The behaviour of teenage cyclists at T-junctions

AN OBSERVATIONAL STUDY FOR THE AA FOUNDATION FOR ROAD SAFETY RESEARCH

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Executive summary

THE BEHAVIOUR OF TEENAGE CYCLISTS AT T-JUNCTIONS
(Institute of Consumer Ergonomics, Loughborough)

Introduction

An examination of national accident statistics shows that casualties to child cyclists have increased recently. Additionally, research has shown that the reporting of such accidents takes place, perhaps, in only one case in three.

Within the casualties reported a large proportion takes place at T-junctions and a majority occur to older children with a peak in the early teens.

This behavioural study has concentrated, therefore, on teenage cyclists negotiating T-junctions.

Method

Observation sites were selected to offer varying traffic conditions with a reasonable probability of use by cyclists. More than 2800 cyclists were seen, of whom over 1250 were teenagers. They were recorded on videotape at 80 T junctions in three counties. The observations were coded for analysis on a computer database. The correct, or prescribed, manoeuvre and behaviour for the purposes of this analysis was drawn from the *Highway Code,* the *Cycling Proficiency Handbook* and other relevant publications.

Findings

a Manoeuvres

The manoeuvre performed most frequently was to cycle past the mouth of the minor road. Doing this in either direction was more frequent than any other manoeuvre and may help to explain the predominance of this manoeuvre in accident reports. In a small number of cases the cyclist crossed the major road directly opposite the minor road, mainly to or from a footpath.

b Adherence to rules

A number of cases (84) of flouting general road rules or regulations were observed, although this only formed 7.5 per cent of the total observations. When it came to following the correct route through the junction 35 per cent of cyclists failed to do so – this was more likely when turning into the minor road. Of the cyclists riding two or more together 31 per cent were in a formation considered inappropriate for the conditions.

One third of those carrying luggage were judged to be doing so unsafely. One in four performed a manoeuvre which involved riding on the pavement. Only one cyclist was observed to be leading a dog on a lead.

c Hazard creation

In spite of the level of non-adherence to rules and prescribed behaviour the level of hazard creation was judged to be low. Only 2 per cent of cyclists were seen as presenting a hazard to themselves and only 0.2 per cent towards other vehicles.

d Attention and confidence

When a subjective judgement as to whether the cyclist was paying attention to riding safely was applied 49 per cent were less than attentive and 6 per cent were clearly distracted. This level of attentiveness decreased when riding in company but increased with density of traffic. It also increased with age.

The general demeanour of the cyclists was also evaluated and 94 per cent were judged to be riding their machines with confidence. There was some slight association of levels other than 'confident' with younger riders.

e Effects of traffic

Levels of traffic on the road during observations were predominantly light. This was also the situation with pavement traffic.

The propensity to follow the prescribed route through the junction was not generally affected by the density of traffic. However, as road traffic density increases it appears that cyclists going straight ahead are less likely to follow the prescribed route than those turning right or left. This may be significant when the high proportion of accidents involving this manoeuvre is considered.

f Conspicuity aids

The total number of lights, conspicuity or safety aids seen was small and while these observations were heavily influenced by the time of year, length of day and fashion for bright clothing (cycling fashion), it is still very poor. The bags provided for paper rounds by newsagents, however, tended to be bright fluorescent/reflective colours.

g Paper rounds

The vast majority of those doing paper rounds were boys of 13 or over. There was a significant difference in the proportion of luggage carried unsafely (63 per cent paper rounds, 26 per cent others). Small numbers made sub analysis difficult but it was noted that out of seven paper boys turning right into the minor road only one followed the prescribed route.

h Type of bicycle

Fashion and age play a part in the type of machine ridden. Half of all bikes are racing bikes and half of the remainder are mountain bikes. BMX bikes are more popular among the younger riders. There was some evidence of modifications carried out to make machines more fashionable.

Implications

Within the constraints of the study (nine months, £45,000) it has only been possible to probe the data to the point where general analysis is available. Deeper probing is indicated on a number of topics where the general findings show behaviour likely to reduce safety. For example, the high rate of deviation from the prescribed route when going straight ahead, especially in denser traffic, could be examined more closely to see whether the prescribed route might be in some way in conflict with a reasonable strategy of defensive cycling. Also the practice of 'unsafe carriage' of paper delivery bags suggests an examination, as far as the filming allows, of the design of the bags.

From the outset it was intended that the 'richness' of the video image should allow this follow up probing and there is reason to suppose that this strategy will be successful.

The level of confidence of riders is a double edged sword. Some level of confidence is clearly necessary in order to ride on the road but, if it is unjustified, it may contribute to conflicts and accidents. Lack of attention and disregard of the rules and prescriptions of safe cycling can be seen as risky, yet the level of hazard creation was low. In this situation it is not surprising that traffic density appears to have little effect on behaviour in spite of the logical increase in risk.

If prescriptive education in cycling is not effective then perhaps a general defensive strategy might have more effect. Certainly there are a number of issues which will need to be addressed in future training and education programmes.

Finally, it is clear that fashion and peer group influence are demonstrating an effect on the structure and design of bicycles and on the apparel worn while riding. The power and subtlety of these influences will need to be appreciated and, if possible, harnessed by anyone wishing to influence teenage riders in the safe riding of their machines.

1 Introduction

In response to the high number of accidents occurring to teenage cyclists, the AA Foundation for Road Safety Research commissioned ICE Ergonomics to undertake an observational study of teenage cyclists on the road.

The accident data reveals that most accidents occur at T-junctions between 1500 and 1800 hrs and to youngsters between the ages of 13 and 16 years.

The objective of the study was therefore to observe and record the behaviour of teenage cyclists at these sites and during these hours. This information was then to be transferred to a database from which descriptive statistics could be derived to describe and investigate the observed behaviour.

The report also includes a brief literature review which, while not explicitly commissioned, was undertaken to provide relevant background information to help guide the direction of the study and interpretation of the study and interpretation of the findings.

1.1 The problem

Nearly 26,000 accidents involving injury to cyclists were reported in 1988. Of these 227 resulted in death, 4652 serious injury and 20,970 slight injury. The true figure for accidents to cyclists is likely to be higher as bicycle accidents are under-reported.

After motorcyclists, pedal cyclists are the road-user most likely to be involved in an injury accident with something like a 20 times greater risk than car drivers and nearly three times more likely than a pedestrian.

Most reported accidents involve collision with a car (19,534). The next most frequent is collision with goods vehicles (2328) and 1434 accidents do not involve another vehicle.

Thus 84 per cent of reported accidents involved a collision with a car or truck. This is a distortion of the true picture of all cycling accidents as those which do not involve a motor vehicle are under-reported by up to 87 per cent (Pedder *et al* 1981). However, accidents involving a motor vehicle are the most frequent cause of injury to cyclists aged 13 and above (Mills 1988).

The largest number of accidents occur at T-junctions (10,385) followed by 5701 which were not within 20 metres of a junction, 2831 at crossroads, 2181 at roundabouts, 1393 at a private drive or entrance and 339 at Y-junctions.

The most common time of day for accidents is between 1500 and 1900 hrs during the week and between 1100 and 1600 at weekends.

There are large differences in the frequency of accident depending upon the manoeuvre the cyclist is undertaking with 'going ahead other' the most common at 17,904. Going ahead on a bend accounts for 1207, turning right or waiting to do so 3177, overtaking a stationary or moving vehicle 1961, turning left or waiting to do so 842, changing lane 642 and, finally, waiting to go ahead but held up 217.

Built-up roads are the scene of more than seven times as many accidents as non-built-up roads (24,455 vs. 2918).

1.2 Explaining the problem

Much of the research has looked at cyclist behaviour, attitudes and education in trying to understand the causes of, and to suggest remedies to, the accident problem. The review below will refer to cyclist behaviour and point to basic inadequacies which may be argued can contribute to the probability of an accident.

1.3 Cyclist normal riding behaviour

A number of studies have used a measure of normative behaviour as a means of providing a single value to the observed behaviour of the rider. The normative behaviour is that defined by traffic laws or prescribed in safety information as the correct technique for a particular manoeuvre.

Many of the studies to be cited here were undertaken on the Continent where cycling, especially in countries such as Holland and Denmark, is a much more popular form of transport among all age groups than it is in the UK. While this begs questions as to the applicability of the results to the UK traffic environment, many of the fundamental findings address cognitive and performance issues which are unlikely to differ in any important aspect between countries.

Throughout the review we will, for ease of reading, convert references to 'left' and 'right' manoeuvres or positions to be compatible with UK driving on the left.

There is considerable evidence in the literature to demonstrate that cyclists are far worse at following prescribed behaviour than other road-users.

Top and Timmermans (1987) video-recorded and subsequently interviewed cyclists at a range of junctions and obtained a norm score for each cyclist's behaviour during each manoeuvre. This is the number of correct actions expressed as a percentage of the total number of possible actions.

They found that overall 30 per cent of the correct actions were not undertaken. Mainly these were 'looking behind' and 'signalling' especially on left turns.

Generally, scores for visual search were low at 45-50 per cent but position on the road scored highly at 75 per cent.

The degree of compliance with cycling rules seems to depend upon the type of manoeuvre being undertaken. Visual search scores were higher when going straight on or turning right than when turning left.

Overall, scores were lower when approaching the junction from the side road and this was particularly pronounced at T-junctions.

The interview data was used to attempt to explain the variance in the data. However, age, sex, education, destination, use of other transport, knowledge of traffic priority rules, estimated safety and traffic density accounted for only 6 per cent of the total variance. While age was the best predictor, this accounted for only 4 per cent of the variance.

Drury (1978) undertook a similar study in New York to investigate the problem of cyclists breaking traffic laws. He found, during observations of 114 cyclists, that 39 per cent broke one or more traffic regulations. Of these 70 per cent were failure to signal, 22 per cent were riding on the pavement and 20 per cent failure to stop at a traffic device. Overall there was better law observance when going straight ahead at intersections than when turning. In looking at individual characteristics it was found that age was a significant factor in law observance for going straight ahead and not for turns with under 16-year olds significantly more likely to break a law than over 16-year olds.

Other researchers have found similar results. Dewar's (1978) study of more than 2000 cyclists found 32 per cent committed riding errors, with the main errors being: failure to signal a turn or lane change, not riding single file, failing to look behind when changing lanes, riding on the wrong side of the roadway and not having both hands on the handlebars.

1.4 Cyclist behaviour and accident causation

While there is plenty of evidence that cyclists do not comply with all the rules of safe cycling, it is another thing to show that their behaviour is actually contributing to the accident.

A cyclist may not be observed to signal when turning right. But then his position on the road may indicate to other road-users his intended direction and maintaining stability may be more important. Drury and Pietraszewski (1979) have shown that drivers are able to derive considerable information from rider position and informal body signals such as looking over the shoulder. Interestingly, the formal signals were less than perfectly recognised by drivers with between 20 and 30 per cent of arm signals not being recognised.

The rider may not be observed to look in all directions before manoeuvring: should this be considered an error when it is known that auditory information is used a lot by cyclists (Kuiken 1985)?

There are real difficulties with identifying the causes of accidents. Two recognised problems are: first, that recall of events preceding a major trauma is unreliable due to the disruption to the memory processes involved: second, identifying cause may often imply apportioning blame to one or other involved parties and this is likely to influence the responses to any questions.

A Swedish study by Sandels(1977) claims that in 1000 accidents 50 per cent of the cyclists were behaving incorrectly.

However, we must remember that the studies cited earlier show that at any moment in time 40 per cent of cyclists will be behaving incorrectly and thus it would prove difficult to show a statistically significant difference between whether a cyclist was behaving correctly and accident probability. A more detailed and precise description of the circumstances is required.

Looking at accidents at intersections, Atkinson and Hurst (1983) found that the most common cyclist factors identified were failure to give way prior to turning, inadequate, inappropriate or no hand signals, failure to comply with road signs and insufficient lighting.

Mills' (1988) hospital based study interviewed 776 injured cyclists about their accident, asking questions about the weather, road, lighting conditions and the circumstances of the accident. Mills concluded that the cyclist was to blame in 37 per cent of accidents, the motorist in 23 per cent, environmental factors in 14 per cent and a mechanical fault in 6 per cent.

1.5 Age of the cyclist and accident type

The type of accident changes with the age of the cyclist as the use to which the bicycle is put changes.

Youngsters are in the main playing while older riders are using the bicycle as a form of transport. The effects of this are demonstrated in Mills' data:-

Age	Bicycle alone %	Bicycle + Motor vehicle %
0-7	80	11
8-12	68	22
13-17	53	39
18+	44	49

Thus as the age of the cyclist increases, the probability of a single vehicle accident decreases and the probability of other vehicles being involved increases.

The simplest explanation of this is that the younger rider spends more time just playing and falling off while older riders are undertaking more journeys on the road and are exposed to a greater risk of collision with a motor vehicle.

Indeed, further Mills' data supports this:-

Manoeuvre/cause	0-7 years %	8-12 years %	13-17 years %	18+ years %
Playing, tricks	36	23	8	<5
Travelling too fast	12	11	<5	<5
Straight over junction on main road	<5	<5	9	14
Turning right	<5	9	9	7
Being overtaken	<5	<5	<5	8
Bike + bike	6	9	6	6

1.6 The cyclist and traffic rules

We must try to understand why the cyclist shows so little compliance with the traffic rules compared to other road users. If we look at this question in some detail it tells us more than why rules are broken: it helps us to understand the general problems of integrating this special type of road user with other road traffic.

We must consider a number of important issues:
- the age of the cyclist
- the development of cycling skills
- the cyclist as a special type of road-user
- the cycling task
- the potential to change behaviour

1.7 Age and development

While in some European countries such as Holland and Denmark the bicycle forms a significant mode of transport for the adult population, in the UK it is primarily a younger person's activity being the only form of personal transport until the age of about 16.

From about 10 years, children start to do some of their riding on the road. The early to mid teens account for the most cyclists in the UK and the highest number of cycling accidents.

The young cyclist first begins riding on the road not only with very little experience of traffic but also at an age when some developmental processes are still incomplete. It is not simply a problem, therefore, of the naive cyclist having insufficient knowledge but of not having sufficient experience to make decisions and judgements and perhaps even not having developed fully the information processing skills to handle the knowledge he does have (Schagen 1985).

This may in part explain why a number of researchers and experts have criticised classroom based training methods (Forester 1982).

In his 1985 paper Schagen reports finding definite deficits in young cyclists' knowledge, especially with respect to priority situations, but points out that it is not only a knowledge problem. Information

processing and memory capacity are still developing beyond the age of ten.

There are different kinds of knowledge the cyclist must have. One is the set of prescribed rules which can be set out in a code of practice such as the Highway Code. These cover a limited set of specific actions and manoeuvres such as signalling and positioning and looking over the shoulder when turning left, right and so on.

The other equally important but less easy to prescribe for, covers information about the traffic and how it moves. This knowledge enables the road-user to develop and use skills such as speed estimation, approach time estimation, gap allowances and predicting traffic movements from vehicle positions etc. From experience the cyclist must develop the bank of knowledge from which the large number of unwritten rules are learned.

In a Canadian study, Brezina and Kramer (1970) studied 275 accidents and 1062 cyclists. They found that it was largely the unwritten abstract rules which were the most significant factor. Several factors influencing the risk of an accident were identified relating primarily to the cyclist's comprehension of the risk inherent in different highway environments. The collision involved cyclist was largely unguided by the conventional abstract rules of placement and priority, responding only to immediate and obvious traffic conflicts.

Cycling is about making a series of decisions – whether to stop at a junction, when to move off, when to pull out, etc. These decisions must be based upon assessing the current situation (knowledge) and making a judgement on the safety or appropriateness of the action (assessing risk).

Lourens *et al* (1985) observed the unpredictable movements of cyclists turning right and concluded that risk judgement and decision making play a central role.

