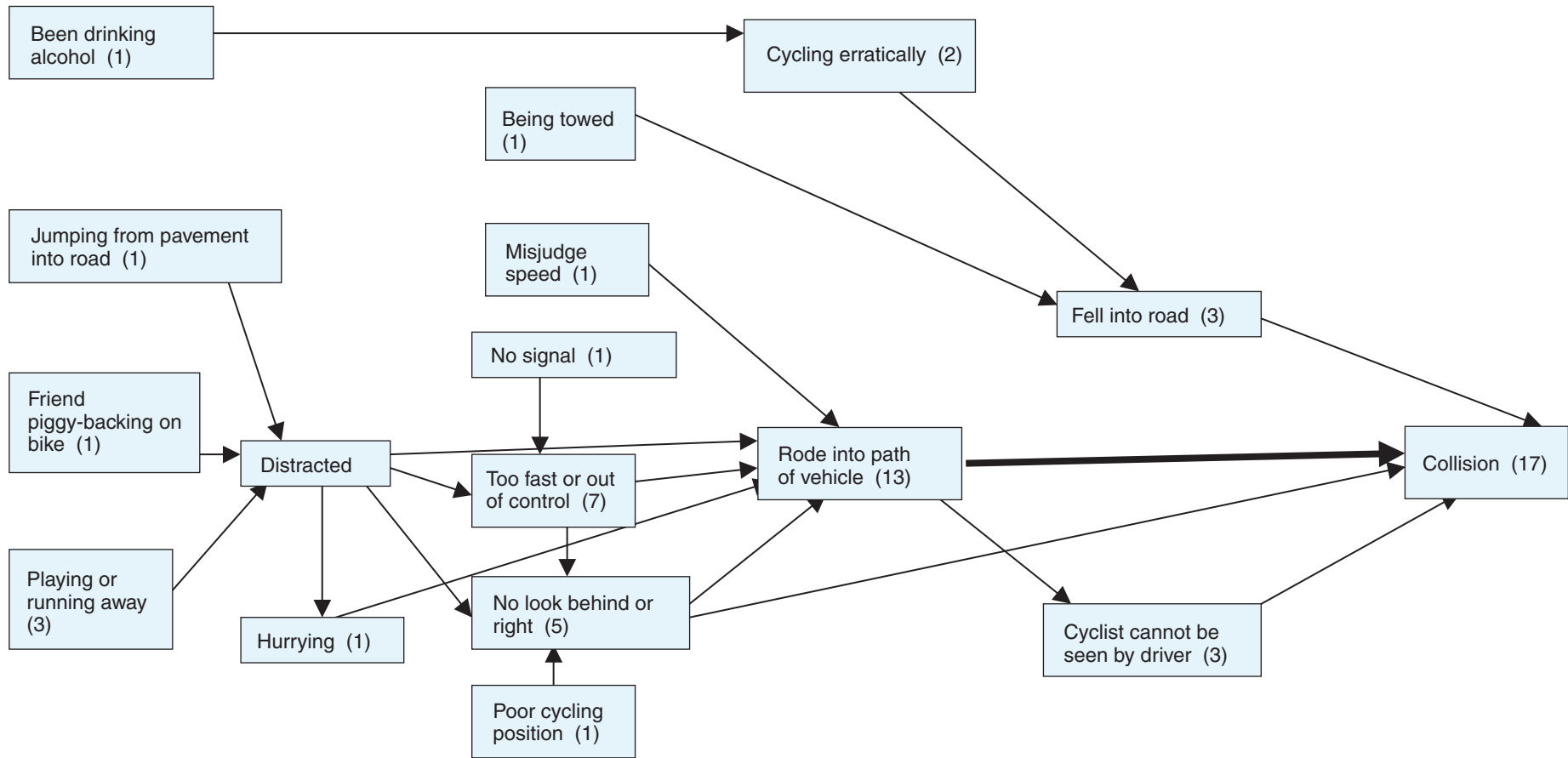


Figure 13 Cycle or fall into the path of a vehicle

3.8 Social circumstances

3.8.1 Comparison with 1991 Census

The 1991 Census was chosen as the most applicable to compare with this dataset which includes accidents from 1987-95. The data comprised 292 child fatalities and were complete for the following variables:

- casualty type (pedal cyclist, pedestrian);
- sex of child;
- age of child (in the range 9-15 years);
- child's home county type (Greater London, other metropolitan county, other county).

Data were missing for the following variables:

- child's ethnic group (Asian, Black, White), 190 cases missing = 65%;
- child's family structure, 126 cases missing = 43%;
- socio-economic group of a carer of the child, 176 cases missing = 60%;
- driver's ethnic group, 263 cases missing = 90%;
- socio-economic group of driver, 84 cases missing = 29%.

The high proportions of missing data for these variables made a comparison with the census unreliable. The findings described below, therefore, cannot be generalised.

3.8.1.1 Age

A fatality rate per 100,000 population was calculated for the sample of 292 fatally injured pedestrians and pedal cyclists using the 1991 Census population for England and Wales. Figure 14 shows that the fatality rate per 100,000 population was higher for males than females in each category. The difference between male and female pedestrians declined in the 12-15 age group: the rate for 12-15 year old female pedestrians slightly exceeding the rate for 9-11 year old males.

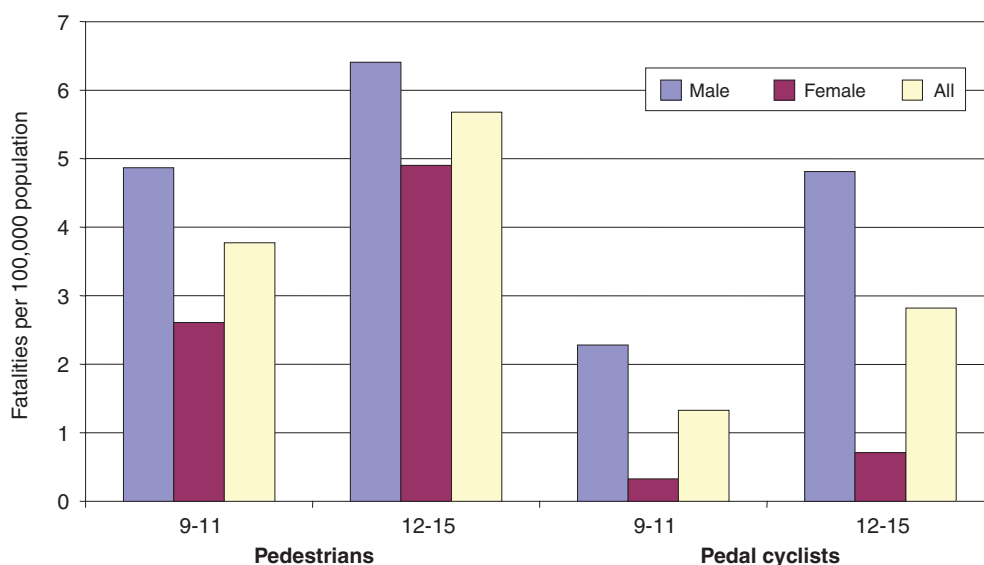


Figure 14 Fatality rate per 100,000 population by age group, sex and casualty type

3.8.1.2 Area

The child's home county was grouped into three categories: Greater London, other metropolitan counties and other. The data show that pedestrian casualties contribute a significantly higher proportion of the total in Greater London and other metropolitan counties than in other counties (see Table 17).

