School of Public Health

Process Evaluation of a Child Pedestrian Injury Prevention Intervention

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Foreword

The Child Pedestrian Injury Prevention Project (CPIPP) was conducted by the Centre for Health Promotion Research at Curtin University. This thesis addresses the process evaluation of this project. The author took a major role in all tasks related to the CPIPP. She took a leading role in all tasks related to the research presented in this thesis, that is, the design, conduct and analysis of teachers' data and the relationship to this data to student outcome data. All tasks described and data analysed for this thesis are the work of the author.

Abstract

The Child Pedestrian Injury Prevention Project (CPIPP) is a rigorous school- and community-based intervention trial delivered to 2,500 children in their second, third and fourth year of schooling in three communities in Perth, Western Australia, from 1995 to 1997. The CPIPP was designed to improve children's pedestrian safety knowledge, their road related behaviors – crossing and playing, and to reduce their risk in, and exposure to, traffic. This thesis addresses the process evaluation of the CPIPP school-based intervention. The Curtin University Human Research Ethics Committee provided ethics approval for this project.

Evaluation of previous school-based pedestrian safety programs has focused mainly on assessing outcomes with little or no process evaluation. An absence of process evaluation increases the likelihood of Type III error, that is, incorrectly attributing null or weak outcomes to a program that has not been adequately implemented.

In each of the three study years, following a teacher training, teachers were asked to implement the school-based intervention. Each year this comprised nine 40-minute pedestrian safety lessons and home activities. Lessons included road crossing practise on real and simulated roads

Data were collected from the student cohort (n=1049) and their Grade 2, 3 and 4 teachers. Four process evaluation instruments were developed and administered in each of the three study years. These included one student instrument (work samples) and three teacher instruments (lesson log, teacher post-implementation questionnaire and classroom observation). Student outcome data including their pedestrian-related knowledge and road crossing and playing behaviours were assessed using a pre- and post-test self report questionnaire.

The majority of teachers (70-97%) and students (72-84%) responded positively to questions about their satisfaction with the CPIPP Grades 2, 3 and 4 curricular. Evidence in student work samples demonstrated that teachers taught 76% (seven of nine lessons) of the Grades 2 and 3 curricular, and 68% (six of the nine lessons) of

the Grade 4 curricular. Teacher self-reported implementation rates using a 'lesson log' were 88%, 81% and 60% respectively for the three curricular. Teachers reported practising road crossing on a real road in 21% (one lesson) of six designated crossing practise lessons in 1996 and 36% (two lessons) in 1997.

Multivariate analyses revealed students' pedestrian safety knowledge was significantly associated with teacher implementation of the classroom curriculum. This relationship was one of dose-response. It demonstrated students who, each year, received at least 7 lessons (81% or more) of the three CPIPP curricular showed a greater improvement in pedestrian safety knowledge than those students who received a lower dose of the curriculum. Significant effects on pedestrian safety knowledge were also observed for students who, each year, practised crossing a real road in at least one lesson (17%) of the curriculum. The relationship between implementation and student road crossing and road playing behaviours was not one of dose-response.

Student work samples, teacher lesson logs and to a lesser extent teacher self-report questionnaires, were found to be valid measures of curriculum implementation. This study also found that implementation of the CPIPP curriculum achieved a modest improvement in student pedestrian safety knowledge and possibly arrested the decline of safe road crossing behaviour. It also demonstrated that classroom pedestrian safety education alone, while necessary, is not sufficient to positively modify children's road crossing behaviours.

The findings of this study demonstrate the importance of measuring teacher implementation. A process evaluation is essential to determine if an intervention has been implemented and to help explain the impact this level of implementation had on program outcomes. However, more research needs to explore the link between other factors in the process of curriculum delivery and program effects. Further research also needs to determine how to develop and measure an intervention that includes the key procedures and content that theoretically promote the desired behaviour, but also allows teachers to make adjustments to the program to suit their teaching style and the needs of their students.