Schagen, looking at accidents at intersections, identified a failure among cyclists to assess risk and possible traffic conflicts. The failure to assess risk was associated with insufficient attention to other traffic, but which comes first is a matter for debate.

Experience seems to come out as the critical factor. Experienced cyclists observe aspects of the traffic that are not observed by inexperienced cyclists. Experienced cyclists are better able to perceive relevant traffic elements in traffic situations than inexperienced cyclists.

While the experienced cyclist gives priority in perception to other traffic the inexperienced cyclist has a narrower focus of attention, concentrating more on direct aspects on or around his own bike such as handling, speed and signalling (Kuiken 1986).

Inexperience with the traffic system and poor knowledge of the road code has been advanced as an explanation of the poor and hazardous

behaviour of cyclists at intersections (Atkinson and Hurst, 1983, Williams 1976).

1.8 Cyclists' application of knowledge

'There appears to be no relationship at all between behaviour and knowledge'

Schagen (1988) concludes after an observational study. No relationship was found between the cyclists' degree of knowledge of priority rules and the subjects' observed behaviour when cycling.

We may have assumed that whether a cyclist applies a rule will be determined largely by situational factors prevailing at any moment in time. While this is not denied by Schagen's study he found that personal factors also play an important part. It was found that with, for example, signalling, half nearly always signalled and half almost never did. This degree of consistency between individuals suggests personal factors and evidence from elsewhere points to one of these being attitudinal. Attitudes to 'rules' had been studied earlier by Schagen (1987) who found that 12 to 18-year-old cyclists scored more negatively on normative behaviour than moped riders.

1.9 The cyclist as a road-user

The young cyclist starts out as a pedestrian and his first experience of traffic is guided by the rules of pedestrian behaviour in traffic. In addition, he probably first learns to ride a bicycle in a pedestrian environment.

The cyclist perhaps always remains a hybrid, half pedestrian, half road-user. The bicycle can after all be used in both environments – but is not properly integrated into either. Even the *Highway Code* suggests returning to the pavement for certain manoeuvres. The cyclist is therefore unpredictable, moving from the road to the footpath and vice versa. He may develop a set of rules but these will be different from those of the pedestrian and the car driver. Being slower and less powerful than the motorised road-users he cannot become a proper member of the traffic stream. For example, Crawford found less than 0.5 per cent assumed a position other than the extreme left or right of the traffic stream when turning right.

The experienced cyclist will react to the pertinent aspects of the current situation and environment according to a complex set of rules which are difficult to learn and perhaps appear unpredictable to the motorist.

The nature of the cycling task affects behaviour in other ways. As the bicycle requires effort to move, it is understandable that a number of studies have observed the 'economy principle' affecting behaviour. For example Chao (1978) found that cyclists would use a signalised cross-walk provided it was not too far from the route of travel. Hyden (1983) reports that cyclists would choose the safest route at a junction provided it was the most direct. Kuiken (1985) describes the economy principle as avoiding stopping, dismounting and taking the shortest route.

In another study, Crawford (1963) found that young cyclists would only use the outside of the lane to turn right (shortest route) if they were not going to stop.

Any recommendations must take account of the 'economy principle' – if a proposal is going to mean more effort it is less likely to be successful.

1.10 Training

Clearly cyclists need a basic set of knowledge about traffic regulations and procedures for standard manoeuvres before they start riding on the road. But the research clearly points to the urgent need for a more comprehensive programme than is often provided at present. A training programme that teaches a standard set of rules even if it includes some practice of them on a training track will not prepare a child for the hazards of the real road.

This has been the conclusion of a number of researchers such as Forrester (1982) and Heinrich (1980).

Behaviour taught in the classroom is not consistently transferred to the road (Bennett, *et al* 1979). Thus the large number of cyclists seen not to follow prescribed behaviour such as signalling, looking over the shoulder etc., are not doing this out of ignorance but perhaps because they do not fully appreciate the need to do so.

Hyden (1983) concluding from a seminar held in 1983, said that cyclists will observe traffic regulations provided they are seen as relevant and reasonable. To make this worse, for some reason some children simply cannot learn. Ryhammar (1979) found that 1 in 5 children between 10 to 12 years could not learn to look over their shoulder before turning left or right.

The challenge of cyclist training is to provide information in a way which will encourage the development of road skills. These skills must include cognitive and perceptual skills as well as the conventional psychomotor skills associated with bicycle control. The skills should enable the cyclist to make accurate assessments of the traffic situation to assess risk and be able to make an accurate judgement of the most appropriate behaviour. If we refer again to the accident data we see that a large proportion of accidents occurs when the cyclist is simply going ahead, not when he is undertaking some manoeuvre. Does this imply a need for training in defensive riding which will involve the development of observational and risk analysis skills?

Some such training is available with such programmes as those developed by Bedfordshire County Council which include a series of teaching packs for different ages including one on risk analysis and reduction aimed at 12 to 13-year-olds (Bedfordshire County Council 1983).

Heinrich (1980) calls for such training to start as soon as the cyclist begins to ride and for it to take place in real traffic situations. One can see the problems with this however. First, today's roads are a less than safe place to begin training. Second, the young child, and Heinrich is suggesting training begins at 5 to 7 years, may not be sufficiently mature

in the development of assimilation and analytical processes necessary to benefit from such training.

At that age rote learning works well but this is a mode of teaching with considerable limitations. Sandels (1976) concluded that it is possible to teach six-year-old children elementary traffic rules in some situations when they know they are being observed.

1.11 Summary of previous research

Accidents

- 26,000 reported accidents – 227 killed, nearly 5,000 seriously injured and 21,000 slightly injured.
- Cyclists are the second most likely to be injured after motorcyclists.
- 84 per cent of accidents involve collision with a car or goods vehicle.
- 40 per cent occur at a T-junction, 26 per cent not within 20 metres of junction.
- 64 per cent were 'going ahead other' ie not on a bend.

Cyclist behaviour

- 30-40 per cent of correct actions are not performed.
- Signalling, looking behind and stopping at junctions are the actions most often not performed.
- 50 per cent of cyclists are behaving incorrectly at the time of the accident.
- Cyclists are to blame in 40 per cent of accidents.
- Motorists are to blame in 23 per cent of accidents.
- Cyclists under 16 years of age are less likely to observe rules than those over 16-years old.

Skills, Knowledge and Attitudes

- Cyclists' knowledge of rules and behaviour is not related.
- Poor understanding of abstract rules and inadequate risk assessment have been identified as major problems.
- Teenage cyclists have negative attitudes to normative behaviour compared with teenage moped riders.
- The 'economy principle' is a major determinant of behaviour.

Training

- There is a poor transfer of training to the real road.
- Up to 20 per cent of young teenagers simply can't learn.
- Training must include traffic skills as well as rules.

2 Study method

2.1 Site selection and data recording techniques

The study procedure is described in detail below but in outline it involved unobtrusively video-recording teenage cyclists at T-junctions in Leicestershire, Nottinghamshire and Derbyshire during the months of June to October 1989.

Site selection was based on a number of scientific and practical criteria. Consultations were made with the three county councils with respect to the acquisition of traffic census, accident and junction information; the three police forces for any relevant information they could contribute; and other cycling 'experts' in the area. It was hoped, for example, to include any known accident 'black spots' in the survey. In practice it turned out that these sources were unable to identify sufficient numbers of suitable sites. For example, some of the few potential sites identified were either not T-junctions or else it was impractical to film at them.

In addition to being suitable for unobtrusive filming the sites had to be used by teenage cyclists in sufficient numbers to justify the time spent filming.

A number of sites were therefore identified directly from road maps and visited by the team to assess their suitability. This provided first hand knowledge about such things as where to view the junction from, but proved very time consuming. As a result, schools were contacted to identify the number of cyclists attending, to provide local knowledge about routes home from school and particular junctions, and to obtain consent to film in the vicinity of the school. School staff did not reveal to the pupils that the filming would be taking place. This process also proved to be costly in time, but was more productive and accurate than the former. One consequence of this means of site identification was that the observers had to decide on arrival at the site where it was possible to park, and if it was not possible to go to a local alternative.

Recordings were made from a camera placed in an unmarked Transit van sited to give a good view up all arms of the junction while remaining relatively unobtrusive and not in itself interfering with the normal flow of traffic. If a cyclist did appear to notice that he/she was being recorded then only the information up to the time at which this occurred was used.

The observers, in addition to filming the cyclist, made a written record of site details and a verbal record on the video sound track of cyclist details including age, sex, type of bicycle and any other relevant information.

Checklists were provided to aid the observers in recording these details (see Appendix I).

The video tapes were then analysed following a coding system developed during pilot trials and review of the type of data being obtained from preliminary analyses. This analysis included the visual

and verbal information from the video tapes together with reference to the junction checklist.

The videos were analysed in 4 stages, using 4 data collection formats.

Stage 1:
The videos of all sites were viewed to identify the number of cyclists captured, which ones were in the age range and some means of recognising them in subsequent viewings. This information was recorded on paper for reference during stages 2, 3 and 4.

Out of 83 junctions visited, at three sites no cyclists were seen, and at the remaining 80 a total of 2862 cyclists were seen. Of these 1271 were within the age range and seen for sufficient time, and 1591 were either too old, too young or too briefly on film.

Stage 2:
The detailed information about junctions was recorded in code on paper to allow transfer to computer spreadsheet.

Of the 83 junctions visited only the 80 where cyclists were seen were analysed. In fact there were 78 different sites, two of which were visited twice. The observations from the videos and reference to the checklist were distilled into 18 recorded variables, and comments where appropriate. These variables are described, together with the frequencies, in section 2.2.1 Junction information.

Stage 3:
General information describing the cyclists was recorded on paper.

There were 29 junctions with fewer than 10 cyclists in the correct age range captured and these were discounted. 1119 cyclists at the remaining 51 junctions were viewed again with attention being paid to a general description of the cyclists, which was recorded as 24 variables and comments where appropriate. These variables are described, together with the frequencies, in section 2.2.2 Cyclist information.

Stage 4:
The same 1119 cyclists at 51 junctions were viewed again, to collect detailed information about their behaviour and manoeuvres. This was done at two levels:

Level 1: In order to be able to give a clear single descriptor, each cyclist's manoeuvre when negotiating the junction was recorded as 1 – 9 (see list on page 33). This was further defined as being either prescribed in execution or other than prescribed, that is they either followed the suggested route or they took an alternative, such as riding on the pavement. [It should be noted that the allocation prescribed at this stage of the coding does not mean that the cyclist followed the prescribed behaviour correctly. That aspect is covered in Stage 4, level 2].

Information was also recorded about the levels of traffic, and conflicts between the cyclist and traffic, with comments where appropriate.

This information was recorded on paper to allow transfer onto computer spreadsheet. (Appendix II)

Level 2: The details of the manoeuvre were recorded. For each manoeuvre that may be expected at a T-junction (that is manoeuvres 1-8, 9 being any others not anticipated) a prescribed way of carrying out that manoeuvre was identified and described in a checklist. This was derived by combining the recommendations made by the *Highway Code,* the *Cycling Proficiency Handbook,* and publications by RoSPA and the County Road Safety Officers' Association. If the cyclist was following the prescribed manoeuvre, then his/her actions were compared to those set out in the checklist, and noted as being yes, no, don't know, not applicable etc.

If the cyclist was not following the prescribed method, but some other way of carrying out the manoeuvre, then his/her actions were noted point by point.

All of the information collected in stage 4, level 2 was recorded on paper (Appendix II), but has not yet been transferred to computer due to the amount and wide variety of information generated.

The data relating to stages 2, 3 and 4, level 1 was then put into three computer spreadsheets for analysis by the SPSS statistical package. Frequencies were produced for all of the variables.

The three spreadsheets were then combined to form the database containing 1119 cyclists at 51 junctions. Crosstabulations were carried out for a selection of variables. The crosstabulations excluded junction type 2, of which there was only one, hence a total of 1106 cyclists at 50 junctions.

2.2 Description and frequencies of variables

2.2.1 Junction Information

This information was collected in stage 2.
Due to rounding errors the column totals do not always add up to 100 per cent.

VARIABLE 1: JUNCTION SITE

Values: Each junction has a unique reference number eg L6, N12, indicating which county the junction is in.

The final junction numbers are not consecutive as even up to the last day of filming alternate sites were used, and the information coding had commenced.

It was intended that equal numbers of sites would be identified and used in Leicestershire, Derbyshire and Nottinghamshire. The total number of sites visited was 83, 30 in Leicestershire, 23 in Derbyshire and 30 in Nottinghamshire. Of these 80 were analysed, as at 3 no cyclists were seen at all.

VARIABLE 2: DATE

Values: The date of filming is recorded.

This is a useful piece of information to enable reference back to the raw data.

TERM/HOLIDAY

Whether the site was filmed during term time or holiday period, or both.

Study of the accident information shows that the summer months of July and August (ie. the summer holidays) have the highest accident rates. During other months of the year, accidents occur most frequently during the 0800 to 0900 hrs and 1500 to 1800 hrs periods, that is travelling to and from school. The intention of this study was to cover the summer cycling period. In practice the late summer and early autumn periods were also included, allowing filming during both holiday and term time. Filming was conducted between the hours of 1430 and 1830, Monday to Friday.

The filming started on 29 June and continued during July on a trial basis. This period included the end of the summer term and holiday period. The objectives of the filming did not change significantly as a result of this trial, and because the quality of the filming was satisfactory it has been included in the study. There were nine sites filmed during this period.

The main filming occurred during August, September and October. There were 71 sites filmed during this period. A further three sites were visited but as no cyclists were seen filming did not take place. This period included the following holiday/term time periods. The figures in brackets are the number of sites filmed:

1 – 21 August
Leicestershire (11), Derbyshire (3) and Nottinghamshire (1) schools on holiday.

22 August – 4 September
Leicestershire (6) schools in autumn term, Derbyshire (1) & Nottinghamshire (1) schools on holiday.

5 September – 13 October
Leicestershire (8), Derbyshire (13) and Nottinghamshire (17) schools in autumn term.

16 – 20 October
Leicestershire (0) schools on half term, Derbyshire (2) and Nottinghamshire (3) schools in autumn term.

23 – 27 October
Leicestershire (0) schools in autumn term, Derbyshire (2) & Nottinghamshire (2) schools in half term.

30 October
Leicestershire (0), Derbyshire (0) and Nottinghamshire (1) schools in autumn term.

Of the 80 sites analysed, 57 were filmed during term time and 23 during the holidays. Of the 51 sites where there were 10 or more cyclists, 38 were filmed during term time and 13 during the holidays. This does not represent the real numbers of cyclists at T-junctions during term or holidays, but shows that the selection of sites for the number of cyclists was equally successful during term and holidays.

VARIABLE 3: AREA

Values: Urban, suburban/residential, rural, or don't know.

The original intention was to have roughly equal numbers of urban, suburban and rural sites. However, when identifying sites for inclusion in the study it became apparent that this would not be representative or possible, and in the final analysis only suburban sites were filmed.

The main reason for this was that the primary concern was to identify sites where there were likely to be cyclists in the age range of interest. Discussions, advice and the early site selection process identified that T-junctions in the vicinity of schools, housing areas and social venues, such as sports centres and recreation grounds, were most likely to yield young cyclists. These areas are, of course, generally suburban. T-junctions in urban areas were more commonly frequented by older cyclists, if there were any cyclists at all. Rural junctions might have the odd young cyclist, but the further away from the school or centre of activity, the less likely sufficient numbers of cyclists would be seen.

It would also appear that the T-junction is more prevalent in suburban areas as a junction type, than in urban and rural areas, where it appeared that the crossroad is the predominant junction type. If this is the case, could the accident figures be explained in part at least by exposure rate?

In addition, the T-junctions had to provide a suitable vantage point, initially from a first floor window, but in practice from an inconspicuously parked Transit van. First floor windows were few and far between in rural areas; parking inconspicuously at a rural T-junction was rarely possible; and parking at all was more difficult in built-up, and therefore urban, areas.