Table 17 Fatalities by casualty type and area

	Casualty type					
	Pedestrian		Pedal cyclist		Total	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Greater London	25	78%	7	22%	32	100%
Other metropolitan county	46	82%	10	18%	56	100%
Other county	131	64%	73	36%	204	100%
Total	202	69%	90	31%	292	100%

Chi-square (2) = 7.97, p<.02

Half of the London fatalities were in the youngest age group, 9-11 (see Table 18). This was significantly higher than the proportions in this age group in the two other area types.

Table 18 Fatalities by age group and area

	Age group					
	9-11		12-15		Total	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Greater London	16	50%*	16	50%	32	100%
Other metropolitan county	19	34%	37	66%	56	100%
Other county	61	30%	143	70%	204	100%
Total	96	33%	196	67%	292	100%

Statistical significance = * p<0.05

Figure 15 shows that the fatality rate per 100,000 population in this sample was highest for 12-15 year olds in non-metropolitan counties. The fatality rate for 9-11 year olds was highest for those living in London and was higher than the rate for 12-15 year olds in London and other metropolitan counties.

3.8.2 Ethnic group

The child's ethnicity was not routinely recorded in the police accident file and was only found in a third of the cases. The following point of interest is taken from the table in Appendix A. Fifty-eight of pedestrian fatalities were known to be white, and 22 were known to be from a minority ethnic group. As it was not clear whether the two groups were likely to be consistently recorded, the only conclusion was that a minimum of 11% of the pedestrian fatalities was from a minority ethnic group. This proportion was higher than the 1991 Census for 9-15 year old children from minority ethnic groups living in England and Wales (9%), although the difference was not statistically significant. Only two pedal cyclists were known to be from a minority ethnic background, consequently the proportion of all child fatalities from a minority ethnic group was 8%.

3.8.3 Socio-economic group

The children's socio-economic group (SEG) was derived from the carer's occupation using the Market Research Society guidelines (MRS, 1992). If both carer's occupations were available, the higher group was used. Table 19 shows the distribution for both child fatalities and for the drivers involved in the accidents.

Among the children who can be classified, the number in socio-economic group E was statistically significantly higher than national proportions. However, because 67 per cent of these data are missing one should not place too much reliance on these figures.

Table 19 Socio-economic group of child fatalities and drivers involved

SEG	Children		Drivers		National proportions Per cent
	Number	Per cent of social grade known	Number	Per cent of social grade known	
A and B	10	11%	15	7%**	17%
C1	16	17%	33	16%*	23%
C2	26	27%	67	33%	32%
D	23	24%	66	33%***	19%
E	20	21%*	22	11%	13%
Total with SEG known	95	100%	203	100%	100%
SEG missing	197		89		
Total	292		292		

Statistical significance = * $p < .05$, ** $p < .01$, *** $p < .001$

The number of drivers in socio-economic groups A and B was less than half the proportion of the population expected in these groups and was balanced by the surplus in group D. These differences were significant (Chi-square, $p < 0.05$). These data were drawn from a 70 per cent sample and so is probably representative of the population of drivers involved in a child fatal accident. However, the national distribution takes no account of the proportions of the adult population in each band who hold a driving licence.

3.8.4 ACORN categories

It proved very difficult to obtain the occupation of the adult carer/s for the child fatalities from the police accident files. The child's home address was, however, often recorded and if the postcode was missing it was obtained by searching the Royal Mail postcode address file. In this way the full home postcode was known for 203 of the child fatalities, 141 pedestrians and 62 pedal cyclists. The postcode could then be linked to a system that is widely applied for market research purposes. This system, known

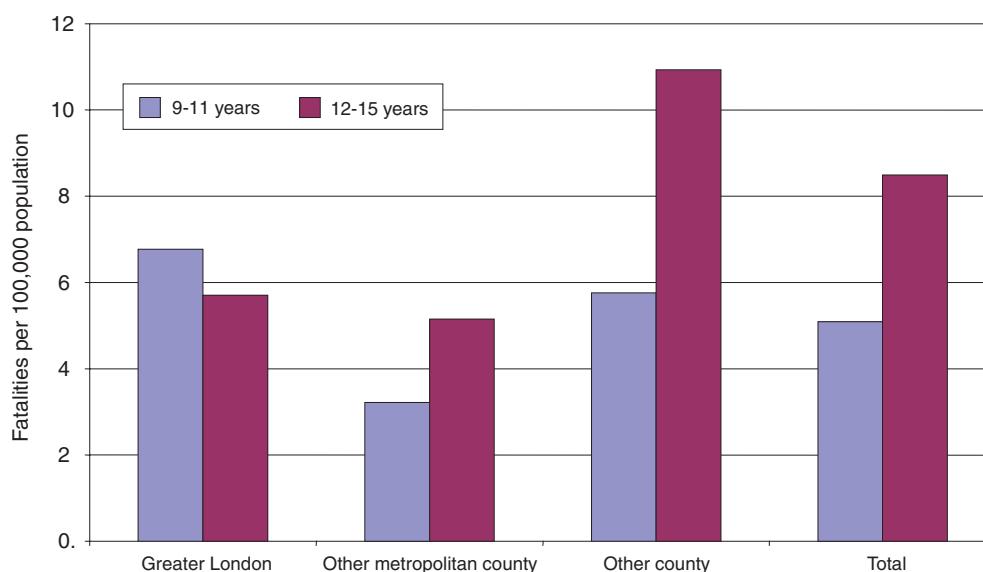


Figure 15 Fatality rate per 100,000 population by area type and age group

as the ACORN directory (CACI, 1993), was supplied by CACI Ltd. Table 20 gives the proportions of the 203 child pedal cyclist and pedestrian fatalities in each of the ACORN categories.