Child pedestrian injury is a complex problem that requires a multifaceted intervention, of which a classroom curriculum can form part.

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Chapter 1

Introduction

Child Pedestrian Injury – A Public Health Issue

The rationale for conducting this study was based on evidence that each year in Australia approximately 50 children (0-14 years) are killed, 700 are hospitalised and a further 2,000 are estimated to receive minor injuries as a result of being hit by a car (Federal Office of Road Safety 1999). Further, Western Australia had the highest rate of pedestrian deaths (1.6/100,000 persons) (Federal Office of Road Safety 1999) compared with children of the same age range (0-14 years) during 1994 in Australia (1.1/100,000 persons) (Federal Office of Road Safety 1999), Sweden (0.8/100,000 persons), the United Kingdom (1.4/100,000 persons) and the United States (1.3/100,000 persons) (Bundesanstalt fur Strassenwesen 1999).

The pedestrian fatality rate for young Western Australians has been high relative to other states and countries for over 10 years. For the period 1985 to 1994, the pedestrian fatality rate for Western Australian children aged 0 to 14 years was 2.0/100,000 persons (Ashwell 1996). In 1997, the disparity between Western Australian and Australian pedestrian fatality rates for 0 to 14 year old children remains almost twofold (W.A.: 1.3/100,000 persons; Australia: 0.7/100,000 persons) (Federal Office of Road Safety 1999).

In Western Australia the greatest proportion of child pedestrian injuries involve 5 to 9 year old children (Ashwell 1996). For the period 1985 to 1994, pedestrian injury was identified as the leading cause of injury-specific death in Western Australian children aged 5 to 9 years (injury rate = 2.2/100,000 persons) (Ashwell 1996). The pedestrian injury hospitalisation rate for 5 to 9 year old children for the same period was 40/100,000 persons (Ashwell 1996).

Children who survive being hit by a car usually sustain severe injuries. In Western Australian hospitals, pedestrian injuries account for approximately 10 percent of all occupied bed days due to paediatric injury admissions. The average length of hospitalisation for 5 to 9 year old children injured as a pedestrian was 30.2 days, four times longer than the average for burns, the next longest length of stay (Sleet 1991). The severity of child pedestrian injuries is further highlighted in a study by Harris et al (1989) who found 75 percent of severely injured child pedestrians were still disabled twelve months after the injury. Additionally, severe head injuries are present in over 80 percent of critically injured child pedestrians (Roberts 1991). The injured children's families are also affected. For example, behavioural problems in uninjured siblings, greater pressures on marital relationships and loss of earnings when a parent has to stop work to care for a disabled child, have been identified as consequences directly related to families of injured children (Harris 1989). The physical, social, emotional and financial costs of pedestrian injury on the injured child, his/her family and the community are extensive.

Pedestrian injuries of lower severity, where children may attend a hospital emergency department or consult a local doctor but do not require hospitalisation, are not reported in injury statistics. Research undertaken in the state of Victoria – Australia, (Ozanne-Smith 1994), reports 63% of child pedestrian injury cases are not admitted to hospital and therefore are not included in hospitalisation data (Ozanne-Smith 1994). While these injuries are of minor or moderate severity they do impact on public health costs. The direct cost to the public health budget of consulting a medical practitioner or attending an emergency department are substantial given that around 2,000 injured children each year use these services. Further, the indirect costs of a parent staying home from work to care for an injured child who does not require hospitalisation also impact on the family and the community.

Pedestrian crashes are estimated to cost $1.0 billion of the $6.1 billion all road trauma costs in Australia each year (Federal Office of Road Safety 1996a). A considerable proportion of this figure is spent on 0 to 14 year old children who comprise 15% of all fatalities and 25% of all hospitalisations in pedestrian crashes (Federal Office of Road Safety 1997; Federal Office of Road Safety 1998).