SCHOOLS

The policy of individual schools towards the use of bicycles by the pupils had a significant effect on the numbers of cyclists to be seen. Policy appeared to be influenced by a number of factors, such as whether there had been a fatal or serious bicycle accident involving a pupil; the perceived danger of the junctions or roads on leaving the school gates; and the problems of theft of bicycles and accessories on school premises.

The catchment area of the schools also influenced the numbers of cyclists to be seen. Large schools, particularly in the cities and those catering for a specific religious denomination, tended to have their pupils brought in by parents or by bus due to the length of journey.

VARIABLE 4: CLASSIFICATION OF ROAD

Values: Whether the main road is an A road or C road or don't know.

ROADCLASS Road Class

Value Label	Value	Frequency	%	Valid %	Cum %
A road	1	36	45.0	45.0	45.0
C road	2	44	55.0	55.0	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

An A road was included, whether it had a T-junction with another A road, a B road or a C/unclassified road. The A road tended to be the major road at the T-junction. B roads were included only if they formed part of the junction with the A or C/unclassified road. C/unclassified roads were included in any combination. The roads are classified according to the major road.

VARIABLE 5: TYPE OF ROAD

Values: Single, dual carriageway, other (eg one way) or don't know.

ROADTYPE

Value Label	Value	Frequency	%	Valid %	Cum %
Single	1	76	95.0	95.0	95.0
Dual	2	2	2.5	2.5	97.5
Other	3	2	2.5	2.5	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

Only two dual carriageways and two other road types, eg school entrance, were observed. In addition, possibly because the urban road environment was so poorly represented, there were no one-way streets.

VARIABLE 6: JUNCTION TYPE

Values: Standard T-junction (A), main road going through 90 degrees (B-C), one-way combinations (D-K), or other.

JUNCTYPE Junction Type

Value Label	Value	Frequency	%	Valid %	Cum %
A	1	79	98.8	98.8	98.8
B-C	2	1	1.3	1.3	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

The types of junction were
A = normal T-junction
B & C = main road goes through 90 degrees
D – K = one-way combinations. None of these was seen.

VARIABLE 7: JUNCTION CONTROL

Values: Traffic lights, stop sign, give-way signs and/or road markings, none, other or don't know.

JUNCCTRL Junction control

Value Label	Value	Frequency	%	Valid %	Cum %
Traffic lights	1	3	3.8	3.8	3.8
Give Way	3	72	90.0	90.0	93.8
None	4	5	6.3	6.3	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

It was originally anticipated that a good sample of each of the junction control types would be seen. However, there were few traffic lights and no stop signs seen. This may be in part because no urban sites were visited, where traffic lights in particular may be a more common form of junction control.

VARIABLE 8: LANES PER CARRIAGEWAY

Values: One in both major and minor road, more than one in both major and minor road, some other combination, or don't know.

LANES Number/type of carriageways

Value Label	Value	Frequency	%	Valid %	Cum %
1/1	1	76	95.0	95.0	95.0
More/more	2	2	2.5	2.5	97.5
Other	3	2	2.5	2.5	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

The cases of more than one lane per carriageway relate to the dual carriageways.

VARIABLE 9: CENTRAL ISLANDS

Values: Yes/yes, in major and minor road; yes/no, in major but not in minor road; no/yes, not in major but in minor road; no/no, not in either road.

ISLANDS Number/location of islands

Value Label	Value	Frequency	%	Valid %	Cum %
Yes/yes	1	3	3.8	3.8	3.8
Yes/no	2	6	7.5	7.5	11.3
No/yes	3	11	13.8	13.8	25.0
No/no	4	60	75.0	75.0	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

ROAD SURFACE

VARIABLE 10: TYPE

Values: Smooth surface, tar and chips (abrasive-rough surface), concrete, mixture or don't know.

SURFTYPE Type of road surface

Value Label	Value	Frequency	%	Valid %	Cum %
Smooth surface	1	37	46.3	46.3	46.3
Rough surface	2	31	38.8	38.8	85.0
Concrete	3	1	1.3	1.3	86.3
Mixture	4	10	12.5	12.5	98.8
Not Known	5	1	1.3	1.3	100.0
TOTAL		**80**	**100. 0**	**100.0**	

Valid cases 80 Missing cases 0

This information was collected by lay people using layman's terms. These frequencies do not, therefore, relate directly to different types of road surface, but instead to the surface as the cyclist might see it. For example, smooth with possibly poor grip, and quite painful on impact; rough but with reasonable grip, but very painful on impact; concrete, very hard on impact; and a mixture, which would mean the combination of characteristics.

Several other items relating to the road surface were asked about in the site checklist, and were either not reported in sufficient numbers or consistently enough, or were reported in such a way as to be difficult to code in a meaningful way.

These items include:
- loose materials, such as chippings, rubbish, leaves;
- manhole covers, grates, potholes, bitumen bonding, or oil;
- the existence and type of lines at the side of the road;
- the cross-section of the road surface – flat, down to curb, down to crown;
- camber of road surface – neutral, positive, negative.

VARIABLE 11: QUALITY/REPAIR

Values: Good, satisfactory, poor, dangerous for cyclist or don't know.

SURFQUAL Quality of road surface

Value Label	Value	Frequency	%	Valid %	Cum %
Good	1	40	50.0	50.0	50.0
Satisfactory	2	34	42.5	42.5	92.5
Poor	3	5	6.3	6.3	98.8
Dangerous for cyclist	4	1	1.3	1.3	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

VARIABLE 12: STATE

Values: Dry, damp, wet, treacherous or don't know.

SURFDRY Dryness of road surface

Value Label	Value	Frequency	%	Valid %	Cum %
Dry	1	74	92.5	92.5	92.5
Damp	2	2	2.5	2.5	95.0
Wet	3	4	5.0	5.0	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

The very low frequency of wet roads is very heavily influenced by the time of year of the study, together with the fact that it was a particularly good summer.

VARIABLE 13: GRADIENT

Values: Level, gentle, steep, other (crest of hill, bottom of dip, dip, etc.) or don't know.

GRADIENT

Value Label	Value	Frequency	%	Valid %	Cum %
Level	1	47	58.8	58.8	58.8
Gentle	2	31	38.8	38.8	97.5
Steep	3	1	1.3	1.3	98.8
Other	4	1	1.3	1.3	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

This classification does not indicate the direction of gradient in relation to the major and minor road, or the actual gradient.

WEATHER

VARIABLE 14: LIGHT

Values: Bright, medium, dull, reduced visibility or don't know.

LIGHT Ambient light

Value Label	Value	Frequency	%	Valid %	Cum %
Bright	1	34	42.5	42.5	42.5
Medium	2	22	27.5	27.5	70.0
Dull	3	24	30.0	30.0	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

There were no cases of reduced visibility recorded, due largely to the time of day of the observations, the time of year and the particularly good weather experienced.

VARIABLE 15: RAIN

Values: None, drizzle, light/medium, heavy/storm or don't know.

RAIN

Value Label	Value	Frequency	%	Valid %	Cum %
None	1	75	93.8	93.8	93.8
Drizzle	2	2	2.5	2.5	96.3
Light/medium	3	3	3.8	3.8	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

The low frequency of rain was again due to the observations being carried out largely in the summer months, during a period of particularly good weather. No heavy rain or storms were recorded. Brief periods of heavy rain were seen, but because they did not last long, and were followed by light rain or fine weather, they were coded as light/medium rain, as that was the overall effect.

VARIABLE 16: WIND

Values: None, light, moderate, strong or don't know.

WIND

Value Label	Value	Frequency	%	Valid %	Cum %
None	1	6	7.5	7.5	7.5
Light	2	64	80.0	80.0	87.5
Moderate	3	10	12.5	12.5	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

In most cases a light breeze was present. However, because of the time of year and the good weather, there were no cases of strong wind which would have significantly hampered the cyclist's progress.

VARIABLE 17: JUNCTION OPENNESS

A subjective judgement by the observer of how open the junction is, in terms of visibility at/from all parts of the junction and down all arms of the junction.

Values: Very open, open, moderately open, restricted, very restricted.

OPENNESS Junction openness

Value Label	Value	Frequency	%	Valid %	Cum %
Very open	1	10	12.5	12.5	12.5
Open	2	17	21.3	21.3	33.8
Moderately open	3	30	37.5	37.5	71.3
Restricted	4	20	25.0	25.0	96.3
Very restricted	5	3	3.8	3.8	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

VARIABLE 18: VISUAL CLUTTER/NOISE

A subjective judgement by the observer of how busy the background of the junction is, and from how much visual information do road-users have to pick out other road-users and relevant information. This is in relation to the fixed background and may include bus shelters, advertisement hoardings, shop fronts and displays, road furniture, garden fences.

Values: Very little, little, moderate, cluttered and very cluttered.

BUSYVIS Visual clutter

Value Label	Value	Frequency	%	Valid %	Cum %
Very little	1	17	21.3	21.3	21.3
Little	2	17	21.3	21.3	42.5
Moderate	3	31	38.8	38.8	81.3
Cluttered	4	13	16.3	16.3	97.5
Very cluttered	5	2	2.5	2.5	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

Variable: Comments
Any information about the junction which is considered to be relevant but for which there was no category eg. school/park/shop out of camera shot but the destination of cyclists; or a note in relation to one of the previous variables.

Values: Yes or no.

COMMENT

Value Label	Value	Frequency	%	Valid %	Cum %
Yes	1	14	17.5	17.5	17.5
No	2	66	82.5	82.5	100.0
TOTAL		**80**	**100.0**	**100.0**	

Valid cases 80 Missing cases 0

2.2.2 Cyclist Information

This information was collected in stage 3.

Many of these variables relate to the section in the *Highway Code* entitled Extra Rules for Cyclists.

Due to rounding errors the column totals do not always add up to 100 per cent.

VARIABLE 1: JUNCTION SITE

Values: Each junction has a unique reference number eg L6, N12, indicating which county the junction is in.

VARIABLE 2: CYCLIST NUMBER

Values: The cyclists at each site are numbered 1-n.

RECOGNISABLE FEATURE
Any description which identifies the cyclist from the one before and after. This may be an item of clothing, hairstyle, stunt etc.

VARIABLE 3: AGE GROUP

Values: For those considered as being between the ages of 11 and 17 years, whether they are less than 13, 13-16, over 16 years or within the 11-17 age group but don't know.

AGEGROUP Age group

Value Label	Value	Frequency	%	Valid %	Cum %
<13 years	1.0	86	7.7	7.7	7.7
13-16 years	2.0	855	76.4	76.4	84.1
>16 years	3.0	171	15.3	15.3	99.4
Not known	4.0	7	.6	.6	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

This distribution is reassuring as it is the 13-16 age group which was of greatest interest. The 11-17 year range was used because of the difficulty of accurately identifying ages, without stopping the cyclists and asking them.

VARIABLE 4: GENDER

Values: Male, female or don't know.

GENDER

Value Label	Value	Frequency	%	Valid %	Cum %
Male	1	996	89.0	89.0	89.0
Female	2	121	10.8	10.8	99.8
Not known	3	2	.2	.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

Cycling appears to be much more popular with teenage boys than girls.

VARIABLE 5: PAPER ROUND

Values: Was the boy or girl on a paper round, yes or no.

PAPERRND Paperboy/girl

Value Label	Value	Frequency	%	Valid %	Cum %
Yes	1.0	84	7.5	7.5	7.5
No	2.0	1035	92.5	92.5	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

Teenagers on paper rounds, because of the purpose of their cycling journey, may well adopt different approaches to riding and interacting with other road-users.

VARIABLE 6: CLOTHING

The overall impression of the colour of the cyclist's clothing is given.

Values: light, medium, dark, other (eg. no shirt) or don't know.

CLOTHING

Value Label	Value	Frequency	%	Valid %	Cum %
Light	1.0	433	38.7	38.7	38.7
Medium	2.0	288	25.7	25.7	64.4
Dark	3.0	387	34.6	34.6	99.0
Other	4.0	5	.4	.4	99.5
Not known	5.0	6	.5	.5	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states that cyclists should 'wear light-coloured or reflective and fluorescent clothing'. 61 per cent of the cyclists seen wore clothing other than light in colour.

The clothing seen was heavily influenced by the time of year of the observations, both in terms of the amount worn and the type and colour of clothes worn. To a certain extent current fashion also influenced the colours seen, as bright cycling wear was the in-thing. At the other extreme, school uniforms tended to be dull.

VARIABLE 7: TYPE OF BICYCLE

Values: Racing, mountain, BMX, traditional, shopper, other or don't know.

BIKETYPE Type of bicycle

Value Label	Value	Frequency	%	Valid %	Cum %
Racing	1.0	592	52.9	52.9	52.9
Mountain	2.0	293	26.2	26.2	79.1
BMX	3.0	134	12.0	12.0	91.1
Traditional	4.0	52	4.6	4.6	95.7
Shopper	5.0	37	3.3	3.3	99.0
Other	6.0	6	.5	.5	99.6
Not known	7.0	5	.4	.4	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

Fashion probably had an influence on the types and numbers of bicycles seen. It appeared that some bicycles had been modified from one type to another, for example, the drop handlebars had been replaced by flat handlebars on some racing bicycles to give it the appearance of a mountain or all-terrain bike (ATB).

The age of the cyclists seen may also have had an effect. It is possible that the BMX is popular with younger cyclists, whereas racing, mountain and all-terrain bikes are preferred by the older teenagers.

VARIABLE 8: LIGHTS, CONSPICUITY AND/OR SAFETY AIDS

eg. Lights on the bicycle; reflective strips, jacket, Sam Browne belt, etc; helmet, knee-pads, bicycle clips, cycle flag.

Values: Yes or no or not known, and if yes a note in the comments at the end.

SAFETAID Lights/Conspicuity Aid

Value Label	Value	Frequency	%	Valid %	Cum %
Yes	1.0	34	3.0	3.0	3.0
No	2.0	891	79.6	79.6	82.7
Not known	3.0	193	17.2	17.2	99.9
Keying error	4.0	1	.1	.1	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The total number of lights, conspicuity or safety aids seen was small and while these observations were heavily influenced by the time of year, length of day, and fashion for bright clothing (cycling fashion), it is still very poor. The bags provided by newsagents for paper-rounds tend to be bright fluorescent/reflective colours.

VARIABLE 9: COMPANY

Whether the cyclist is on his/her own or with other cyclists.

Values: Alone or with others.

COMPANY Cycling with others

Value Label	Value	Frequency	%	Valid %	Cum %
Alone	1.0	725	64.8	64.8	64.8
With others	2.0	394	35.2	35.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 10: IF OTHERS

Values: Not applicable, or if with others, are they riding single file, side by side, three or more deep or in a group.

IFOTHERS Formation

Value Label	Value	Frequency	%	Valid %	Cum %
Not applicable	.0	724	64.7	64.7	64.7
Single file	1.0	302	27.0	27.0	91.7
Side by side	2.0	72	6.4	6.4	98.1
3 abreast/group	3.0	21	1.9	1.9	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states that cyclists 'do not ride more than two side by side. Ride in single file on narrow roads'.

VARIABLE 11: IS THIS APPROPRIATE?

Values: Not applicable, or if they are with others, is the way they are riding appropriate or not for the road they are on and the traffic conditions at the time, yes or no.

OTHERSOK Safe formation

Value Label	Value	Frequency	%	Valid %	Cum %
Not applicable	.0	724	64.7	64.7	64.7
Yes	1.0	274	24.5	24.5	89.2
No	2.0	121	10.8	10.8	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

This depends on the amount and speed of traffic, width of road, parked cars etc.

31 per cent of those riding in single file, side by side or in a group, were doing so inappropriately for the conditions.

There are occasions when riding in single file may not be appropriate. For example, when there is a chain of two, three or more cyclists travelling slowly, in single file, along a narrow but busy road, other vehicles may not be able to get past the cyclists, causing a tailback. However, if the cyclists had been spaced out, other vehicles may have safely overtaken them one at a time, causing less of a hold-up.