Table 20 The number and proportion of the 203 pedestrian and pedal cyclist fatalities in each ACORN category

	ACORN category						
	A	B	C	D	E	F	All
N	39	25	5	59	21	54	203
Pedestrian	18%	10%	3%	32%	9%	28%	100%
Pedal cyclist	21%	18%	2%*	23%	15%	23%	100%
All	19%	12%	2%**	29%	10%	27%	100%
% of population in each ACORN category	20%	12%	8%	24%	14%	22%	100%

Statistical significance = * $p < .05$, ** $p < .001$

The ACORN categories (Appendix B) most likely to include families with children aged 9 -15 were A, B, D and E. The categories, which most often include families from minority ethnic groups, were C, E and F.

For this population of 203 child casualties whose full postcode was known for their home address 29 per cent were from the D Acorn category and 27 per cent from the F Acorn category. This is slightly more than would be expected from the ACORN distributions, although the differences were not significant.

The ACORN categories C and E were under-represented in the accident involved sample. In the case of category C this was probably because a high proportion of the children in these families are aged under 5, (the accident involved sample includes children aged between 9 and 15). For category E only one of the 6 sub-categories includes children aged over 5 (1.1% of the total population).

3.8.5 Family type

Table 21 compares the family structure of this sample of fatally injured children with national proportions.

Table 21 Family type of child fatality

	Children		National proportions** Per cent
	Number	Per cent (n=166)	
Living with two parents*	98	59%	73%
Living in a stepfamily	38	23%	8%
Living with lone parent	24	15%	19%
Other	7	4%	-
Total with family structure known	166	100%	100%
Family structure missing	126		
Total	292		

Percentages subject to rounding error.

* Includes married and unmarried parents.

** The 1991 Census gave proportions of married couple, cohabiting couple and lone parent households with dependent children. The General Household Survey, 1995 gave details of the proportion of children living in a stepfamily.

Nearly a quarter of the children fatally injured were living in a stepfamily, compared with eight percent of the national child population in 1994 (Chi-square, $p < 0.001$). This suggests that somehow children living in a stepfamily were at higher risk of having a fatal traffic accident. The proportions of children fatally injured when living with two natural parents or a lone parent were less than the equivalent national proportions in 1991.

3.8.6 Disability or impairment

In 12 of the 292 cases the witness statements indicated that the child fatality had a disability or impairment. Four fatalities (one pedestrian and three pedal cyclists) had a hearing impairment: one was deaf and the others had temporary deafness associated with conditions such as 'glue ear'. Two pedestrians were not wearing their glasses at the time of the accident and it was believed another pedestrian was having difficulties with their contact lenses. Four children were described as having learning difficulties (1.4%). In two of these cases the child's learning disability was known not to be a factor: one was a 'hit and run' incident, whilst the other child was hit by a trailer which had become detached from a vehicle. As temporary or permanent disability was not routinely recorded these figures are likely to be an underestimate.

3.9 Driver characteristics

In the majority of cases the driver involved in the accident was a male, aged over 25. Female drivers were involved in one in five of the pedal cyclist fatalities and one in three of the pedestrian fatalities. Table 22 gives the age and sex of the drivers (where known) involved in the child pedestrian and pedal cyclist fatalities.

Table 22 Sex and age of the drivers involved in the child fatalities

Driver's sex and age group	Pedal cyclist(86)	Pedestrian(196)
N	11	44
Female aged 25 and under	64%	30%
Female aged over 25	36%	70%
N	75	152
Male aged 25 and under	39%	38%
Male aged over 25	61%	62%

Overall 35 per cent of the drivers involved in accidents with pedal cyclist fatalities were travelling to/from work compared to only 22 per cent of the drivers involved in accidents with pedestrians. This might be related to the differences in time of day when the accident occurred; for the pedal cyclist fatalities a higher proportion were in the early morning.

As highlighted in section 3.7, the police investigation was primarily concerned about whether an offence had been committed. Details of the drivers' behaviour at the time of the accident was focused upon whether they took evasive action to avoid the child such as swerving or braking or had given a pedal cyclist sufficient room when over-taking. In most cases the police reported that the

driver had taken evasive action and suggested the child pedestrian or pedal cyclist was 'unavoidable'. Consequently, in most cases the reporting police officer recommended that no further action was required against the driver. There was no evidence recorded to suggest that any of the drivers modified their behaviour prior to the child entering the carriageway (for example, slowing down when they saw a group of children).

Finally, it is worth noting that about 14 per cent (42/292) of drivers involved in fatal accidents with both cyclists and pedestrians were prosecuted for offences, of which 37 offences related to careless, reckless or dangerous driving. Eleven drivers were convicted of causing death by dangerous or reckless driving, 12 were convicted of careless driving and three were convicted for reckless driving.

Vehicle speed was recorded in one fifth of the files; in 16 per cent (9) of these cases was the vehicle believed to have been travelling above the speed limit. Only one driver was convicted for speeding.

4 Discussion

This study provided useful information on the accident circumstances of road accidents involving young adolescents, particularly on accompaniment and behaviour of the child at the time of the accident. Its findings were consistent with other studies of accident involved children, which had included small samples of young adolescents (Christie, 1995; Lawson, 1990; Carsten *et al.*, 1989) or had been limited to a single area (Ward *et al.*, 1994; Lawson, 1990; Grayson, 1975). An earlier study by Carole Miller Research (1998) examined child pedestrian accidents in Scotland also had similar findings. This consistency suggests that the sample of fatal accidents reviewed in this study were representative of all severity casualties.

As previous analyses of STATS19 have indicated (e.g. White *et al.*, unpublished; Carole Miller Research, 1998; Lynam and Harland, 1992) boys in this age group were more likely to be involved in a fatal road accident than girls, especially as a pedal cyclist. Only 12 per cent of the pedal cyclist fatalities were female. This is probably related to exposure as boys are more likely to cycle than girls (Elliott and Baughan, 2003; CAPT, 2002). The findings of this study also supported previous research that found young adolescent pedestrians had a higher proportion of accidents on main roads, further away from the child's home (Carole Miller Research, 1998; Lawson, 1990). Almost half of the child fatalities were involved in accidents on A-roads and in 20 cases this was a dual carriageway. Nearly half the children were fatally injured on a road with a speed limit above 30 mph. In the majority of cases the traffic flows on these roads were recorded as light. Descriptions and photographs of the accident site included in the police files revealed that over half of the accidents were not in a solely residential street.