While there has been a decline in child pedestrian injury rates in Australia and other countries since 1988 due to children spending less time as pedestrians (Roberts 1993; Federal Office of Road Safety 1996b; Carlin 1997), evidence of the increased use of the car as the preferred mode of transport leads to a greater number of vehicles on the road, and therefore, an increased risk to the child pedestrian (Carlin 1997). While the reliance on the motor vehicle continues, child pedestrian injuries will remain a public health concern.

Statement of the Problem

The Global Burden of Disease study (Murray 1996) suggests road traffic injuries could rise from ninth in 1990, to be the third leading cause of death and disability worldwide in 2020. Pedestrian injury will continue to be a major child health problem if efforts are not directed at prevention. While injury control is a public health priority in Australia and other countries (Department of Human Services and Health 1994), there are few published studies describing community-based injury prevention intervention trials that have been rigorously tested. Fewer still, aim to reduce child pedestrian injury.

Community-based injury prevention intervention trials have a greater potential for success if they include multifactorial interventions (Stevenson 1996). Interventions to reduce the incidence and severity of child pedestrian injury can be aimed at modifying the behaviour of the child (eg: reducing exposure to the road; adult accompaniment in the road environment; road crossing skills) and the environment to which the child is exposed (eg: driver behaviour; roads and vehicles) (Gillam 1995; Stevenson 1996). Environmental interventions typically aim to separate pedestrians from vehicles, or modify traffic speed and volume in pedestrians areas. Behavioural interventions usually involve education programs designed to improve road-related knowledge, attitudes and behaviours.

Schools are an ideal setting to deliver road / pedestrian safety education as they have: an established infrastructure to reach children and parents; staff who are trained in providing education; structures and supports (eg: school policy) that can reinforce and service safety messages; and links to community groups and support services (Green 1991; Nutbeam 1993; Shilton 1993; Allensworth 1997; Booth 1997; Colquhoun 1997). While schools are well positioned to deliver road safety education, they appear not to have been involved to their full potential. Previous research has identified inadequacies in current Western Australian school-based road safety education. In a case-control study conducted in 1993 in Perth, Western Australia, only 30% of case children and 40% of control children reported receiving pedestrian skills training in the actual road environment (Stevenson 1995). A study conducted in 1998 found that fewer than 20% of Western Australian teachers were teaching at most two lessons per year from a statewide-disseminated road safety resource. One of the main barriers cited by teachers for their lack of implementation was that only one copy of the resource was sent to each school and limited professional development and other teacher and / or school support was provided (Centre for Health Promotion Research 1998).

Previous pedestrian safety education programs designed to modify child pedestrian behaviour have met with only modest success (Rivara 1990; Gillam 1995; Dowswell 1996; Stevenson 1996). However, drawing conclusions from the findings of these studies is difficult due to many of the programs having significant methodological constraints including: inappropriate sample selection, inadequate intervention strategies, insufficient intervention implementation, inadequate process evaluation, inappropriate impact measures and inadequate statistical analyses (Stevenson 1996).

The prevention of child pedestrian injury requires a multi-faceted approach addressing both the behaviour of children and the road environment (Stevenson 1996). To address this public health issue a school and community-based intervention trial was undertaken. The aim of the Child Pedestrian Injury Prevention Project (CPIPP) was to modify the pedestrian behaviour of a cohort of 6-7 year old children, as well as the environment to which the cohort children were exposed. A three-year school-based pedestrian safety education program was developed to modify the children's pedestrian behaviour and a community coalition was established to modify the speed and volume of vehicles (chiefly driver behaviour) in the children's environment.