VARIABLE 12: RIDING ON THE PAVEMENT

Values: Do they at any point ride on the pavement? Yes, no or walking.

PAVEMENT Riding on pavement

Value Label	Value	Frequency	%	Valid %	Cum %
Yes	1.0	283	25.3	25.3	25.3
No	2.0	815	72.8	72.8	98.1
Walking	3.0	21	1.9	1.9	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states that 'you must not ride on the pavement or on a footpath unless there are signs allowing shared use with pedestrians'. One quarter of all cyclists seen do so.

VARIABLE 13: STUNTS

Does the cyclist perform any stunts, such as jumping, standing on the saddle, pulling wheelies?

Values: Yes or no.

Value Label	Value	Frequency	%	Valid %	Cum %
Yes	1.0	12	1.1	1.1	1.1
No	2.0	1107	98.9	98.9	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

There were very few cyclists performing stunts. It is possible that this was in part due to cyclists in this study having purpose to their journey, as opposed to 'playing' on the street corner.

VARIABLE 14: POSITION FROM THE KERB

Values: Good position from the kerb is between 60cm-1m, less than 60cm is too close, >1m is too far out, or not known or other (eg. on the pavement).

KERB Distance from kerb

Value Label	Value	Frequency	%	Valid %	Cum %
60-100cm	1.0	294	26.3	26.3	26.3
<60cm	2.0	164	14.7	14.7	40.9
>100cm	3.0	33	2.9	2.9	43.9
Not known	4.0	328	29.3	29.3	73.2
Other	5.0	300	26.8	26.8	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

Recommendations about the position of the cyclist from the kerb are made. However, it would be reasonable to assume that the actual position is dependent not just on the recommendations, but on the amount of traffic, the width of the road and carriageways, the presence of manhole covers, grates, gutters, painted lines and parked cars. The results cannot be accounted for against these aspects; however, it appears that if cyclists are not cycling at the correct distance, they are cycling too close to the kerb rather than too far out.

VARIABLE 15: USE OF A BUS LANE

Values: This may or may not be allowed.

No bus lanes were seen. This may be because they tend to be in urban areas and no urban junctions were filmed.

VARIABLE 16: HANDS ON HANDLEBARS

That is the number of hands on the handlebars during normal riding along, not in relation to signalling before turning. The free hand(s) may be hanging at the side of the body or holding something, such as luggage.

Values: Both, one or no hands on the handlebars, not applicable if pushing the bicycle or don't know.

HANDSON Hands on handlebars

Value Label	Value	Frequency	%	Valid %	Cum %
Both	1.0	1020	91.2	91.2	91.2
One	2.0	59	5.3	5.3	96.4
None	3.0	20	1.8	1.8	98.2
Not applicable	4.0	20	1.8	1.8	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states 'when you are riding: always keep both hands on the handlebar unless you are signalling'. The results show that 7 per cent of cyclists do not have both hands on the handlebars when riding along. Some of the possible reasons for cycling with only one or no hands were just for the fun of it; to hold/carry/adjust luggage of some sort; to hold a can or food while drinking or eating; to adjust clothes, hair or to satisfy an itch; or to wave at other people.

VARIABLE 17: FEET ON PEDALS

Values: Both, one or no feet on the pedals, not applicable if pushing the bicycle or don't know.

FEETON Feet on pedals

Value Label	Value	Frequency	%	Valid %	Cum %
Both	1.0	1082	96.7	96.7	96.7
One	2.0	17	1.5	1.5	98.2
Not applicable	4.0	20	1.8	1.8	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states 'when you are riding: always keep both feet on the pedals'. The 1.5 per cent with only one foot on a pedal tended to be coasting along at walking pace, usually accompanying a friend on foot.

VARIABLE 18: HOLDING ON TO OTHER VEHICLES

Holding on to a moving or leaning on to a stationary vehicle, or holding on to another bicycle. This was not seen.

VARIABLE 19: CARRYING A PASSENGER

Values: No, or if yes, on the front or the back of the bicycle.

PASSENGER Carrying a passenger

Value Label	Value	Frequency	%	Valid %	Cum %
No	1.0	1103	98.6	98.6	98.6
Yes, front	2.0	2	.2	.2	98.7
Yes, rear	3.0	14	1.3	1.3	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states 'when you are riding: do not carry a passenger unless your cycle has been built or altered to carry one'. None of the few seen carrying a passenger had any form of chair for the purpose. Passengers tended to sit on the saddle while the cyclist stood on the pedals, or stand on the axle of the rear wheel and hold on to the cyclist.

VARIABLE 20: CLOSENESS TO OTHER VEHICLES

Values: Cyclist keeps good distance from other vehicles, gets too close to other vehicles, not applicable or don't know.

NEARVEHS Closeness to other vehicles

Value Label	Value	Frequency	%	Valid %	Cum %
Good	1.0	10	.9	.9	.9
Too near	2.0	10	.9	.9	1.8
Not applicable	3.0	1099	98.2	98.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

This was judged when riding along, as opposed to while carrying out a manoeuvre. The very small number of cyclists at good distance or too close to other vehicles is possibly because generally the cyclist tends not to be in the main stream of traffic, but in towards the kerb. Thus it may be more likely that other vehicles might be judged to be too close to the cyclist, than the other way round.

VARIABLE 21: LUGGAGE

Values: None, yes and safely carried or yes but unsafely carried or not known.

LUGGAGE

Value Label	Value	Frequency	%	Valid %	Cum %
None	1.0	397	35.5	35.5	35.5
Yes, safe	2.0	491	43.9	43.9	79.4
Yes, unsafe	3.0	221	19.7	19.7	99.1
Not known	4.0	10	.9	.9	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The *Highway Code* states 'when you are riding: do not carry anything which might affect your balance or become entangled with the wheels or chain'. 20 per cent of cyclists were carrying luggage in an unsafe manner. Unsafe was defined as either causing a distraction, loss of balance or physical interference with the bicycle or rider, or having the potential to cause any of these. Thus, bags over the handlebars, luggage under the arm, gripped between the teeth or dangling near the wheels were all classified unsafe.

VARIABLE 22: LEADING AN ANIMAL

One boy was seen to be leading a dog on a lead.

VARIABLE 23: ATTENTION

A subjective judgement by the observer of how much attention the cyclist paid to the task of riding a bicycle safely, his/her surroundings and other traffic.

Values: Attentive, cursory or relaxed, daydreaming, distracted (eg. by friends, bicycle or luggage), or don't know.

ATTENTIV Paying Attention

Value Label	Value	Frequency	%	Valid %	Cum %
Attentive	1.0	574	51.3	51.3	51.3
Cursory	2.0	465	41.6	41.6	92.9
Daydreaming	3.0	14	1.3	1.3	94.1
Distracted	4.0	64	5.7	5.7	99.8
Not known	5.0	2	.2	.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

49 per cent of the cyclists were less than attentive and at worst distracted from the job in hand.

VARIABLE 24: GENERAL COMPLIANCE WITH TRAFFIC SIGNALS/MARKINGS

A subjective judgement by the observer of how well the cyclist complied with general road rules, regulations and recommendations. For example stopping at red traffic lights in the correct road position rather than mounting the pavement and riding past red traffic lights then rejoining the road beyond the junction.

Values: Good, sufficient, poor, complete disregard, not applicable or don't know.

OBEYSIGS Compliance with rules

Value Label	Value	Frequency	%	Valid %	Cum %
Good	1.0	255	22.8	22.8	22.8
Sufficient	2.0	54	4.8	4.8	27.6
Poor	3.0	7	.6	.6	28.2
Complete disregard	4.0	84	7.5	7.5	35.7
Not applicable	5.0	717	64.1	64.1	99.8
Not known	6.0	2	.2	.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 25: CONFIDENCE

A subjective judgement by the observer of the general impression the cyclist gives of their confidence in riding a bicycle. Do they wobble, are they timid, do they take risks, do they pull wheelies and show off?

Values: Lacking in confidence, a bit nervous, confident, a bit over confident/blasé, cocky/showing off or not known.

CONFIDEN Apparent confidence

Value Label	Value	Frequency	%	Valid %	Cum %
Lacking	1.0	7	.6	.6	.6
A Bit Nervous	2.0	13	1.2	1.2	1.8
Confident	3.0	1046	93.5	93.5	95.3
Blasé	4.0	36	3.2	3.2	98.5
Showing off	5.0	15	1.3	1.3	99.8
Not known	6.0	2	.2	.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 26: POTENTIAL HAZARD DESCRIPTION

A subjective judgement by the observer of the general impression the cyclist gives of being a danger to him/herself or others. For example did he/she join a main road from a minor road with a very restricted view, at such a speed that had a car been coming along the main road they could have collided?

Values: If there is any potential hazard generated by the cyclist is it to him/herself, self and pedestrians or other cyclists, self and other vehicle, or other vehicles.

HAZARD Presenting a hazard

Value Label	Value	Frequency	%	Valid %	Cum %
None	1.0	1095	97.9	97.9	97.9
Self	2.0	22	2.0	2.0	99.8
Self and vehicle	4.0	2	.2	.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE: COMMENTS

Any information about the cyclist which is considered to be relevant but for which there was no category, eg, cyclist had to ride on the pavement because of roadworks.

Values: Comments yes or no.

REMARKS

Value Label	Value	Frequency	%	Valid %	Cum %
Yes	1.00	119	10.6	10.6	10.6
No	2.00	1000	89.4	89.4	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

2.2.3 Cyclist's manoeuvre

This information was collected in stage 4, level 1.

Due to rounding errors the column totals do not always add up to 100 per cent.

VARIABLE 1: JUNCTION SITE

Values: Each junction has a unique reference number eg. L6, N12, indicating which county the junction is in.

VARIABLE 2: CYCLIST NUMBER

Values: The cyclists at each site are numbered 1-n.

VARIABLE 3: MANOEUVRE TYPE

Values: 1-8 or 9 other, such as U-turn.

1 – straight on past the mouth of the minor road
2 – straight on on the opposite side of the road
3 – right turn from major into minor road
4 – right turn from minor into major road
5 – left turn from major into minor road
6 – left turn from minor into major road
7 – straight on from minor road, crossing major road
8 – crossing major road to go straight down minor road
9 – other, such as U-turn.

MANOEUVRE Manoeuvre

Value Label	Value	Frequency	%	Valid %	Cum %
	1	234	20.9	20.9	20.9
	2	234	20.9	20.9	41.8
	3	131	11.7	11.7	53.5
	4	172	15.4	15.4	68.9
	5	73	6.5	6.5	75.4
	6	208	18.6	18.6	94.0
	7	35	3.1	3.1	97.1
	8	12	1.1	1.1	98.2
	9	20	1.8	1.8	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 4: ACTUAL MANOEUVRE

While carrying out the manoeuvre did the cyclist follow the route as prescribed in the *Highway Code, Cycling Proficiency Handbook,* etc. or adopt some other approach eg. avoiding the junction by riding across the pavement and joining the road past the junction?

Values: Prescribed (including A-prescribed, B-prescribed, and C-prescribed) or other.

EXECUTN Execution of manoeuvre

Value Label	Value	Frequency	%	Valid %	Cum %
Prescribed	1	733	65.5	65.5	65.5
Other	2	386	34.5	34.5	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

For manoeuvres 1, 2, 5 and 6 the options were prescribed or other.

For manoeuvres 4, 7 and 8 the options were A-prescribed, B-prescribed or other.

For manoeuvre 3 the options were A-prescribed, B-prescribed, C-prescribed or other.

For manoeuvre 9 the only option possible was other.

VARIABLE 5: ROAD TRAFFIC

At the point when the cyclist is carrying out the manoeuvre, what traffic is on the road at the junction?

Values: None, light, moderate, busy, very busy/dangerous for the cyclist.

ROADTRAF Road traffic level

Value Label	Value	Frequency	%	Valid %	Cum %
None	1	143	12.8	12.8	12.8
Light	2	714	63.8	63.8	76.6
Moderate	3	169	15.1	15.1	91.7
Busy	4	81	7.2	7.2	98.9
Very busy	5	12	1.1	1.1	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 6: PAVEMENT TRAFFIC

At the point when the cyclist is carrying out the manoeuvre, what traffic (pedestrians, other cyclists, pushchairs etc.) is on the pavement at the junction?

Values: None, light, moderate, busy, very busy/dangerous for the cyclist.

PAVETRAF Pavement traffic level

Value Label	Value	Frequency	%	Valid %	Cum %
None	1	394	35.2	35.2	35.2
Light	2	528	47.2	47.2	82.4
Moderate	3	131	11.7	11.7	94.1
Busy	4	54	4.8	4.8	98.9
Very busy	5	12	1.1	1.1	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 7: OTHER ROAD TRAFFIC – (CONFLICT)

At the point when the cyclist is carrying out the manoeuvre, is any traffic crossing the path of the cyclist? ie. if the cyclist has right of way, is any other vehicle assuming the right of way?

Values: Yes, no, or not applicable.

CONFOTH Road traffic crossing cyclist

Value Label	Value	Frequency	%	Valid %	Cum %
N/A		188	16.8	16.8	16.8
No		920	82.2	82.2	99.0
Yes		11	1.0	1.0	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 8: IF COMMENT

Did the driver of the other vehicle make the cyclist change path, speed, position in the road etc, did something else happen, or did nothing happen?

Values: Is there a comment, yes or no.

COMMENTO Confoth comments

Value Label	Value	Frequency	%	Valid %	Cum %
No		1098	98.1	98.1	98.1
Yes		21	1.9	1.9	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 9: CYCLIST AND OTHER ROAD TRAFFIC – (CONFLICT)

At the point when the cyclist is carrying out the manoeuvre, is the cyclist crossing the path of any other vehicle? ie. if the other vehicle has right of way, does the cyclist assume the right of way?

Values: Yes, no, or not applicable.

CONFCYC cyclist crossing road traffic

Value Label	Value	Frequency	%	Valid %	Cum %
N/A		185	16.5	16.5	16.5
No		876	78.3	78.3	94.8
Yes		58	5.2	5.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 10: IF COMMENT

Did the cyclist make the driver of the other vehicle change path, speed, position in the road etc, did something else happen or did nothing happen?

Values: Is there a comment, yes or no.

COMMENTC Confcyc comments

Value Label	Value	Frequency	%	Valid %	Cum %
No		1057	94.5	94.5	94.5
Yes		62	5.5	5.5	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 11: PAVEMENT TRAFFIC ON THE ROAD

At the point when the cyclist is carrying out the manoeuvre, is any pavement traffic crossing the path of the cyclist on the road? ie. if the cyclist has right of way, is the pedestrian/cyclist/etc. assuming the right of way?

Values: Yes, no, or not applicable.

CONFRD Pavement traffic crossing cyclist

Value Label	Value	Frequency	%	Valid %	Cum %
N/A		182	16.3	16.3	16.3
No		914	81.7	81.7	97.9
Yes		23	2.1	2.1	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 12: IF COMMENT

Values: Did the pedestrian/cyclist/etc. make the cyclist change path, speed, position in the road etc, did something else happen, or did nothing happen?

Values: Is there a comment, yes or no.

COMMENTR Confrd comments

Value Label	Value	Frequency	%	Valid %	Cum %
No		1079	96.4	96.4	96.4
Yes		40	3.6	3.6	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 13: CYCLIST AND PAVEMENT TRAFFIC – (CONFLICT)

At the point when the cyclist is carrying out the manoeuvre, is the cyclist crossing the path of other pavement traffic? ie. if the pedestrian/ cyclist/etc. has right of way, does the cyclist assume the right of way?

Values: Yes, no, or not applicable.