Although the peak time for accidents was around 4pm, which coincides with the journey home from school, analysis of witness statements revealed that relatively few

fatally injured children were travelling directly to or from school and most of the accidents occurred when the child was out playing or at leisure. This supports findings from other studies of accident involved child pedestrians (Carole Miller Research, 1998; Christie, 1995b; Lawson, 1990; Carsten *et al.*, 1989). Some of these studies have suggested that the school journey becomes increasingly important as the child gets older (White *et al.*, unpublished; Carole Miller Research, 1998; Carsten *et al.*, 1989). This study showed that the proportion of children fatally injured on the school journey increased slightly from 12 per cent of fatalities aged 9-11 to 18 per cent of fatalities aged 12-15.

Earlier research has found pedestrian accident risk is related to socio-economic group (Christie, 1995b; Sharples *et al.*, 1990). However, there was insufficient evidence in these fatal accident files to support the finding that the young adolescent fatalities were from lower socio-economic groups. The carer's occupation was missing in two-thirds of the cases and, where known, was often the mother's occupation. Socio-economic group is normally classified on the father's occupation, which might be coded higher than the mother's occupation if she is the main carer of the child. This may explain the significantly higher proportion of children in socio-economic group E. Analysis of ACORN categories revealed no significant differences in the categories most likely to contain families with children aged 9-15. Other research of health inequalities has suggested that influences such as peer group and youth culture may cut across factors related to family, home background and neighbourhood for 10-15 year olds and so reduce or remove the socio-economic group differential (West, 1997).

Fewer drivers involved in the accident were from socio-economic groups A and B than expected, and there was a higher proportion of drivers from socio-economic group D.

Ethnic group was not routinely recorded in the police accident files and was unknown for the casualty in 64 per cent of cases. From the small number which were coded, 22 pedestrians were known to be from a minority ethnic group, suggesting that a minimum of 11 per cent of the pedestrian fatalities were from a minority ethnic background. This was higher than the proportion in the 1991 Census for 9-15 year old children living in England and Wales (9 per cent). Only two pedal cyclists were known to be from a minority ethnic group. Overall, the proportion of pedestrian and pedal cyclists from a minority ethnic group was 8 per cent.

Details of the child's family structure were given in a limited number of cases (57 per cent). In a quarter of these cases the child was living in a stepfamily, a proportion that was higher than that expected. This finding may be related to the fact that the police were more likely to record this type of family structure, especially if they needed to notify both parents. However, other injury studies have related family disruption to accident risk (Pless *et al.*, 1989).

Unlike other studies (Christie, 1999; MVA, 1989) hearing impairment was not identified as an important factor, being recorded in only four cases. This may be because the police did not routinely report temporary and permanent disability so the incidence may have been underestimated.

At the time of the accident two-thirds of the children were accompanied (184 cases). Less than 10 per cent were accompanied by at least one adult (7 pedal cyclists and 18 pedestrians) of whom 14 were the child's parent. Younger girls aged 9-11 were more likely to be accompanied by an adult than boys the same age or older children. However, the sample of 9-11 year old girls is small so the results may not be reliable. The proportion of pedestrian fatalities accompanied by their peers was similar to those found for 11–16 year olds in studies of child pedestrians by Christie (1995b) and for 10-14 year olds by Lawson (1990). However, Ward *et al.*, (1994) and Grayson (1975) found a greater proportion of young adolescent pedestrians (aged 10-14) were alone at the time of the accident.

Girls were more likely to be accompanied at the time of the accident than boys: overall 45 per cent of the male fatalities were alone at the time of the accident compared to 28 per cent of the females. This may reflect the greater proportion of cyclists in the male sample. The majority of accompanied fatalities were with friends of the same sex at the time of the accident. The pedal cyclist fatalities were accompanied less often and, if they were accompanied then the group was small and comprised children of the same age and sex. Most of child fatalities were in a group with one or two friends. Lawson (1990) and Carsten *et al.* (1989) also reported that child pedestrians were likely to be in a group of 2 or 3 at the time of the accident. These studies did not, however, indicate the sex of the members of the group and were based upon different age groups.

Overall one-third of the children were involved in accidents in darkness: 41 per cent of the pedestrians were killed in darkness and one in five pedal cyclists. The accident descriptions indicated that very few pedal cyclists or pedestrians wore safety clothing. The two cyclists who wore safety items were both on paper-rounds and were using paper bags with reflective strips on them. Only one cyclist was wearing a cycle helmet and only one cyclist displayed lights on their bike during darkness. These findings reflect those found in recent surveys of adolescents. In a survey of 11-16 year olds reported by Elliott and Baughan (2003) half the adolescents said they never wore a cycle helmet and 58% did not wear fluorescent or reflective clothing when cycling, whilst an even greater proportion of pedestrians never wore reflective clothing. Similar findings were found for cyclists in a study of 11-14 year olds living in Gateshead by CAPT (2002).

Most of the child pedestrian fatalities were described as running or not paying attention, which is consistent with the findings of other studies of police accident reports (Carole Miller Research, 1998; Tight *et al.*, 1996).

It should be remembered that this study of fatal accidents relied on the accounts of witnesses to describe the child's behaviour. This means it was subject to their interpretation. A child might have been described as 'running' to explain how they could 'appear from no where'. The primary purpose of the police investigation was to determine whether an offence had been committed so the focus was upon the behaviour of the driver (Stone, unpublished). Therefore, the amount of detail about the child's behaviour was often limited.

The majority of the fatally injured young adolescents in this study were not taking part in extreme risk activities but were showing evidence of some risk taking including failure to choose safe crossing places, poor observations and distractions. Recent studies of adolescents suggest that some of these behaviours are quite common (CAPT, 2002; Brake, 2002). Adolescent pedestrians aged 11-16 reported that they frequently forget to look both ways before crossing or make sure traffic has stopped before using a pedestrian crossing; they also frequently cross without waiting for the 'green man' or not bother walking to a nearby crossing (Elliott and Baughan, 2003).

Distraction and/or being in a hurry appeared to be related to the child making an error, especially in pedestrian accidents. Tight *et al.* (1996) also related distraction from the crossing task, being in a hurry and 'thoughtlessness' to perceptual errors in urban child pedestrian accidents.