This thesis addresses the process evaluation of the CPIPP school-based intervention. This intervention trial was conducted from 1995 to 1997 in Perth, Western Australia. Process evaluation involves observing and assessing the delivery of an intervention. It assesses *"How much of the intervention was provided, to whom, when, and by whom?"* (p14) (Windsor 1994) and how well it was delivered (Green 1991). A process evaluation of an intervention trial such as CPIPP was essential to determine whether the intervention was properly implemented and what factors may have contributed to the intervention's success or failure. A rigorous measurement of dose (level of implementation of the intervention) can also be used to assess the relationship between intervention dose and level of outcomes – or, dose-response relationship (McGraw 1996; Allensworth 1997). A positive dose-response relationship is seen as evidence of construct validity – that is, observed outcomes are attributed to the intervention rather than other influences (Allensworth 1997).

Evaluation of previous school-based pedestrian safety programs has focused mainly on assessing outcomes with little or no evaluation of program implementation. As a result, the degree of program implementation and the relationship between implementation and outcomes are poorly understood. No matter how effective an intervention proves to be, if there is no description of the level of implementation, inferences based on outcome data alone are compromised (Basch 1984).

Aims and Objectives

The aim of this research is to evaluate the extent, quality, and impact of teacher implementation of CPIPP's school-based pedestrian injury prevention program. This intervention was delivered to a cohort of six to seven-year-old children tracked from 1995 to 1997.

The strategy objectives of the study presented in this thesis are to:

- Examine teacher and student satisfaction with the CPIPP intervention.
- Assess the quantity and quality of the CPIPP intervention taught by teachers to their students.
- Determine the validity of each measure of curriculum implementation by examining the association between implementation measures; the association of these measures with student outcomes; and the association of a composite measure of implementation with student outcomes.

Benefits of the Study

This study not only examines satisfaction with, and implementation of, a school-based pedestrian safety education curriculum, it also examines the relationship between measures of curriculum implementation and student outcomes. No published findings of school-based road safety education programs have reported a rigorous process evaluation, much less linked implementation levels to study outcomes. No previous school-based road safety education program has tested and standardised implementation measures. The implementation measures developed in this study were based on process evaluation methods used in previous school-based health education intervention trials (Basch 1985; Perry 1990; Taggart 1990; Parcel 1991; Ross 1991; Resnicow 1992; Rohrbach 1993; Smith 1993; Edmundson 1994; Gingiss 1994; McGraw 1996). However, while these health education interventions were similar in principle to the present study, none examined implementation of a road safety curriculum. For this reason this investigation included an exploratory analysis of the validity of a number of measures suitable for measuring implementation of a school-based road safety curriculum. This study also tests the validity of a greater number of implementation measures than previous school-based health education research. The findings of this study could make a positive contribution to the small number of school-based health education programs on which process data have been used to better understand student outcomes.

Reduced resources and a crowded curriculum in schools drive the need for an understanding of what comprises an effective education program. Process evaluation is an essential part of the assessment of program effectiveness as it can help to explain why a program has achieved success or failure. This study aims to determine if study outcomes can be attributed to a school-based pedestrian safety education intervention, and suggests methods to measure program implementation. Evidence of rigorous evaluation to determine program effectiveness is likely to influence the acceptability of the program by teachers and/or education systems and to support universal dissemination. Rivara (1996) suggests 31% of injury-related fatalities among United States children and adolescents could be prevented if available prevention strategies were implemented universally (Rivara 1996).

No school-based pedestrian safety program has used multiple measures of program implementation to determine if in fact the program was delivered as planned by the program developers. The lack of published material in this field ensures that the work in this thesis is unique.

Definition of Terms

Process evaluation – an evaluation designed to document how an intervention is delivered. A process evaluation includes measuring how many of the program participants received how much of the intervention, who they received it from and when. Assessment of the degree to which the intervention was delivered as described by its planners is important in a process evaluation as is the acceptability of the intervention by participants.

Program implementation – the component of a process evaluation that measures how much of the intervention was delivered (usually described as 'implementation quantity') and the assessment of the degree to which the intervention was delivered according to a written program guide (usually described as 'implementation quality').