CONFPAV Cyclist crossing pavement traffic

Value Label	Value	Frequency	%	Valid %	Cum %
N/A		799	71.4	71.4	71.4
No		295	26.4	26.4	97.8
Yes		25	2.2	2.2	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

VARIABLE 14: IF COMMENT

Did the cyclist make the pedestrian/cyclist/etc. change path, speed, position in the road etc, did something else happen or did nothing happen?

Values: Is there a comment, yes or no.

COMMENTP Confpav comments

Value Label	Value	Frequency	%	Valid %	Cum %
No		1028	91.9	91.9	91.9
Yes		91	8.1	8.1	100.0
TOTAL		**1119**	**100.0**	**100.0**	

Valid cases 1119 Missing cases 0

The following information was collected in stage 4, level 2.

DETAILED ACCOUNT OF THE MANOEUVRE

For the purposes of the analysis the database information states whether the manoeuvre is prescribed or not as explained in variable 4, Actual manoeuvre.

However, in addition to this classification, a detailed account was recorded of how each manoeuvre was executed.

For those classified as the 'prescribed' execution of the manoeuvre:

For these manoeuvres, the account consisted of a direct comparison with recommendations combined from the *Highway Code* and the *Cycling Proficiency Handbook,* and publications by RoSPA and the County Road Safety Officers' Association. Thus for each manoeuvre there was a list of all the activities the cyclist should carry out.

The cyclist's undertaking, or not, of each of those activities was recorded, together with any additional information.

For those classified as an 'other' execution of the manoeuvre:

For those manoeuvres, where it was impossible to have predicted all of the likely outcomes, a detailed point-by-point description of the manoeuvre was recorded.

This information was recorded for all 1119 cyclists, but remains in written form awaiting computer coding and analysis.

3 Results of the study

3.1 General findings from frequencies

The main points from section 2.2, where 1119 cyclists were observed at 51 junctions, are summarised below:

- Of the cylists seen, 89 per cent are male and 11 per cent female.
- 8 per cent were on paper rounds.
- Only 3 per cent had some form of safety aid, such as lights, reflective strips and helmets.
- 31 per cent of cyclists riding two or more together were riding in an inappropriate formation for the conditions. This represents 11 per cent of the whole sample.
- 25 per cent rode on the pavement.
- 64 per cent were carrying luggage of some sort, and of these one third were considered to be doing so unsafely.
- 94 per cent were riding their bicycles with confidence.
- 35 per cent undertook a manoeuvre other than recommended in the cycling handbooks referred to.
- 23 per cent encountered moderate or busier road traffic levels.
- 18 per cent encountered moderate or busier pavement traffic levels.
- It should be noted that no accidents were seen during the observations.

3.2 General findings from crosstabulations

Crosstabulations were carried out on information relating to 1106 cyclists at 50 junctions. The information relating to one junction (type B, where the major road went through 90°) was excluded.

The main findings are summarised below.

3.2.1 Undertaking each manoeuvre

Refer to Appendix IV, Crosstabulation Table 1.

Manoeuvre	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Total**
Frequency	228	231	130	172	70	208	35	12	20	**1106**
%	21	21	12	16	6	19	3	1	2	

Rank order of manoeuvre by frequency:-

1st: 2 going straight ahead with minor road on right (231 cases)

2nd: 1 going straight ahead with minor road on left (228 cases)

3rd: 6 turning left out of minor road (208 cases)

4th: 4 turning right out of minor road (172 cases)

5th: 3 turning right into minor road (130 cases)

6th: 5 turning left into minor road (70 cases)

7th: 7 going straight on from minor road (35 cases)

8th: 9 other

9th: 8 going straight on from footpath up minor road (12 cases)

- Most cyclist are travelling straight ahead at T-junctions. This may in part explain why most accidents occur during this manoeuvre.

3.2.2 Following prescribed manoeuvre

Refer to Appendix IV, Crosstabulations Tables 1-6.

Manoeuvre	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**TOTAL**
No. following prescribed route	176	162	68	120	39	141	12	8	N/A	**726**
%	77	70	52	70	56	68	34	67		**66**

- Overall 66 per cent followed a prescribed route during the manoeuvre, 34 per cent did not.
- Cyclists were less likely to follow a prescribed route when turning right or left into the minor road than when undertaking other manoeuvres, but least likely to do so when undertaking manoeuvre 7, that is going straight over the major road towards a path or driveway.
- The number of girls undertaking each manoeuvre was very small. As a result, direct comparison of boys and girls in their choice between prescribed or other route is not possible. However, the girls appeared to behave differently from the boys when undertaking manoeuvres 2 and 3, and this deserves further investigation.
- The number of paperboys/girls undertaking each manoeuvre was also very small. As above, it is not really possible to compare paperboys/girls with non-paperboys/girls. One point of interest is that of the seven who were turning right into the minor road (manoeuvre 3) only 1 followed the prescribed route.

3.2.3 Effect on cyclist of traffic density

Refer to Appendix IV, Crosstabulation Tables 13 and 14.

Road Traffic Level	Prescribed Route		Other Route	
	N	%	N	%
None	95	68	44	32
Light	475	67	230	33
Moderate	105	62	64	38
Busy	46	56	35	44
Very busy	5	41	7	59

$chi^2 = 8.24$ = significant at 5%
chi^2 excluding 'very busy' = 2.75 = not significant

- In general it appears that cyclists' route choice was not influenced by the level of road traffic at the time they were undertaking the manoeuvre. That is, they were no more or less likely to follow the prescribed route under any of the 5 levels of traffic density.

However, by combining manoeuvres into their general direction, traffic density does appear to influence route choice.

Road Traffic Level	% Following a prescribed route of all those undertaking the same manoeuvres		
	Going straight on, manoeuvres 1 & 2	Turning right manoeuvres 3 & 4	Turning left manoeuvres 5 & 6
None	81	70	59
Light	75	63	68
Moderate	68	60	57
Busy	57	58	58
Very Busy		Too few cases	
Range	**24**	**12**	**11**

- As road traffic density increases it appears that cyclists going straight ahead are less likely to follow the prescribed route than those turning right or left.

3.2.4 Attention to the road

Refer to Appendix IV, Crosstabulation tables 15-28.

- Only half the cyclists were rated as 'attentive'. Attentiveness increased with age and declined when riding in company.

It was also dependent upon the manoeuvre being undertaken with riders being most attentive when turning right out of the minor road and when turning left out of the minor road. Least attention was observed

when the cyclist was riding straight across the junction passing the minor road on his or her left. This could be considered one of the more hazardous manoeuvres in so far as the cyclist is vulnerable to cars entering or leaving the minor road crossing his path.

	% Rated as 'Attentive'
Condition	
A roads	52
C roads	51
Traffic level	
– none	47
– light	52
– moderate	51
– busy	51
– very busy	92 (NB: n = 12)
Age	
< 13 years	34
13-16 years	50
> 16 years	65
Cycling alone	56
Cycling in company	42
Manoeuvre type 1	36
2	52
3	46
4	64
5	47
6	62

3.2.5 Confidence

Refer to Appendix IV, Crosstabulation tables 30-33.

Nearly 94 per cent were considered to ride their bicycles with confidence. As a result the numbers showing any other levels of confidence were very small. However, slightly more show confidence as age increases.

3.2.6 Paper-rounds

Refer to Appendix IV, Crosstabulation tables 34-41.

95 per cent of those on a paper-round were boys, and only 10 per cent appeared to be less than 13 years old.

26 per cent of those on a paper round rode on the pavement, showing that paperboys/girls are no more likely to do so than other teenage cyclists.

All of those on a paper round were carrying luggage. 63 per cent of them were considered to be carrying their paper delivery bags unsafely, whereas only 26 per cent of those not on a paper round but carrying luggage were thought to be doing so unsafely.

4 Review of findings

This study has found that of one third of all cyclists' manoeuvres observed at T-junctions the cyclist did not follow a recommended route. Previous studies have found a similar figure for compliance with all prescribed behaviour across all types of junction.

The detailed analysis has yet to be undertaken on this new database to obtain a figure for compliance with all 'rules'; however it can be assumed even now that it would rise above 35 per cent.

This requires confirmation for it suggests that teenage cyclists' behaviour at T-junctions (which accounts for the greatest number of cyclists' road accidents), is less predictable than would have been expected from other research.

We have to look further into this issue, however, if we are to avoid over simplistic understanding of behaviour. Only detailed investigation of the data will tell us whether the behaviour reported here is likely to be contributing to the accident problem. It may, on the other hand, be that the greater variety of behaviour is a result of the greater vulnerability of the cyclist rather than a contributory factor.

Observance of prescribed rules about looking, signalling, position on the road etc is only part of the strategy of safe riding. As was highlighted by the literature review another essentially important aspect is the understanding and application of a series of abstract 'rules' and skills relating to being a part of the traffic environment.

The question to be asked is the extent to which the cyclists in this study demonstrated these skills. Do they modify their behaviour in response to the conditions prevailing at the time of their manoeuvre and do they do this in an appropriate manner? Does it matter if the cyclist does not take the prescribed route if there is no traffic around at the time or if his or her behaviour is not going to cause a traffic conflict?

Overall the study found that whether the prescribed route was taken was not dependent upon the traffic density at the time of the manoeuvre. Initially this might suggest that cyclists are not adapting their behaviour to the traffic environment. However, a close inspection of the data reveals a more complex story, for the response to traffic conditions is dependent upon the type of manoeuvre being undertaken. Greater variability in the route taken is observed when the cyclists are riding straight ahead at the junction. That is, the greater the traffic density the fewer follow the prescribed route.

Although not as large an effect, a similar result is found for right turns, whereas left turn route choices appear to be uninfluenced by the amount of traffic around.

We can say then that with the exception of left turns, cyclist behaviour shows some evidence of modification in response to traffic conditions. Further analysis of the data should reveal the nature of this modification in detail and whether this is appropriate. It may also help explain why it is not observed for left turns. Is it, for example, simply that there are more opportunities for the cyclist to use the pavement during a left turn?

Another measure of the cyclists' responsiveness to the traffic environment in which they are riding is the level of attentiveness displayed. Paying appropriate attention is clearly important to safe cycling and this study has shown how it increases with age even over the short time span of the teenage years. What we cannot say yet is why this is found. Is it, for example, due to improving road craft skills or increasing riding skills? As Kuiken (1986) found, younger cyclists have a narrower field of attention, tending to focus on aspects of cycle control rather than the wider environment.

It must be a matter of concern that only half the cyclists observed could be rated as paying good attention to the road. Of at least equal significance is the finding that attentiveness appeared uninfluenced by the level of risk pertaining at the time they were riding. There is no relationship between traffic density and attentiveness. While higher attentiveness scores were obtained during turns than when cycling straight ahead we know from the accident data that vulnerability is greater when going straight ahead.

Associated with attentiveness is the apparent confidence displayed by the cyclists while riding their bicycle. 94 per cent of the cyclists observed displayed confidence, only 1 per cent were a little nervous. Given so few displaying anything other than confidence we must conclude that this is not affected by other factors such as the type of manoeuvre being undertaken or the traffic density.

Such a high level of confidence might be regarded as a problem for it suggests cyclists are not conscious of their own vulnerability and this may undermine attempts at training and education. A lower level of confidence may improve attentiveness to both the road environment and to the educational programme.

Alternatively, it might be that to ride on the roads at all a high level of confidence in riding ability is necessary, but this does not necessarily mean that cyclists are aware of their vulnerability. It might indicate that training and education contribute well to confidence in riding skills, but insufficiently towards the more difficult areas of attitude, traffic and riding strategies.

We suggest that any future training or education programmes address these issues as a first priority.

Finally, we have discussed earlier the importance of the cycling strategy in addition to teaching of specific skills. If we accept that cyclists are most likely to be involved in a collision with a vehicle when going straight ahead at a junction, the strategy this implies is one of 'defensive riding' based upon observation skills and attention to other road-users.

5 Recommendations

This study was a general look at teenage cyclists to see what they are doing, what information could be collected about them on film and how that information could be used to address the problem of accidents.

The analysis that has been carried out on this recorded information has generated a lot of descriptive information about those included in the study, and some subjective information about the sample. This forms a good basis from which to investigate further.

During the filming, coding and analysis stages of the work, questions were being asked without knowing whether it would be possible to answer them. The principle followed was 'if the question is not asked, then it will not be possible to establish whether the answer can be found'.

This broad brush approach had implications. It is possible that some items of information were overlooked, and likely that many may not have been classified in sufficient detail. In addition, the criteria for coding (variable levels) may not always have been wholly appropriate. Some of the variables, such as levels of confidence and attention, were subjective. The practicalities of carrying out the coding, such as the amount of film to go through, the length of time needed, the number of people doing the coding, were likely to have an influence on the outcomes.

In addition, the approach adopted may have resulted in some of the criteria for judgement changing during the coding of the information, as the range and scope of possible outcomes became apparent. This may have been inevitable, unless the films had all been studied and classified prior to the definition of the coding structure.

However, because film of so many cyclists has been recorded and studied, it will now be possible to identify areas of specific interest which need to be addressed in more detail and from a more scientific base. Further suggestions about how to collect and interpret information from the recordings can be made. This may involve at one level further manipulation of the existing results, and at another level going back to the recordings and redefining the questions, the criteria and in some cases the sample.

5.1 Recommendations specific to this cyclist data base

Further detailed analyses should be undertaken on the new database including, for example:

- a detailed analysis of behaviour, in terms of compliance with prescribed behaviour or the chosen alternatives. This might include an investigation of the percentage value for signalling, looking, stopping, etc.

- an analysis of how often these actions are appropriate, whether and how often they are not appropriate, and whether they depend upon road conditions.

- a comparison of the junctions where less than 10 cyclists were seen with those with more than 10 cyclists, to establish if there are any significant differences that might contribute to whether the junction is chosen or avoided by cyclists.

These are but a few of the directions that can be followed. Consideration by interested parties may highlight many other avenues to be investigated in the database.

5.2 General recommendations

- A review of the current cycling guidelines should be undertaken in the light of the findings of this report, in terms of relevance to today's cycling environment, cyclist, and training programmes.

- Education, information and training programmes should be reviewed, and attention placed on developing roadcraft skills. The aim should be to place as much emphasis on roadcraft skills as is currently placed on prescriptive rules of signalling etc. Learning by rote is not enough.

- A defensive riding scheme should be considered.

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7 Appendices

7.1 Appendix I Junction and verbal checklists

THE BEHAVIOUR OF YOUNG CYCLISTS AT T-JUNCTIONS
AA Foundation for Road Safety Research

JUNCTION CHECKLIST

This checklist should be completed at each location as fully as possible.

DATE:

LOCATION: Road names, town/area, map & reference etc.

TIME started:
finished:

TYPE OF AREA:

Industrial
Urban
Sub-urban
Residential Rural

DETAILED SKETCH PLAN OF JUNCTION: showing layout, distances, important road features, and other influential factors referred to in this form.

Please use other side of page.

Tally of cyclists seen.