A number of cyclist accidents occurred when the cyclist was turning or moving right across the road. Often the driver was overtaking the cyclist at the time of the collision. In some cases being overtaken caused the cyclist to wobble and fall into the side of the vehicle. A study by Breeze and Southall (1990) of cyclist behaviour at T-junctions reported a third of cyclists failed to follow the correct route through the junction and a quarter rode on the pavement. A higher proportion of the accident involved pedal cyclists were using the pavement in this study (44%); just over a third of the pedal cyclist fatalities were involved in a collision whilst crossing the road.

There were some examples of extreme risk taking especially among cyclists, riding at speed out of junctions or being towed by a vehicle. One in ten pedestrians ran into the road whilst playing chase or another game. Only one of whom was believed to have done so deliberately, although whether a child witness would confess to playing 'chicken' with the fatality is doubtful. Other pedestrians crossed against traffic lights.

The behaviour of the child was considered by witnesses and the police in the context of the accident and may have been described as 'unsafe' due to the consequences of the accident. Generally, the behaviours carried out by the child pedestrians and cyclists were typical of adult pedestrians and cyclists. It was apparent that some children had misjudged the speed of the vehicle or the gap size, which suggests a skill deficit. It may be that children in this age group have not developed sufficient skill or experience to carry out these pedestrian behaviours safely.

The presence of alcohol in blood samples taken from 10 (5%) of these child pedestrians and two (2%) of the child pedal cyclists is interesting. Of these children nine were male aged between 12 and 15 years with blood alcohol concentrations (BAC) between 23 and 294mg/100ml (Appendix A). Of the four females one was 12 years old with a BAC of 10mg/100ml, and one was a 15 year old with a BAC of 294mg/100ml. In addition, a female was reported to have 'been drinking'. One of the males aged 15 with BAC of 78mg/100ml had also taken a hypnotic drug (choralhydrate). For comparison the drink-drive limit for drivers is 80mg/100ml (BAC).

Recent research for DfT (Keigan *et al.*, 2003) on the incidence of alcohol in fatally injured adult pedestrians reported an increase from 53% to 72% in the period 1985 to 1999 in the presence of any alcohol in the 16 to 19 year olds. The Royal College of Physicians Report (2001) shows that alcohol consumption among under-age drinkers (11-15) more than doubled between 1990 and 1996 (Goddard, 1996). Furthermore, Department of Health research (2001) shows that a quarter of 11-15 year olds reported drinking alcohol in the last week. Further evidence of a problem with British teenagers comes from the ESPAD report (2000) which covered interviews with 60,000 15-16 year olds in 30 countries; the UK was second in the league behind Denmark for frequency in drinking. Although 5 per cent is a small proportion of these accident-involved children, the recent trend in the increased detection of alcohol in young people indicates an area where more research might be beneficial. Two of the child pedestrian fatalities had taken cannabis.

Descriptions of the drivers' behaviour focused upon whether they took action to avoid the child such as swerving or braking or had given the pedal cyclist sufficient room when over-taking. In most cases the police reports suggested the child pedestrian or pedal cyclist was 'unavoidable' and recommended that no further action was required against the driver. The driver was absolved from responsibility for the accident. Thirty-seven drivers (13%) were prosecuted for offences related to careless, reckless or dangerous driving. Eleven drivers were convicted of causing death by dangerous or reckless driving and a further 12 were convicted of careless driving. Three drivers were convicted for reckless driving. In nine cases the vehicle was believed to have been travelling above the speed limit but only one driver was known to have been prosecuted for speeding. These drivers were likely to have been unprepared for the unpredictable behaviour of child pedestrians and cyclists. There was no evidence to suggest that any of the drivers had modified their behaviour prior to the child crossing the road.

5 Conclusions and recommendations

1 The pattern of the circumstances of the fatal accidents recorded in the police files was similar to that indicated in a variety of studies of child pedestrian and cyclist accidents:

- Boys are more likely to be involved than girls.
- Most fatalities occur after school, when the child is out playing or at leisure.
- Almost half of the fatal accidents occurred on A-class roads. It was particularly noticeable in this study that a fifth of the pedestrian fatalities occurred on dual carriageways, and nearly half of the accidents were on roads with a speed limit above 30mph. But in the majority of cases the traffic flows on these roads were recorded as light.
- Two in five pedestrian fatalities occurred during the hours of darkness. This study confirmed that child pedestrians involved in fatal accidents were unlikely to be wearing clothing that was visible.

- Cyclists were particularly vulnerable when moving across the road or turning right. This study showed that many of the cyclist fatalities did not appear to look behind or signal their intended manoeuvre clearly enough.

2 The study provided new information on the pattern of accompaniment among child fatalities:

- Two thirds of the children were accompanied at the time of the accident but less than 10 per cent were accompanied by an adult.
- Girls are more likely to be accompanied than boys; over 45 per cent of male fatalities were alone.
- Most child fatalities were in groups with only one or two friends, usually of the same age and sex.

3 Although the information in the police files was primarily directed towards looking for any evidence of lack of care by the driver, it also provided a picture of child behaviour:

- Poor observations and/or crossing from an inappropriate location were highlighted in a quarter of pedestrian accidents.
- The majority of child fatalities in this age group were not taking part in extreme risk activities, but there were some examples of this especially among cyclists.
- Distraction and/or being in a hurry appeared to be associated with children taking risks or making an error, especially in pedestrian accidents.
- Over a third of cyclist fatalities were involved in a collision after riding off the pavement and across the road.
- More generally the behaviour of the child pedestrians and cyclists were typical of adult pedestrians and cyclists. However, they may have over-estimated their own level of skill.
- Nine per cent of drivers were convicted of either careless or reckless driving or causing death by dangerous or reckless driving.

4 Limited data were available from police files on socio-economic group, ethnicity and family circumstances of the child so the following findings are indicative and require further study:

- A slightly higher proportion of pedestrians was from a minority ethnic background compared to the census.
- Children living in a stepfamily appear to be at greater risk than those living with two natural parents or children living with a lone parent.
- There was insufficient evidence to reliably determine whether the young adolescent fatalities were from lower socio-economic groups. However, there were no significant differences in ACORN categories most likely contain children aged 9-15.
- Relatively few fatalities were reported as having a disability, but it is possible that temporary or permanent disability was not routinely reported in the police files.