Quantity / Completeness – Measurement of implementation completeness is the quantification of the number and duration of intervention sessions or elements conducted. Implementation quantity is synonymous with implementation completeness. Implementation completeness is usually a measure of the proportion of the intervention delivered.

Quality / Fidelity – Measurement of implementation quality is a practitioner's 'fidelity', or degree to which he/she delivers an intervention according to the methods and protocols described by developers of the intervention. Implementation fidelity is usually measured on a subset of lessons.

Dose – degree of exposure to an intervention.

Dose-response relationship – borrowed from drug trials, this term describes increases in a specified outcome measure (response) associated with increases in the amount of exposure to an intervention (dose).

Construct validity – involves a theoretical comparison of two phenomena that are closely related, but not the same. Construct validity is investigated to assess instrument validity when there is no criterion or gold standard measure. It is the extent to which a measure relates to other measures that is consistent with theoretically derived hypotheses concerning the concepts (or constructs) that are being measured.

Research Hypotheses

The research hypotheses for this study are generated from the third objective of the study, namely to:

> determine the validity of each measure of curriculum implementation by examining the association between implementation measures; the association of these measures with student outcomes; and the association of a composite measure of implementation with student outcomes.

The research hypotheses for this study are:

H_0 - There is no significant association between the change in pedestrian safety knowledge from baseline to post-test of students and the intervention dose.

H_1 - There is a significant association between the change in pedestrian safety knowledge from baseline to post-test of students and the intervention dose.

H_0 - There is no significant association between the change in self-reported road crossing behaviour from baseline to post-test of students and the intervention dose.

H_1 - There is a significant association between the change in self-reported road crossing behaviour from baseline to post-test of students and the intervention dose.

H_0 - There is no significant association between the change in self-reported road playing behaviour from baseline to post-test of students and the intervention dose.

H_1 - There is a significant association between the change in self-reported road playing behaviour from baseline to post-test of students and the intervention dose.

Chapter 2

Literature Review

The literature review considers:

- school-based pedestrian safety education programs – an examination of evaluation procedures included in previous school-based pedestrian safety programs, particularly the presence of process evaluation measures;
- process evaluation procedures used in school-based health education research; and
- the theoretical framework for a process evaluation.

School-based pedestrian safety education programs

A search of the literature found few rigorous research studies of school-based pedestrian safety education programs. Of the studies found, Roberts (1995) suggests it is no surprise few have shown improvements in children's traffic knowledge, improvements in road crossing behaviour and reductions in injury rates. This may be due to the complexity of the traffic environment outweighing the cognitive, physical and developmental abilities of young children (Roberts 1995; Stevenson 1996). A major factor in children's vulnerability in the road environment is their lack of skill crossing the road. Other factors identified in the literature that influence the vulnerability of children as road users include their age, exposure to the road environment, socioeconomic factors and their gender (Stevenson 1995).

Risk associated with children's pedestrian injury

Developmental limitations of child pedestrians

Behavioural, physical, sensory and cognitive abilities of children develop continually through childhood. The development of these abilities impacts on a child's cognitive ability to judge complex traffic situations (Schieber 1996) and to successfully complete the complex task of road crossing. The road-crossing task requires accurate figure-to-ground discrimination, distance depth and vehicle size and velocity judgment, as well as personal perception of how long it will take to cross safely (Stevenson 1996). Piaget's child development theory suggests young children are unable to appreciate the interrelationships between these concepts until they are about 10 years of age. Up to age 10 children are only able to focus on one salient variable at a time. (Demetre 1992)

Research in Sweden conducted over a 12 year period examined the effect of developmental limitations on children attempting to cross a road (Sandels 1975). This research found children typically interpret situations from their own point of view. For example, they presume that if they can see a car, then the car can see them.