CLASSIFICATION OF ROADS:

	road 1	road 2	other
A (Trunk)			
A road			
(B road) C road Unclassified			

TYPE OF T-JUNCTION:

Traffic lights
Stop sign
Give way sign
No signs or road markings

TYPE OF ROADS:

	road 1	road 2	other
dual carriageway			
single carriageway			
one-way			

LANES PER CARRIAGEWAY: on both roads approaching, but not at, the junction

road 1 road 2 other

LANES PER CARRIAGEWAY: on both roads at the junction

road 1 road 2 other

DESIGNATION OF LANES: right turn only, left turn only, straight on only, left and straight on etc.

road 1

road 2

other

LANE WIDTHS: (approx) at junction (and approaching junction if different from junction)

road 1 road 2 other

CENTRAL ISLANDS PRESENT: where and what sort (raised curb, bollards, pelican crossing, barrier, painted etc).

road 1

road 2

other

RAMPS ON TO PAVEMENTS AND CENTRAL ISLANDS: where

road 1

road 2

other

KERB HEIGHT (approx):

BARRIERS: where

PAVEMENT WIDTH (approx):

TYPE OF ROAD SURFACE:

road 1 road 2 other

Tarmac
Tar and chips
Concrete section
Other (what)

QUALITY OF ROAD SURFACE:

	road 1	road 2	other
Repair			
Pot holes			
Bitumen bonding			
Manhole covers			
Gravel/grit			
Oil			
Leaves			
Other (what)			

GRADIENT OF ROADS:

	road 1	road 2	other
Level			
Crest of hill			
Bottom of hill			
Dip			
Up hill slope			
Down hill slope			

ROAD CROSS-SECTION:

	road 1	road 2	other
Flat			
Down to kerb			
Down to crown			

CAMBER: the angle of the road surface in relation to the turn being made eg. on a left hand turn, leaning to the left, the road slopes away to the right away from the tyres – this would be a negative camber.

	road 1	road 2	other
Positive			
Negative			
Neutral			

STATE OF ROAD SURFACE:

	road 1	road 2	other
Dry			
Damp			
Wet			
Puddly/patchy			

WEATHER:
Clear
Rain
Drizzle

DAYLIGHT QUALITY:
Sunny
Bright
Overcast
Cloud
Fog
Mist
Drizzle
Rain

WIND:
Strong
Light
Gusty

FURNITURE AT JUNCTION:
Buildings
Shops
Hedges/greenery
Walls
Road signs etc
other

POSSIBLE LIMITATIONS TO VIEW OF JUNCTION: from each approach.
Pedestrians
Moving traffic
Parked vehicles
Signs, lampposts
Buildings
Walls
Other

ANY OTHER RELEVANT FEATURES: which may have a bearing on the behaviour of young cyclists. For example, just down the road from the junction (and out of sight of the video) there may be a row of shops, access to a cycle route, a sports centre or recreational area, etc.

THE BEHAVIOUR OF YOUNG CYCLISTS AT T-JUNCTIONS
AA Foundation for Road Safety Research

VERBAL CHECKLIST

For each cyclist seen, try to record on the video a verbal description of relevant features. Remember that the naked eye can see much more detail than the video, and that analysis of the film would be significantly improved with your account.

Approx. AGE OF THE CYCLIST

13 to 16
Possibly older than 16 but less than 18 or 19
Possibly younger than 13 but older than 10 or 11

SEX

Male
Female
Couldn't tell

CONFIDENCE/EXPERIENCE: it may be possible for you to make a judgement of how confident the cyclist is and/or how experienced they are at riding in the given traffic conditions. eg. very, reasonably, not very, totally lacking.

TYPE OF BICYCLE

Sports/racing
Mountain
BMX
Small wheels
Chopper
Other

SPECIAL FEATURES

Lights front/rear
Reflective strips in wheels
Reflectors front/rear
Bicycle flags
Go faster bits

LUGGAGE

Rucksack
Panniers
Rack (with clip or bungies)
Saddlebag
Handle bar bag/shopping basket
Shopping/other bag hanging from handle bars
Hand held/balanced
Bag hanging down from shoulder
Other

ATTIRE

Head
Body
Arms
Hands
Legs
Feet

SAFETY AIDS

Helmet Reflective jacket/bib
'Sam Browne' reflective strip (across chest and round waist)
Reflective wrist/ankle bands
Elbow/knee pads
Gloves
Other

OTHER POINTS TO NOTE

Facial expressions
Gestures to other road-users (polite or not!) and the causes of the gestures
Any idea of the purpose of the cyclist's journey
Other

7.2 Appendix II Prescribed procedures for undertaking manoeuvres and recording sheet for stage 4 of data collection

Recommended procedures for undertaking various manoeuvres at T-junctions. These were derived by collating the recommendations made by the *Highway Code, The Cycling Proficiency Handbook,* and publications by RoSPA and the County Road Safety Officers' Association.

Manoeuvre 1

1 Position 60cm – 1m from kerb approaching junction.

2 Look into side road, as approaching it, for other traffic.

3 Try to work out what other traffic is doing and make sure they've been seen.

4 If a car pulls out of a side/minor road (either to turn left in front of, or right across path of, cyclist) is cyclist prepared to take avoiding action?

5 Look behind over shoulder.

6 If vehicle turns left in front, is cyclist prepared to take avoiding action?

7 Look towards oncoming traffic.

8 If vehicle turns right across path, is cyclist prepared to take avoiding action?

Manoeuvre 2

1 Position 60cm – 1m from kerb approaching junction.

2 Look to offside, into side road, as approaching it, for other traffic?

3 If vehicle pulls out in front, is cyclist prepared to take avoiding action?

Manoeuvre 3

Option A – normal manoeuvre

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Right arm straight out, palm at 90° to the road.

4 Move to just left of centre of the road.

5 Keep signalling.

6 Wait in the waiting position for a gap in the oncoming traffic, opposite left hand lane of the minor road.

7 Turn into the minor road only when there is a gap in the oncoming traffic.

8 When turning keep both hands on the handlebars.

9 Look for pedestrians crossing/stepping into the minor road in front of cyclist.

10 Give way to pedestrians crossing the minor road.

Manoeuvre 3

Option B – If junction is very busy

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Right arm straight out, palm parallel to the road, moving arm up and down for slowing down/stopping.

4 Pull to the kerb and stop gently, at the point where the cyclist wishes to cross the road.

5 Get off the bicycle, on the left hand side, nearest the kerb.

6 Wheel the bicycle along the pavement to the point where the cyclist wishes to cross the road, if not stopped there.

7 Wait for a safe gap in the traffic.

8 Walk across the road with the bicycle when it is clear.

9 Before restarting in the minor road, look behind for traffic.

10 Wait until it is safe to set off again.

11 Give way to pedestrians crossing the minor road.

Manoeuvre 3

Option C – If junction is very busy

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Right arm straight out, palm parallel to the road, moving arm up and down for slowing down/ stopping.

4 Pull to the kerb and stop gently, at the point where the cyclist wishes to cross the road.

5 Wait at the kerb in the waiting position.

6 Wait for a safe gap in the traffic.

7 Cycle across the road when it is safe.

8 Look for pedestrians crossing/stepping into minor road in front of cyclist.

9 Give way to pedestrians crossing the minor road.

Manoeuvre 4

Option A – normal manoeuvre

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Right arm straight out, palm at 90° to the road.

4 Move to just left of centre line.

5 Keep signalling as you move to the centre.

6a The cyclist must stop at a STOP sign. Do so behind the road marking if there is one, in the waiting position.

6b The cyclist must stop at a GIVE WAY sign unless he can see that the road is clear.

7 Wait for a gap in the traffic from both directions.

8 Is the cyclist aware of traffic also turning right as it could cut across the path of the cyclist?

9 Look for pedestrians stepping into the road.

10 Look for parked vehicles in the major road. They could force the cyclist out into the path of other traffic.

11 Only turn into the major road when all traffic has passed.

12 When turning keep both hands on the handlebars.

Manoeuvre 4

Option B – If junction is very busy

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Right arm straight out, palm parallel to the road, moving arm up and down for slowing down/stopping.

4 Pull to the kerb and stop gently.

5 Get off the bicycle, on the left hand side, nearest the kerb.

6 Wheel the bicycle along the pavement.

7 Wait for a gap in the traffic from both directions.

8 Walk across the road with the bicycle when it is clear.

9 Before restarting in the major road, look behind for traffic.

10 Wait until it is safe to set off again.

Manoeuvre 5

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Left arm straight out, palm at 90° to the road.

4 Look for pedestrians crossing/stepping into minor road.

5 Give way to pedestrians crossing the minor road.

6 Is the cyclist aware of vehicles which might stop or cut in front of him?

7 Keep a safe distance from other vehicles (not too close).

8 Establish the correct position before turning into the side road, keeping well in to the left.

9 Keep a safe distance away from the kerb and avoid swinging out.

10 When turning keep both hands on the handlebars.

11 Look for parked vehicles in the road ahead.

Manoeuvre 6

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind before signalling or moving.

3 Give clear and correct arm signal. Left arm straight out, palm at 90° to the road.

4 Look for pedestrians crossing/stepping into minor road.

5 Give way to pedestrians crossing the minor road.

6a The cyclist must stop at a STOP sign. Do so behind the road marking if there is one, in the waiting position.

6b The cyclist must stop at a GIVE WAY sign unless he can see that the road is clear.

7 Look right at the main road.

8 Wait until all traffic from your right has passed.

9 Do not turn if a vehicle to the right is blocking the view to the right.

10 Is the cyclist aware of long vehicles and ones with trailers also turning left?

11 Keep a safe distance away from the kerb and avoid swinging out.

12 When turning keep both hands on the handlebars.

13 Look for parked vehicles in the road ahead.

Manoeuvre 7

Option A – normal manoeuvre

1 Position 60cm – 1m from kerb approaching junction.

2 Look behind.

3 Keep near to the left of the road, but if possible leave enough space for others to turn left.

4 The cyclist does not need to signal (although other road users may not expect him to go straight ahead over a T-junction). The cyclist's road position indicates his intention to go straight on.

5a The cyclist must stop at a STOP sign. Do so behind the road marking if there is one, in the waiting position.

5b The cyclist must stop at a GIVE WAY sign unless he can see that the road is clear.

6 Wait for a gap in the traffic from both directions.

7 Is the cyclist aware of traffic also turning right or left across his path?

8 Look for pedestrians stepping into the road.

9 Look for parked vehicles.

10 Keep looking all around as the cyclist is crossing the road.

11 At the kerb on the far side of the junction, dismount the bicycle.

12 Look for pedestrians walking along the pavement.

13 Walk across the pavement wheeling the bicycle.

Manoeuvre 7

Option B – If junction is very busy

1 Position 60cm – 1m from kerb approaching junction.
2 Look behind before signalling or moving.
3 Give clear and correct arm signal. Right arm straight out, palm parallel to the road, moving arm up and down for slowing down/stopping.
4 Pull to the kerb and stop gently.
5 Get off the bicycle, on the left hand side, nearest the kerb.
6 Wheel the bicycle along the pavement.
7 Wait for a gap in the traffic from both directions.
8 Walk across the road with the bicycle when it is clear.
9 At the far side of the junction, push the bicycle onto the pavement.
10 Look for pedestrians walking along the pavement.
11 Walk across the pavement wheeling the bicycle.

Manoeuvre 8

Option A – normal manoeuvre

1 Look for pedestrians walking along the pavement.
2 Walk across the pavement wheeling the bicycle.
3 At the kerb, mount the bicycle and wait in the waiting position.
4 Wait for a gap in the traffic from both directions.
5 Only pull into the major road when all traffic has passed.
6 Keep looking all around whilst crossing the road.
7 Look for pedestrians crossing/stepping into minor road.
8 Give way to pedestrians crossing the minor road.
9 Look for parked vehicles in the road ahead.

Manoeuvre 8

Option B – If junction is very busy

1 Look for pedestrians walking along the pavement.
2 Walk across the pavement wheeling the bicycle.
3 At the kerb, wait for a gap in the traffic from both directions.
4 Wait until the road is clear and all traffic has passed, then walk across the road.
5 Is the cyclist aware of traffic also turning right as it could cut across the path of the cyclist?
6 Keep looking all around whilst crossing the road.
7 Before restarting, look behind for traffic.
8 Wait until it is safe to set off again.
9 Look for pedestrians crossing/stepping into minor road.
10 Give way to pedestrians crossing the minor road.
11 Look for parked vehicles in the road ahead.

Site number:	Manoeuvre:	
Cyclist number:	Actual:	
Road Traffic	None	1
	Light	2
	Moderate	3
	Busy	4
	Very busy (dangerous for cyclists)	5
Pavement Traffic	None	1
	Light	2
	Moderate	3
	Busy	4
	Very busy	5

CONFLICTS

Other road traffic

Is other traffic crossing the path of the cyclist? Yes/No

Did the driver make the cyclist change path, speed, position etc., and if so, how?

Cyclist and other road traffic

Is the cyclist crossing the path of other vehicles? Yes/No

Did the cyclist make the driver change path, speed, position etc., and if so, how?

Pavement traffic on the road

Is any pavement traffic crossing the path of the cyclist on the road? Yes/No

Did the pedestrian/cyclist/etc. make the cyclist change path, speed, position etc., and if so, how?

Cyclist and pavement traffic on the pavement

Is the cyclist crossing the path of other pavement traffic on the pavement? Yes/No

Did the cyclist make the pedestrian/cyclist/etc. change path, speed, position etc., and if so, how?

MANOEUVRES: Prescription

1	2		3			4		5	6	7		8	
		A	B	C	A	B			A	B	A	B
1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3
4	–	4	4	4	4	4	4	4	4	4	4	4
5	–	5	5	5	5	5	5	5	5a/5b	5	5	5
6	–	6	6	6	6a/6b	6	6	6a/6b	6	6	6	6
7	–	7	7	7	7	7	7	7	7	7	7	7
8	–	8	8	8	8	8	8	8	8	8	8	8
–	–	9	9	9	9	9	9	9	9	9	9	9
–	–	10	10	–	10	10	10	10	10	10	–	10
–	–	–	11	–	11	–	11	11	11	11	–	11
–	–	–	–	–	12	–	–	12	12	–	–	–
–	–	–	–	–	–	–	–	13	13	–	–	–

MANOEUVRES: Description

OPTIONS:
· = Comment
/ = Yes
·/ = Yes, with qualifying or describing statement
x = No
·x = No, with qualifying or describing statement
n/a = Not applicable
·n/a = Not applicable with comment
d/k = Didn't see on film
·d/k = Couldn't tell

7.3 Appendix III Total number of cyclists seen

Site no.	Term/Hols	Male	Female	Not Known	n	Other	Total
L13	term	13	0	0	13	17	30
L9	term	11	4	0	15	34	49
D4	term	22	4	0	26	19	45
N5	term	14	0	0	14	13	27
N1	term	21	0	0	21	15	36
N2	term	17	1	0	18	1	19
D3	term	7	3	0	10	20	30
N3	term	8	1	0	9	3	12
N4	term	1	0	0	1	5	6
L4	hols	5	0	0	5	23	28
L6	hols	1	1	0	2	24	26
L8	hols	1	0	0	1	24	25
L11	hols	6	2	0	8	21	29
L5	hols	16	0	0	16	77	93
L1	hols	5	0	0	5	19	24
L20	hols	5	2	0	7	25	32
L21	hols	10	3	0	13	54	67
D2	hols	10	0	0	10	10	20
D1	hols	18	1	0	19	25	44
D12	hols	21	3	0	24	16	40
L18	hols	19	2	0	21	18	39
L19	hols	6	0	0	6	4	10
L3 *	hols	18	1	0	19	27	46
L12	hols	12	4	1	17	8	25
L10	hols	10	1	0	11	16	27
N30	hols	15	3	0	18	28	46
N6	hols	10	3	0	13	19	32
L2	term	7	1	0	8	30	38
L3 *	term	45	4	1	50	52	102
L23	term	5	0	0	5	9	14
D11	hols	7	2	0	9	11	20
L25	term	1	2	0	3	1	4
L7	term	7	0	0	7	11	18
L24	term	16	2	0	18	12	30
L26	term	8	2	0	10	28	38
L29	term	29	5	0	34	16	50
L28	term	12	1	1	14	8	22
L30	term	32	6	0	38	7	45
L31	term	28	1	0	29	44	73
L32	term	1	0	0	1	3	4
L22	term	22	0	0	22	30	52
L16	term	13	3	0	16	27	43
L17	term	18	5	0	23	63	86
(D5)	term	0	0	0	0	0	0
D7	term	9	0	0	9	7	16
(D21)	term	0	0	0	0	0	0
D24	term	18	0	0	18	84	102
N12	term	1	0	0	1	1	2
N15	term	6	0	0	6	34	40
N20	term	7	0	0	7	5	12
N34	term	44	6	0	50	35	85
N29	term	22	3	0	25	7	32
O	term	0	0	0	0	0	0

Site no.	Term/Hols	Male	Female	Not Known	n	Other	Total
D13	term	9	2	0	11	9	20
N10	term	28	1	0	29	21	50
D22	term	36	9	0	45	25	70
N33	term	8	1	0	9	2	11
N28	term	11	1	0	12	40	52
D18	term	12	2	0	14	17	31
N17	term	9	0	0	9	14	23
D19	term	4	0	0	4	2	6
N38	term	20	4	0	24	30	54
D28	term	2	0	0	2	1	3
N24 *	term	18	2	0	20	31	51
D17	term	21	2	0	23	17	40
N39	term	19	0	0	19	47	66
D25	term	42	1	0	43	13	56
N23	term	17	0	0	17	11	28
D15	term	21	0	0	21	13	34
N43	term	33	5	0	38	56	94
D20	term	7	5	0	12	8	20
N9	term	41	7	0	48	25	73
N26	term	8	0	0	8	7	15
D27	term	7	0	0	7	1	8
N22	term	19	0	0	19	5	24
N40	term	28	4	0	32	29	61
D26	term	23	2	0	25	13	38
N11	term	3	1	0	4	0	4
N41	hols	10	0	0	10	24	34
D16	hols	1	2	0	3	3	6
N24 *	hols	0	0	0	0	10	10
D23	hols	9	3	0	12	20	32
N8	term	6	0	0	6	7	13
		1132	**136**	**3**	**1271**	**1591**	**2862**
		89.0%	**10.70**	**0.2%**			

7.4 Appendix IV Crosstabulations

NB: Junctiontype 2 cyclists have been excluded from all tables.