- 5 The data from this study on accompaniment and behaviour at the time of accident involvement can be compared with data on the frequency with which these factors occur in general behaviour (as for example derived in Chinn *et al.*, 2004) to identify any major differences in risk between different situations.
- 6 Countermeasures aimed at young adolescents should reflect the following factors highlighted by this study:
- Children in this age group are in a transition period between the training they received at earlier ages, involving recommended crossing drills, and the apparently less constrained crossing behaviour of adults. It is important to differentiate between their need for further specific ‘training’ and their need for more general awareness of risk.
 - The frequency with which accidents appear to be associated with lack of concentration on the crossing task suggests that it would be useful to try to raise young adolescent’s awareness of risk. Children of this age are not involved in transport activities in which they influence risk directly except cycling. It is possible that this may result in overconfidence in drivers’ abilities to counter any errors they make as pedestrians. Distractions are present in a variety of forms so it may be more fruitful to focus on a general message, rather than highlighting particular distractions.
 - The evidence of alcohol involvement, although only in a relatively small number of incidents, suggests this should be given particular attention.
 - One specific situation that warrants more attention is the incidence of fatalities on dual carriageway.
 - It is not obvious that engineering or speed reducing measures would be of any greater benefit to this age group than to the general pedestrian population.

5.1 Limitations of the study

The use of police records is an established methodology for investigating the factors which contribute towards road accidents (e.g. Clarke *et al.*, 2002; Carsten *et al.*, 1989; Brison *et al.*, 1988). However, a number of limitations associated with this approach should be noted. For example, researchers are reliant on information given in witness statements, which may be unreliable, biased or insufficient. The context in which any information is collected should be considered carefully by researchers. The data is also limited to what the police considered relevant to each investigation. Consequently, a significant amount of missing data is inevitable. Under-reporting is also an issue for non-fatal accidents.

Despite these limitations, there are no other data sources that would provide superior information about the factors involved in *fatal* road accidents. Ideally, when investigating the factors involved in road traffic accidents, one would collect information to supplement the data provided by the police records. For example, a survey of casualties could be conducted to provide information about their exposure, training, educational attainment, disability,

social economic group and ethnicity (i.e. information that is not routinely included in the police records). However, given the present study was concerned with fatal accidents, such an approach was not possible. Therefore, a potential avenue for future research would be to investigate the factors contributing to serious and slight road accidents involving children, though it should be noted that the task of conducting surveys of children who are involved in road accidents would need to be approached with the utmost sensitivity and adhere to strict ethical guidelines. In addition, the accuracy of the data that would be obtained from children’s reports would need to be seriously considered.

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Appendix A: Counts for coding frame variables (over 50% present or of particular importance)

The following variables were recorded in addition to those available in STATS19.

Child Development 3: Police & Coroners' files coding frame

For all accidents	Pedestrians (202)	Pedal cyclists (90)
LOCATION OF ACCIDENT		
Road	Known	
Town	Known	
ACCIDENT SITE		
Through	201	89
Cul-de-sac	1	1
LAND USE AROUND ACCIDENT		
Residential	81	32
Residential/commercial	59	19
Parkland/farming	29	16
School	9	4
Other	6	1
Unknown	18	18
PARKING		
Obstructive	22	9
Not obstructive	18	8
No on-street parking	40	14
Unknown	122	59
BARRIER BETWEEN ROAD AND FOOTPATH		
None	56	27
Railing	20	2
Bank	6	1
Other raised	2	1
Verge/space with trees	6	8
Verge/space without trees	22	9
Unknown	90	42
VOLUME OF TRAFFIC		
Heavy	18	10
Moderate	18	3
Light	58	30
Unknown	108	47
AVERAGE SPEED OF TRAFFIC		
Above speed limit	6	3
At speed limit	16	3
Below speed limit	17	10
Unknown	163	74
NAME OF DECEASED CHILD		
All known		
CHILD'S DATE OF BIRTH		
Known for 260		
CHILD'S AGE IN YEARS		
9	26	7
10	22	4
11	23	14
12	36	16
13	31	14
14	38	16
15	26	19
	202	90
SEX OF CHILD		
Male	123	79
Female	79	11

Continued

(Continued) Child Development 3: Police & Coroners' files coding frame

TIME TAKEN TO DIE Hours (rounded up to whole no.)		
1	92	42
2	3	2
3	5	2
5	2	2
7	1	
83		
9		1
10		1
11	1	
12	2	
13	1	
16		1
21	1	
Unknown	91	39
BLOOD ALCOHOL CONCENTRATION OF CHILD Mg/100ml		
Unknown	192	88
10	1	
23	1	
46	1	
60	1	
78	1	
157	1	
223		1
226	1	
259	1	
267		1
294	1	
Had been drinking	1	
ILLEGAL DRUGS		
Cannabinoids (THC)	2	
Chloralhydrate	1	
MEDICATION		
Medicine for asthma	1	1
Tegretol	1	
CHILD'S HOME ADDRESS		
Road		All known
Town		
Postcode		
ETHNIC ORIGIN OF CHILD		
White	57	24
White other	1	
Black Caribbean	5	
Black African		
Black unspecified	3	
Indian	1	1
Pakistani	1	
Asian other		
Asian unspecified	11	1
Other	1	
Unknown	122	64
FAMILY TYPE OF CHILD		
Single parent	17	7
Living with parents	68	30
Living with parent/step	25	13
Living with other family member	2	2
Other	2	
Unknown	88	38

Continued

(Continued) Child Development 3: Police & Coroners' files coding frame

<i>Family - other:</i>		
Boarding school	1	
With mother in refuge for battered women	1	
<hr/>		
MARITAL STATUS OF CARER		
Single (never married)	2	1
Widowed	3	
Divorced	5	4
Separated	1	
Cohabiting	2	2
Married	32	18
Unknown	157	65
<hr/>		
NUMBER OF CHILDREN IN HOUSEHOLD		
13	2	
2	28	11
3	17	6
4	11	1
5	2	2
6	3	
7	2	
9	1	
Unknown	135	68
<hr/>		
<i>for pedestrians and cyclists</i>		
JOURNEY PURPOSE		
Unknown	6	9
To/from school	40	8
Playing	57	26
Leisure	56	28
Errands	20	5
Job	4	11
Other	19	3
<hr/>		
NUMBER ACCOMPANYING CHILD AT TIME OF ACCIDENT		
<i>Also see Table 14</i>		
0	53	44
1	64	22
2	31	14
3	18	6
4	12	1
5	6	
6	5	
7	2	
8	1	
10	1	
24	1	
Unknown	8	3
<hr/>		
ACCOMPANIMENT AT TIME OF ACCIDENT		
NUMBER OF ADULTS		
0	57	14
1	16	6
2	2	
3		1
Not applicable/unknown	127	69
<hr/>		
NUMBER OF OLDER CHILDREN		
0	39	11
1	26	11
2	15	
3	1	
4	2	
5	3	
6	1	
Not applicable/unknown	115	68

Continued

(Continued) Child Development 3: Police & Coroners' files coding frame

NUMBER OF SAME AGE CHILDREN		
0	17	3
1	51	15
2	17	11
3	2	2
4	6	
5	1	
6	1	
	7	1
	23	1
Not applicable/unknown	105	59
<hr/>		
NUMBER OF YOUNGER CHILDREN		
0	46	15
1	28	3
2	6	2
3	2	
Not applicable/unknown	120	70
<hr/>		
RELATIONSHIP OF ACCOMPANYING PERSONS		
PERSON 1		
Not applicable /unknown	67	49
Parent	11	2
Sibling	17	2
Other relative	8	1
Carer	1	
Friend (child)	95	34
Friend (adult)	3	2
PERSON 2		
Not applicable /unknown	130	70
Parent	1	
Sibling	6	1
Other relative	2	
Friend (child)	62	18
Friend (adult)	1	1
PERSON 3		
Not applicable /unknown	159	83
Sibling	2	1
Friend (child)	40	5
Other	1	1
PERSON 4		
Not applicable /unknown	177	90
Friend (child)	23	
Other	2	
PERSON 5		
Not applicable /unknown	188	90
Friend (child)	14	
<hr/>		
SEX OF ACCOMPANYING PERSON		
PERSON 1		
Female	47	4
Male	91	38
Unknown	64	48
PERSON 2		
Female	26	6
Male	47	14
Unknown	129	70
PERSON 3		
Female	16	2
Male	27	5
Unknown	159	83

Continued

(Continued) Child Development 3: Police & Coroners' files coding frame

PERSON 4		
Female	7	
Male	17	
Unknown	178	90
PERSON 5		
Female	5	
Male	9	
Unknown	188	90
ACTION OF CHILD PRIOR TO IMPACT		
See section 3.7		
DISTRACTED AT TIME OF IMPACT		
See section 3.7		
WEARING BRIGHT OR REFLECTIVE CLOTHING		
See Table 11		
DISABILITY		
Visual	2	1
Hearing	1	3
Learning difficulties	4	
Asthma	3	
Diabetic	1	
None	68	35
Unknown	123	51
PLAYING TRUANT, BUNKING OFF SCHOOL		
Yes	1	
No/ Not applicable	201	90
<i>for cyclists only</i>		
WEARING A CYCLE HELMET?		
Yes		
No		69
Came off in accident		1
Unknown		20
Not applicable	202	
USING CYCLE LIGHTS (IF DARK)?		
Yes		1
No		12
Unknown		5
Not applicable	202	72
FAULTY CYCLE		
Rear brake not working – unroadworthy		1
No reflectors/lights		2
No brakes, lights and reflectors		2
Bike too small		1
Brakes not working or missing		4
Chain		1
Unknown / No / Not applicable	202	79
CYCLIST WEARING FLORESCENT OR REFLECTIVE CLOTHING?		
Yes		2
No		36
Unknown		52
Not applicable	202	
CYCLING POSITION		
Seated - holding handlebar		17
Standing - holding handlebar		8
Seated - no hands		1
Standing - no hands		
Other		
Unknown		64
Not applicable	202	

Continued

(Continued) Child Development 3: Police & Coroners' files coding frame

CYCLING LOCATION		
Pavement		11
Footpath - not paved		1
Other		10
No path		3
Unknown		65
Not applicable	202	
<i>For all accidents</i>		
SPEED OF VEHICLE (MPH)		
<30	22	5
30-39	38	11
40-49	20	6
50-59	12	4
60-69	6	3
70+	3	3
Unknown	101	58
SEX OF DRIVER		
Female	45	11
Male	156	79
Unknown	1	
AGE OF DRIVER		
<20	18	7
20-25	53	29
26-35	58	19
36-45	35	15
>45	33	16
Unknown	5	4
	202	90
DRIVER'S HOME ADDRESS ROAD		
Road		All known
Town		All known
Postcode		known for 45
SOCIO-ECONOMIC GROUP OF DRIVER		
A	1	1
B	10	3
C1	23	10
C2	43	24
D	42	24
E	14	8
Housewife	1	
Retired	2	1
Unemployed	1	
Unknown	65	19
ETHNIC ORIGIN OF DRIVER		
White	12	9
Black	1	1
Asian	3	
Other	1	2
Unknown	185	78
ACTION TAKEN BY DRIVER PRE-IMPACT		
See section 3.7		
DRIVER TESTED FOR ALCOHOL		
Yes	90	34
No	12	14
Unknown	100	42
BREATH alcohol		
Microgram/100ml		
Unknown	113	56
Negative	87	34
Positive	2	0

Continued

(Continued) Child Development 3: Police & Coroners' files coding frame

ILLEGAL DRUGS		
Methadone		1
MEDICATION		
Recent coronary		1
Kidney transplant		1
DRIVER'S JOURNEY PURPOSE		
To/from work	45	32
To/from school/education	1	1
Leisure	55	17
Shopping	12	4
At work	10	4
Other	16	9
Unknown	63	23
DRIVER'S FAMILIARITY WITH ROUTE		
Regular	56	35
Occasionally	27	12
First time	3	1
Unknown	116	42
JOYRIDING		
Yes	1	
No/unknown	201	90
DRIVER PROSECUTED		
Yes	36	11
No	136	68
Unknown	30	11
DRIVER OFFENCE 1		
Causing death by dangerous/reckless driving	12	4
No insurance	3	
Vehicle defects	1	2
Tachograph offences	1	
Careless driving/driving without due care	13	3
Speeding		1
Taking without consent	2	
Fail to report/fail to stop after an accident		1
No licence	2	
No vehicle tax	1	
Other	1	
Not applicable	136	68
Unknown	30	11
DRIVER OFFENCE 2		
No insurance	1	
No licence	5	
Tachograph offences	3	2
Reckless driving	2	
Not applicable	161	77
Unknown	30	11
DRIVER OFFENCE 3		
Speeding	1	
No vehicle tax	1	
No insurance	1	
Driving whilst disqualified	1	
Driving with defective eyesight	1	
Tachograph offences	1	1
Not applicable	166	77
Unknown	30	11