Manoeuvre by execution of manoeuvre

Table 1 by ALL
Table 2 by male
Table 3 by female
Table 4 by not known
Table 5 by paperboy/girl (Yes)
Table 6 by paperboy/girl (No)

Execution of manoeuvre

Table 7 by ALL
Table 8 by pavement

Road traffic level

Table 9 by ALL

Road traffic level by pavement traffic level

Table 10 by ALL
Table 11 by prescribed
Table 12 by other

Manoeuvre by road traffic level

Table 13 by prescribed
Table 14 by other

Paying attention

Table 15 by road class
Table 16 by road traffic level
Table 17 by junction openness
Table 18 by agegroup
Table 19 by cycling with others
Table 20 by apparent confidence
Table 21 by manoeuvre
Table 22 by execution of manoeuvre
Table 23 by road traffic crossing cyclist
Table 24 by luggage
Table 25 by hands on handlebars
Table 26 by carrying passenger
Table 27 by stunts
Table 28 by paperboy/girl

Compliance with Rules

Table 29 compliance with rules by road traffic level

Apparent Confidence

Table 30 by road class
Table 31 by road traffic level
Table 32 by execution of manoeuvre
Table 33 by agegroup

Paperboy/girl

Table 34 by gender
Table 35 by agegroup
Table 36 by riding on pavement
Table 37 by stunts
Table 38 by luggage
Table 39 by paying attention
Table 40 by compliance with rules
Table 41 by apparent confidence

Table 1 – Crosstabulation: Manoeuvre by execution of manoeuvre

EXECUTN–> MANUVRE	Count / Row Pct	Prescribed 1	A Prescribed 2	C Prescribed 3	Other 4	Row Total
	1	176			52	**228**
		77.2			22.8	**20.6**
	2	162			69	**231**
		70.1			29.9	**20.9**
	3		66	2	62	**130**
			50.7	1.5	47.7	**11.8**
	4	4	120		52	**172**
		2.3	69.7		30.2	**15.6**
	5	39			31	**70**
		55.7			44.3	**6.3**
	6	141			67	**208**
		67.8			32.2	**18.8**
	7	3	12		23	**35**
		8.6	34.3		65.7	**3.2**
	8		8		4	**12**
			66.7		33.3	**1.1**
	9				20	**20**
					100.0	**1.8**
Column Total		**518**	**206**	**2**	**380**	**1106**
		46.8	**18.6**	**.2**	**34.4**	**100.0**

Table 2 – Crosstabulation: Manoeuvre by execution of manoeuvre Controlling for GENDER: Male.

EXECUTN–> MANUVRE	Count Row Pct	Prescribed 1	A Prescribed 2	C Prescribed 3	Other 4	Row Total
	1	156			46	**202**
		77.2			22.8	**20.5**
	2	153			59	**212**
		72.2			27.8	**21.5**
	3		63	2	53	**118**
			53.4	1.7	44.9	**12.0**
	4		105		44	**149**
			70.5		29.5	**15.1**
	5	34			28	**62**
		54.8			45.2	**6.3**
	6	126			54	**180**
		70.0			30.0	**18.3**
	7		10		20	**30**
			33.4		66.7	**3.0**
	8		8		4	**12**
			66.7		33.3	**1.2**
	9				19	**19**
					100.0	**1.9**
Column Total		**469**	**186**	**2**	**327**	**984**
		47.7	**18.9**	**.2**	**33.2**	**100.0**

Table 3 – Crosstabulation: Manoeuvre by execution of manoeuvre. Controlling for GENDER: Female

EXECUTN–> MANUVRE	Count Row Pct	Prescribed 1	A Prescribed 2	Other 3	Row Total
	1	20 83.3		4 16.7	**24** **20.2**
	2	9 47.4		10 52.6	**19** **16.0**
	3		3 25.0	9 75.0	**12** **10.1**
	4		15 68.2	7 31.8	**22** **18.5**
	5	5 62.5		3 37.5	**8** **6.7**
	6	15 53.6		13 46.4	**28** **23.5**
	7	1 20.0	2 40.0	3 60.0	**5** **4.2**
	9			1 100.0	**1** **.8**
Column Total		**49** **41.1**	**20** **16.8**	**50** **42.0**	**119** **100.0**

Table 4 – Crosstabulation: Manoeuvre by execution of manoeuvre. Controlling for GENDER: Not Known

EXECUTN–> MANUVRE	Count Row Pct	Other 2	Row Total
	1	2 100.0	2 100.0
Column Total		**2** **100.0**	**2** **100.0**

Table 5 – Crosstabulation: Manoeuvre by execution of manoeuvre. Controlling for PAPERRND Paperboy/girl: Yes

EXECUTN–> MANUVRE	Count Row Pct	Prescribed 1	A Prescribed 2	Other 4	Row Total
	1	17 77.3		5 22.7	**2** **27.5**
	2	13 61.9		8 38.1	**21** **26.3**
	3		1 14.3	6 85.7	**7** **8.8**
	4		11 91.7	1 8.3	**12** **15.0**
	5	4 57.1		3 42.9	**7** **8.8**
	6	3 60.0		2 40.0	**5** **6.3**
	7		1 100.0		**1** **1.3**
	8		3 100.0		**3** **3.8**
	9			2 100.0	**2** **2.5**
Column Total		**37** **46.3**	**16** **20.0**	**27** **33.8**	**80** **100.0**

Table 6 – Crosstabulation: Manoeuvre by execution of manoeuvre. Controlling for PAPERRND Paperboy/girl: No

EXECUTN–> MANUVRE	Count / Row Pct	Prescribed 1	A Prescribed 2	C Prescribed 3	Other 4	Row Total
	1	159			47	**206**
		77.2			22.8	**20.1**
	2	149			61	**210**
		71.0			29.0	**20.5**
	3	2	65	2	56	**123**
		1.6	52.8	1.6	45.5	**12.0**
	4	4	109		50	**159**
		2.5	68.5		31.4	**15.5**
	5	35			28	**63**
		55.6			44.4	**6.1**
	6	138			65	**203**
		68.0			32.0	**19.8**
	7	2	11		23	**34**
		5.9	32.4		67.6	**3.3**
	8		5		4	**9**
			55.6		44.4	**.9**
	9				18	**18**
					100.0	**1.8**
Column Total		**481**	**190**	**2**	**352**	**1025**
		46.9	**18.5**	**.2**	**34.3**	**100.0**

Table 7

EXECBAND Execution of manoeuvre

Value Label	Value	Frequency	%	Valid %	Cum %
Presc+A+C	1.00	726	65.6	65.6	65.6
Other	2.00	380	34.4	34.4	100.0
TOTAL		**1106**	**100.0**	**100.0**	

Table 8 – How many cyclists went on the pavement whilst following the prescribed or other route?

EXECBAND Execution of Manoeuvre, where Pavement = 1. (Yes)

Value Label	Value	Frequency	%	Valid %	Cum %
Presc+A+C	1.00	9	3.3	3.3	3.3
Other	2.00	267	96.7	96.7	100.0
TOTAL		**276**	**100.0**	**100.0**	

Table 9

ROADTRAF Road Traffic Level

Value Label	Value	Frequency	%	Valid %	Cum %
None	1	139	12.6	12.6	12.6
Light	2	705	63.7	63.7	76.3
Moderate	3	169	15.3	15.3	91.6
Busy	4	81	7.3	7.3	98.9
Very Busy	5	12	1.1	1.1	100.00
TOTAL		**1106**	**100.0**	**100.0**	

Table 10 – Crosstabulation: Road traffic level by pavement traffic level

PAVETRAF–> ROADTRAF	Count Row Pct	None 1	Light 2	Moderate 3	Busy 4	Very Busy 5	Row Total
	1	60	68	5	6		**139**
None		3.2	48.9	3.6	4.3		**12.6**
	2	257	329	77	34	8	**705**
Light		36.5	46.7	10.9	4.8	1.1	**63.7**
	3	50	82	34	2	1	**169**
Moderate		29.6	48.5	20.1	1.2	.6	**15.3**
	4	16	43	11	11		**81**
Busy		19.8	53.1	13.6	13.6		**7.3**
	5	2	2	4	1	3	**12**
Very Busy		16.7	16.7	33.3	8.3	25.0	**1.1**
Column Total		**385** **34.8**	**524** **47.4**	**131** **11.8**	**54** **4.9**	**12** **1.1**	**1106** **100.0**

Table 11 – Crosstabulation: Road traffic level by pavement traffic level. Controlling for execution of manoeuvre: (Presc+A+C)

PAVETRAF–> ROADTRAF	Count Row Pct	None 1	Light 2	Moderate 3	Busy 4	Very Busy 5	Row Total
None	1	35	52	4	4		95
		36.8	54.7	4.2	4.2		13.1
Light	2	186	210	52	25	2	475
		39.2	44.2	10.9	5.3	.4	65.4
Moderate	3	31	51	22	1		105
		29.5	48.6	21.0	1.0		14.5
Busy	4	10	22	8	6		46
		21.7	47.8	17.4	13.0		6.3
Very Busy	5	2	1	1	1		5
		40.0	20.0	20.0	20.0		.7
Column Total		**264**	**336**	**87**	**37**	**2**	**726**
		36.4	**46.3**	**12.0**	**5.1**	**.3**	**100.0**

Table 12 – Crosstabulation: Road traffic level by pavement traffic level. Controlling for execution of manoeuvre: Other

PAVETRAF–> ROADTRAF	Count Row Pct	None 1	Light 2	Moderate 3	Busy 4	Very Busy 5	Row Total
None	1	25	16	1	2		44
		56.8	36.4	2.3	4.5		11.6
Light	2	71	119	25	9	6	230
		30.9	51.7	10.9	3.9	2.6	0.5
Moderate	3	19	31	12	1	1	64
		29.7	48.4	18.8	1.6	1.6	16.8
Busy	4	6	21	3	5		35
		17.1	60.0	8.6	14.3		9.2
Very Busy	5		1	3		3	7
			14.3	42.9		42.9	1.8
Column Total		**121**	**188**	**44**	**17**	**10**	**380**
		31.8	**49.5**	**11.6**	**4.5**	**2.6**	**100.0**

Table 13 – Crosstabulation: Manoeuvre by road traffic level. Controlling for execution of manoeuvre: (Presc+A+C)

PAVETRAF–> ROADTRAF	Count Row Pct	None 1	Light 2	Moderate 3	Busy 4	Very Busy 5	Row Total
	1	24	115	28	9		**176**
		13.6	65.3	15.9	5.1		**24.2**
	2	20	113	25	3	1	**162**
		12.3	69.8	15.4	1.9	.6	**22.3**
	3	7	46	10	5		**68**
		10.3	67.6	14.7	7.4		**9.4**
	4	12	72	20	14	2	**120**
		10.0	60.0	16.7	11.7	1.7	**16.5**
	5	5	26	6	2		**39**
		12.8	66.7	15.4	5.1		**5.4**
	6	25	99	10	5	2	**141**
		17.7	70.2	7.1	3.5	1.4	**19.4**
	7	1	1	4	6		**12**
		8.3	8.3	33.3	50.0		**1.7**
	8	1	3	2	2		**8**
		12.5	37.5	25.0	25.0		**1.1**
Column Total		**95**	**475**	**105**	**46**	**5**	**726**
		13.1	**65.4**	**14.5**	**6.3**	**.7**	**100.0**

Table 14 – Crosstabulation: Manoeuvre by road traffic level. Controlling for execution of manoeuvre: Other

ROADTRAF–> MANUVRE	Count / Row Pct	None 1	Light 2	Moderate 3	Busy 4	Very Busy 5	Row Total
	1	4	34	11	3		**52**
		7.7	65.4	21.2	5.8		**13.7**
	2	6	43	14	6		**69**
		8.7	62.3	20.3	8.7		**18.2**
	3	7	39	9	7		**62**
		11.3	62.9	14.5	11.3		**16.3**
	4	1	30	11	7	3	**52**
		1.9	57.7	21.2	13.5	5.8	**13.7**
	5	10	19	1	1		**31**
		32.3	61.3	3.2	3.2		**8.2**
	6	11	41	11	4		**67**
		16.4	61.2	16.4	6.0		**17.6**
	7		11	5	3	4	**23**
			47.8	21.7	13.0	17.4	**6.1**
	8		3		1		**4**
			75.0		25.0		**1.1**
	9	5	10	2	3	20	
		25.0	50.0	10.0	15.0		**5.3**
Column Total		**44** **11.6**	**230** **60.5**	**64** **16.8**	**35** **9.2**	**7** **1.8**	**380** **100.0**

Table 15 – Crosstabulation: Paying attention by road class

ROADCLAS–> ATTENTIV	Count / Row Pct	A Road 1	C Road 2	Row Total
	1.0	256	312	**568**
Attentive		45.1	54.9	**51.4**
	2.0	190	269	**459**
Cursory		41.4	58.6	**41.5**
	3.0	6	8	**14**
Daydreaming		42.9	57.1	**1.3**
	4.0	36	26	**62**
Distracted		58.1	41.9	**5.6**
	5.0	2		**2**
Not Known		100.0		**.2**
Column Total		**490** **44.3**	**615** **55.7**	**1105** **100.0**

Table 16 – Crosstabulation: Paying attention by road traffic level

ROADTRAF–> ATTENTIV	Count Row Pct	None 1	Light 2	Moderate 3	Busy 4	Very Busy 5	Row Total
Attentive	**1.0**	66 11.6	363 63.9	87 15.3	41 7.2	11 1.9	**568** **51.4**
Cursory	**2.0**	57 12.4	300 65.4	73 15.9	28 6.1	1 .2	**459** **41.5**
Daydreaming	**3.0**	4 28.6	10 71.4				**14** **1.3**
Distracted	**4.0**	12 19.4	29 46.8	9 14.5	12 19.4		**62** **5.6**
Not Known	**5.0**		2 100.0				**2** **.2**
Column Total		**139** **12.6**	**704** **63.7**	**169** **15.3**	**81** **7.3**	**12** **1.1**	**1105** **100.0**