(Continued) Child Development 3: Police & Coroners' files coding frame

DRIVER OFFENCE 4		
No licence		1
No MOT		1
Tachograph offences		1
Reckless driving		2
Not applicable	167	79
Unknown	30	11
DRIVER OFFENCE 5		
No insurance		1
No licence		1
Reckless driving		1
Not applicable	169	79
Unknown	30	11
OUTCOME OF OFFENCE IN COURT		
OFFENCE 1		
Guilty	24	10
Not guilty/not known	12	1
OFFENCE 2		
Guilty	10	2
Not guilty/not known	1	
OFFENCE 3		
Guilty	6	1
OFFENCE 4		
Guilty	4	-
OFFENCE 5		
Guilty	3	-
CORONERS' VERDICT		
Accidental/Misadventure	102	48
Unlawful	1	
Other	3	1
Unknown	96	41
SHORT DESCRIPTION OF ACCIDENT		
See section 3.7		

Continued

Appendix B: Definitions of socio-economic classifications

1 Description of ACORN categories

CACI has classified each local area in Great Britain using a set of 54 ACORN types (CACI 1993). This is based on an extensive cluster analysis of data from the 1991 Census. The actual directory comprises a list of all British postcodes with the appropriate ACORN types for each postcode. The 54 ACORN types are grouped into 17 ACORN Groups, which are further grouped into 6 ACORN Categories; some demographics and socio-economic notes are given here.

Category A: Thriving

Wealthy achievers, suburban areas .

Affluent greys, rural communities.

Prosperous pensioners, retirement areas.

Aged 45-64, few young children, proportion of older children is 10% above average, family areas but most children have left home.

Professional and managerial people, owner occupied.
99% white,

Category B: Expanding

Affluent executives, family areas.

Well-off workers, family areas.

Above average levels of under 15s, small families (1 or 2 children), highest levels of under 5s, most common group for 'married couple with 1 or 2 children'.

Category C: Rising

Affluent urbanites, town and city areas.

Prosperous professional, metropolitan areas.

Better-off executives, inner city areas.

Below average levels of families/couples with young children (aged 0-4 years), very mixed - families/couples without children, singles, multi-person households. 5-6 times national average for Afro-Caribbean and over 3 times Asian ethnic groups.

Category D: Settling

Comfortable middle agers, mature home owning areas.

Skilled workers, home owning areas.

Older couples (over 45) with no dependent children, AND proportions of 5-14 and 25-44 year olds close to national average, likely to find married couple with 2 children, predominantly family areas.

Also young couples and single non pensioners.

Category E: Aspiring

New home owners, mature communities.

White collar workers, better-off multi-ethnic areas.

Proportion of single parent families is 26% above average, couples with and without children close to national average, generally more pensioners, poor health, large families. Generally one third of population are black/Asian.

Category F: Striving

Older people, less prosperous areas.

Council estate residents, better-off homes.

Council estate residents, high unemployment.

Council estate residents, greatest hardship.

People in multi-ethnic, low-income areas.

Older single person households, long-term illness, High proportions of single parent homes, large families, >=3 -adult households, children aged under 5, fewer 5-14 year olds. Generally high concentrations of people from black/Asian/Chinese ethnic groups are found.

2 Description of market research socio-economic groups

- A – Senior managerial, administrative or professional.
- B – Middle managerial, executives in large organisations.
- C1 – Junior managerial, administrative or professional, or supervisory and clerical.
- C2 – Skilled manual.
- D – Semi-skilled or unskilled manual.
- E – casual workers and those without a regular income.

Abstract

In Britain, the number of children killed or seriously injured as pedestrians or cyclists peaks between the ages 11 to 14. Monitoring of progress towards the casualty reduction target has also showed that pedestrians aged 11-15 had the slowest rate of decline. This project aimed to investigate police fatal accident files in order to classify the circumstances of the accident, identify populations with a relatively high risk of accident involvement and to determine how fatal accident victims do or do not differ from the general population and where counter measures should be aimed to be most effective.

The study found that two-thirds of the children involved in the fatal accident sample were accompanied at the time of the accident. Most (over 70%) of fatally injured accompanied children were in a small group with only one or two child companions. Most fatally injured children were not taking part in extreme risk behaviours. Common types of behaviour involved choosing unsafe places to cross and crossing against traffic lights. Several fatalities also occurred while attempting to cross dual carriageway roads away from crossing facilities. More generally, adolescent behaviour in accident involved situations was not untypical of adult accident situations. Distraction was noted in many cases but arose from a variety of sources. Alcohol was a factor in a small number of child pedestrian accidents but may highlight an increasing trend. Several cyclist fatalities involved riding off the pavement across the roadway. Very few pedestrians or cyclists wore safety clothing. Thirteen per cent of drivers involved in these fatal accidents were prosecuted for careless, dangerous or reckless driving following the accident: nine per cent were convicted.

There was insufficient evidence to determine whether the young adolescent fatalities were from lower socio-economic groups. However, analysis of ACORN categories indicated that there were no significant differences in the proportions of fatalities in the categories most likely contain children aged 9-15. This suggests that the relationship between accident, risk and low socio-economic group may decline or diminish in this age group. Relatively few fatalities were reported as having a disability, but it is possible that this is an underestimate as temporary or permanent disability was not routinely reported in the police files.

The findings suggest that countermeasures aimed at young adolescents should increase awareness of risk. Distractions are present in a variety of forms so it may be more effective to focus on a general message, rather than highlighting particular distractions. The inappropriate use of dual carriageways and the influence of alcohol in young adolescent pedestrian accidents should also be considered.

Related publications

- TRL601 *The attitudes and behaviour of adolescent road users: An application of the theory of planned behaviour* by M A Elliott. 2004 (price £60, code L)
- TRL599 *Road safety behaviour of adolescent children in groups* by L Chinn, M Elliott, J Sentinella and K Williams. 2004 (price £45, code JX)
- TRL579 *The incidence of alcohol in fatally injured adult pedestrians* by M Keigan, R J Tunbridge and P Jackson. 2003 (price £30, code AX)
- TRL561 *Adolescent road user behaviour: a survey of 11-16 year olds* by M A Elliott and C J Baughan. 2003 (price £25, code A)
- TRL542 *In-depth accident causation study of young drivers* by D D Clarke, P Ward and W Truman. 2002 (price £30, code AX)
- TRL474 *Police fatal road accident reports: phase II* by R Minton. 2000 (price £40, code H)
- PR117 *The high risk child pedestrian: socio-economic and environmental factors in their accidents* by N Christie. 1995 (price £40, code H)
- PR116 *Social, economic and environmental factors in child pedestrian accidents: a research review* by N Christie. 1995 (price £30, code E)
- LR688 *The Hampshire child pedestrian study* by G Grayson. 1975 (price £25)

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