Table 17 – Crosstabulation: Paying attention by junction openness

PAVETRAF–> ATTENTIV	Count Row Pct	Very Open 1	Open 2	Moder-ately Open 3	Re-stricted 4	Very Re-stricted 5	Row Total
Attentive	**1.0**	37 6.5	88 15.5	188 33.1	236 41.5	19 3.3	**568** **51.4**
Cursory	**2.0**	26 5.7	125 27.2	120 26.1	152 33.1	36 7.8	**459** **41.5**
Daydreaming	**3.0**	1 7.1	3 21.4	5 35.7	3 21.4	2 14.3	**14** **1.3**
Distracted	**4.0**	4 6.5	11 17.7	37 59.7	8 12.9	2 3.2	**62** **5.6**
Not Known	**5.0**			1 50.0	1 50.0		**2** **.2**
Column Total		**68** **6.2**	**227** **20.5**	**351** **31.8**	**400** **36.2**	**59** **5.3**	**1105** **100.0**

Table 18 – Crosstabulation: Paying attention by agegroup

AGEGROUP–> ATTENTIV	Count Row Pct	<13 years 1.0	13-16 years 2.0	>16 years 3.0	Not Known 4.0	Row Total
Attentive	**1.0**	28 4.9	427 75.2	109 19.2	4 .7	**568** **51.4**
Cursory	**2.0**	45 9.8	356 77.6	55 12.0	3 .7	**459** **41.5**
Daydreaming	**3.0**	2 14.3	10 71.4	2 14.3		**14** **1.3**
Distracted	**4.0**	8 12.9	53 85.5	1 1.6		**62** **5.6**
Not Known	**5.0**		1 50.0	1 50.0		**2** **.2**
Column Total		**83** **7.5**	**847** **76.7**	**168** **15.2**	**7** **.6**	**1105** **100.0**

Table 19 – Crosstabulation: Paying attention by cycling with others

COMPANY–> ATTENTIV	Count Row Pct	Alone 1.0	With Others 2.0	Row Total
Attentive	**1.0**	405 71.3	163 28.7	**568** **51.4**
Cursory	**2.0**	269 58.6	190 41.4	**459** **41.5**
Daydreaming	**3.0**	13 92.9	1 7.1	**14** **1.3**
Distracted	**4.0**	30 48.4	32 51.6	**62** **5.6**
Not Known	**5.0**	2 100.0		**2** **.2**
Column Total		**719** **65.1**	**386** **34.9**	**1105** **100.0**

Table 20 – Crosstabulation: Paying attention by apparent confidence

CONFIDEN–> ATTENTIV	Count Row Pct	Lack-ing 1.0	A Bit Nerv-ous 2.0	Con-fident 3.0	Blasé 4.0	Show-ing Off 5.0	Not Known 6.0	Row Total
Attentive	**1.0**	2 .4	6 1.1	555 97.7	5 .9			**568** **51.4**
Cursory	**2.0**	4 .9	6 1.3	421 91.7	222 4.8	4 .9	2 .4	**459** **41.5**
Daydreaming	**3.0**			12 85.7	2 14.3			**14** **1.3**
Distracted	**4.0**	1 1.6	1 1.6	43 69.4	7 11.3	10 16.1		**62** **5.6**
Not Known	**5.0**			2 100.0				**2** **.2**
Column Total		**7** **.6**	**13** **1.2**	**1033** **93.5**	**36** **3.3**	**14** **1.3**	**2** **.2**	**1105** **100.0**

Table 21 – Crosstabulation: Paying attention by manoeuvre

MANUVRE–> ATTENTIV	Count Row Pct	1	2	3	4	5	6	7	8	9	Row Total
Attentive	**1.0**	83 14.6	119 21.0	60 10.6	109 19.2	33 5.8	129 22.7	22 3.9	8 1.4	5 0.9	**568** **51.4**
Cursory	**2.0**	133 29.0	101 22.0	56 12.2	54 11.8	30 6.5	62 13.5	11 2.4	4 0.9	8 1.7	**459** **41.5**
Daydreaming	**3.0**	**3** 21.4	3 21.4	2 14.3		2 14.3	2 14.3	1 7.1		1 7.1	**14** **1.3**
Distracted	**4.0**	9 14.5	7 11.3	12 19.4	8 12.9	5 8.1	14 22.6	1 1.6		6 9.7	**62** **5.6**
Not Known	**5.0**		1 50.0				1 50.0				
Column Total		**228** **20.6**	**231** **20.9**	**130** **11.8**	**171** **15.5**	**70** **6.3**	**208** **18.8**	**35** **3.2**	**12** **1.1**	**20** **1.8**	**1105** **100.0**

Table 22 – Crosstabulation: Paying attention by execution of manoeuvre

EXECBAND–> ATTENTIV	Count Row Pct	Presc+A+C 1.00	Other 2.00	Row Total
Attentive	**1.0**	457 80.5	111 19.5	**568** **51.4**
Cursory	**2.0**	251 54.7	208 45.3	**459** **41.5**
Daydreaming	**3.0**	4 28.6	10 71.4	**14** **1.3**
Distracted	**4.0**	12 19.4	50 80.6	**62** **5.6**
Not Known	**5.0**	2 100.0		**2** **.2**
Column Total		**726** **65.7**	**379** **34.3**	**1105** **100.0**

Table 23 – Crosstabulation: Paying attention by road traffic crossing cyclist

CONFOTH–> ATTENTIV	Count Row Pct	N/A	NO	YES	Row Total
Attentive	**1.0**	30 5.3	535 94.2	3 .5	**568** **51.4**
Cursory	**2.0**	119 25.9	334 72.8	6 1.3	**459** **41.5**
Daydreaming	**3.0**	6 42.9	8 57.1		**14** **1.3**
Distracted	**4.0**	30 48.4	31 50.0	1 1.6	**62** **5.6**
Not Known	**5.0**		2 100.0		**2** **.2**
Column Total		**185** **16.7**	**910** **82.4**	**10** **.9**	**1105** **100.0**

Table 24 – Crosstabulation: Paying attention by luggage

LUGGAGE–> ATTENTIV	Count Row Pct	None 1.0	Yes, Safe 2.0	Yes, Unsafe 3.0	Not Known 4.0	Row Total
Attentive	**1.0**	182 32.0	279 49.1	103 18.1	4 .7	**568** **51.4**
Cursory	**2.0**	168 36.6	186 40.5	101 22.0	4 .9	**459** **41.5**
Daydreaming	**3.0**	7 50.0	5 35.7	2 14.3		**14** **1.3**
Distracted	**4.0**	33 53.2	16 25.8	11 17.7	2 3.2	**62** **5.6**
Not Known	**5.0**		2 100.0			**2** **.2**
Column Total		**390** **35.3**	**488** **44.2**	**217** **19.6**	**10** **.9**	**1105** **100.0**

Table 25 – Crosstabulation: Paying attention by hands on handlebars

HANDSON–> ATTENTIV	Count Row Pct	Both 1.0	One 2.0	None 3.0	Not Applicable 4.0	Row Total
Attentive	**1.0**	548 96.5	11 1.9	2 .4	7 1.2	**568** **51.4**
Cursory	**2.0**	398 86.7	36 7.8	16 3.5	9 2.0	**459** **41.5**
Daydreaming	**3.0**	11 78.6	3 21.4			**14** **1.3**
Distracted	**4.0**	49 79.0	7 11.3	2 3.2	4 6.5	**62** **5.6**
Not Known	**5.0**	2 100.0				**2** **.2**
Column Total		**1008** **91.2**	**57** **5.2**	**20** **1.8**	**20** **1.8**	**1105** **100.0**

Table 26 – Crosstabulation: Paying attention by carrying passenger

PASSENGR–> ATTENTIV	Count Row Pct	No 1.0	Yes, Front 2.0	Yes, Rear 3.0	Row Total
Attentive	**1.0**	568 100.0			**568** **51.4**
Cursory	**2.0**	449 97.8	1 .2	9 2.0	**459** **41.5**
Daydreaming	**3.0**	14 100.0			**14** **1.3**
Distracted	**4.0**	56 90.3	1 1.6	5 8.1	**62** **5.6**
Not Known	**5.0**	2 100.0			**2** **.2**
Column Total		**1089** **98.6**	**2** **.2**	**14** **1.3**	**1105** **100.0**

Table 27 – Crosstabulation: Paying attention by stunts

STUNTS–> ATTENTIV	Count Row Pct	Yes 1.0	No 2.0	Row Total
Attentive	**1.0**	1 .2	567 99.8	**568** **51.4**
Cursory	**2.0**	6 1.3	453 98.7	**459** **41.5**
Daydreaming	**3.0**		14 100.0	**14** **1.3**
Distracted	**4.0**	5 8.1	57 91.9	**62** **5.6**
Not Known	**5.0**		2 100.0	**2** **.2**
Column Total		**12** **1.1**	**1093** **98.9**	**1105** **100.0**

Table 28 – Crosstabulation: Paying attention by paperboy/girl

PAPERRND–> ATTENTIV	Count Row Pct	Yes 1.0	No 2.0	Row Total
Attentive	**1.0**	42 7.4	526 92.6	**568** **51.4**
Cursory	**2.0**	33 7.2	426 92.8	**459** **41.5**
Daydreaming	**3.0**	3 21.4	11 78.6	**14** **1.3**
Distracted	**4.0**	2 3.2	60 96.8	**62** **5.6**
Not Known	**5.0**		2 100.0	**2** **.2**
Column Total		**80** **7.2**	**1025** **92.8**	**1105** **100.0**

Table 29 – Crosstabulation: Compliance with rules by road traffic level

ROADTRAF–> OBEYSIGS	Count Row Pct	None 1	Light 2	Mod-erate 3	Busy 4	Very Busy 5	Row Total
Good	**1.0**	24 9.4	157 61.6	34 13.3	33 12.9	7 2.7	**255** **23.1**
Sufficient	**2.0**	16 29.6	31 57.4	6 11.1	1 1.9		**54** **4.9**
Poor	**3.0**		5 71.4	2 28.6			**7** **.6**
Complete Disregard	**4.0**	6 7.1	60 71.4	13 15.5	2 2.4	3 3.6	**84** **7.6**
Not Applicable	**5.0**	93 13.2	450 64.0	113 16.1	45 6.4	2 .3	**703** **63.6**
Not Known	**6.0**		1 50.0	1 50.0			**2** **.2**
Column Total		**139** **12.6**	**704** **63.7**	**169** **15.3**	**81** **7.3**	**12** **1.1**	**1105** **100.0**

Table 30 – Crosstabulation: Apparent confidence by road class

ROADCLAS–> CONFIDEN	Count Row Pct	A Road 1	C Road 2	Row Total
Lacking	**1.0**	6 85.7	1 14.3	**7** **.6**
A Bit Nervous	**2.0**	6 46.2	7 53.8	**13** **1.2**
Confident	**3.0**	457 44.2	576 55.8	**1033** **93.5**
Blasé	**4.0**	15 41.7	21 58.3	**36** **3.3**
Showing Off	**5.0**	6 42.9	8 57.1	**14** **1.3**
Not Known	**6.0**		8 100.0	**2** **.2**
Column Total		**490** **44.3**	**615** **55.7**	**1105** **100.0**

Table 31 – Crosstabulation: Apparent confidence by road traffic level

ROADTRAF–> CONFIDEN	Count Row Pct	None 1	Light 2	Mod-erate 3	Busy 4	Very Busy 5	Row Total
Lacking	**1.0**	1 14.3	4 57.1	1 14.3	1 14.3		**7** **.6**
A Bit Nervous	**2.0**	2 15.4	10 76.9	1 7.7			**13** **1.2**
Confident	**3.0**	128 12.4	652 63.1	166 16.1	75 7.3	12 1.2	**1033** **93.5**
Blasé	**4.0**	4 11.1	27 75.0	1 2.8	4 11.1		**36** **3.3**
Showing Off	**5.0**	4 28.6	9 64.3		1 7.1		**14** **1.3**
Not Known	**6.0**		2 100.0				**2** **.2**
Column Total		**139** **12.6**	**704** **63.7**	**169** **15.3**	**81** **7.3**	**12** **1.1**	**1105** **100.0**

Table 32 – Crosstabulation: Apparent confidence by execution of manoeuvre

EXECBAND–> CONFIDEN	Count Row Pct	Presc+A+C 1.00	Other 2.00	Row Total
Lacking	1.0	4 57.1	3 42.9	7 .6
A Bit Nervous	2.0	4 30.8	9 69.2	13 1.2
Confident	3.0	694 67.2	339 32.8	1033 93.5
Blasé	4.0	21 58.3	15 41.7	36 3.3
Showing Off	5.0	3 21.4	11 78.6	14 1.3
Not Known	6.0		2 100.0	2 .2
Column Total		726 65.7	379 34.3	1105 100.0

Table 33 – Crosstabulation: Apparent confidence by agegroup

AGEGROUP–> CONFIDEN	Count Row Pct	<13 years 1.0	13-16 years 2.0	>16 years 3.0	Not Known 4.0	Row Total
Lacking	1.0		5 71.4	2 28.6		7 .6
A Bit Nervous	2.0	6 46.2	7 53.8			13 1.2
Confident	3.0	74 7.2	790 76.5	162 15.7	7 .7	1033 93.5
Blasé	4.0	3 8.3	29 80.6	4 11.1		36 3.3
Showing Off	5.0		14 100.0			14 1.3
Not Known	6.0		2 100.0			2 .2
Column Total		83 7.5	847 76.7	168 15.2	7 .6	1105 100.0

Table 34 – Crosstabulation: By paperboy/girl

PAPERRND–> GENDER	Count / Row Pct	Yes 1.0	No 2.0	Row Total
Male	1	76 7.7	908 92.3	984 89.0
Female	2	3 2.5	116 97.5	119 10.8
Not Known	3	1 50.0	1 50.0	2 .2
Column Total		80 7.2	1025 92.8	1105 100.0

Table 35 – Crosstabulation: Agegroup by paperboy/girl

PAPERRND–> AGEGROUP	Count / Row Pct	Yes 1.0	No 2.0	Row Total
<13 years	1.0	8 9.6	75 90.4	83 7.5
13-16 years	2.0	69 8.1	778 91.9	847 76.7
>16 years	3.0	2 1.2	166 98.8	168 15.2
Not Known	4.0	1 14.3	6 85.7	7 .6
Column Total		80 7.2	1025 92.8	1105 100.0

Table 36 – Crosstabulation: Riding on pavement by paperboy/girl

PAPERRND–> PAVEMENT	Count / Row Pct	Yes 1.0	No 2.0	Row Total
Yes	1.0	21 7.6	255 92.4	276 25.0
No	2.0	59 7.3	749 92.7	808 73.1
Walking	3.0		21 100.0	21 1.9
Column Total		80 7.2	1025 92.8	1105 100.0

Table 37 – Crosstabulation: Stunts by paperboy/girl

PAPERRND–> STUNTS	Count Row Pct	Yes 1.0	No 2.0	Row Total
Yes	1.0	1 8.3	11 91.7	12 1.1
No	2.0	79 7.2	1014 92.8	1093 98.9
Column Total		80 7.2	1025 92.8	1105 100.0

Table 38 – Crosstabulation: Luggage by paperboy/girl

PAPERRND–> LUGGAGE	Count Row Pct	Yes 1.0	No 2.0	Row Total
None	1.0			390 35.3
Yes, Safe	2.0	29 5.9	459 94.1	488 44.2
Yes, Unsafe	3.0	50 23.0	167 77.0	217 19.6
Not Known	4.0	1 10.0	9 90.0	10 .9
Column Total		80 7.2	635 92.8	1105 100.0

Table 39 – Crosstabulation: Paying attention by paperboy/girl

PAPERRND–> ATTENTIV	Count Row Pct	Yes 1.0	No 2.0	Row Total
Attentive	1.0	42 7.4	526 92.6	568 51.4
Cursory	2.0	33 7.2	426 92.8	459 41.5
Daydreaming	3.0	3 21.4	11 78.6	14 1.3
Distracted	4.0	2 3.2	60 96.8	62 5.6
Not Known	5.0		2 100.0	2 .2
Column Total		80 7.2	1025 92.8	1105 100.0