Visual limitations identified by Sandels (1975) found that because children had difficulty judging speed and distance they often assumed that cars could stop instantly. The developmental limitations of children's vision also affect their ability to change their focus from near to far. They also have peripheral vision one third narrower than an adult. Further, their visual perception is such that they see a car travelling towards them as becoming larger in shape but can not judge if it is moving quickly or slowly.

Due to their developing hearing sense children also have difficulty discriminating the direction from where sounds are coming, particularly in a noisy environment. Physically, children are shorter in stature reducing their field of vision and making them more difficult to be seen by drivers. Children also have a shorter attention span and often have a poor sense of danger, further impacting on their ability to make safer judgements in the road environment. (Sandels 1975)

Age

The highest rate of child pedestrian injury occurs in children aged five to nine years (Stevenson 1992; Ashwell 1996; Federal Office of Road Safety 1996b). Children under five years have a reduced exposure to road injury compared to older children. With the commencement of schooling at approximately five years of age children engage in more pedestrian activity, often without an adult, increasing their exposure to road injury. Parents often see attending school as a rite of passage for children to become pedestrians and are unaware of the developmental limitations of children to cross roads safely. As children get older they become more familiar with the skills required to cross a road, reducing their risk of pedestrian injury (Rivara 1990; Federal Office of Road Safety 1996b).

Gender

More boys than girls aged five to nine years are injured as pedestrians (Rivara 1990; Stevenson 1992; Ashwell 1996). Researchers suggest this gender disparity is not due to boys having a greater exposure to road injury but to differences in the road crossing behaviour of girls and boys (Routledge 1974).

Socioeconomic background

Children living in areas of lower socioeconomic status (SES) are at greater risk of pedestrian injury (Rivara 1990; Roberts 1995; Stevenson 1995). Stevenson et al (1995) found the local road environment in areas of lower SES were more hazardous. This study found that in these areas a greater proportion of cars exceeded the speed limit. Another explanation for socioeconomic differences is that children from low-income families are more likely to walk to school or other locations (Roberts 1996).

Pedestrian safety education for children

While it is accepted that children have limited perceptual, cognitive and motor skills to cross a road especially in complex traffic situations (Sandels 1975; Schieber 1996), children are exposed to the road environment and require road crossing training to improve their ability to safely use roads (Cambon de Lavalette 1988; Thomson 1992). Schools are an ideal setting to deliver road crossing training as they have: an established infrastructure to reach the majority of children and parents; staff who are trained in providing education; structures and supports (eg: school policy) that can reinforce and service safety messages; and links to community groups and support services (Green 1991; Nutbeam 1993; Shilton 1993; Allensworth 1997; Booth 1997; Colquhoun 1997).

Whereas most schools have access to statewide pedestrian safety education materials, there are few examples of school-based pedestrian safety education empirical intervention trials reported in the literature. This can, in part, be explained by the difficulty and cost of measuring observed road crossing behavioural outcomes for young children (Grayson 1982; Gillam 1995) as well as the low priority given to evaluation by many health promotion professionals and their possible lack of expertise in this area (Hawe 1990). However, if pedestrian safety education programs are not evaluated there remains a lack of evidence to support their inclusion in the school curriculum.

A number of British studies have demonstrated improved road crossing behaviour in child pedestrians receiving interventions (Young 1987; Ampofo-Boateng 1991; Demetre 1992; Thomson 1992; Ampofo-Boateng 1993; Demetre and Thompson 1993). Each of these interventions comprised a single skill (eg: visual timing skills) program that was delivered over six training sessions. These sessions were undertaken with between 15 and 30 (varying with each study) five year-old children, and 60 five to 11 year old children. The children were individually trained on both simulated and real road environments. These studies provide valuable information on individual strategies and skills for a child pedestrian safety-training program. However, they each addressed only one component of the complex road-crossing process. This process involves making a decision on when, how and where to cross a road. Visual timing skills (Young 1987), finding safe places to cross, special strategies for dangerous situations and the road crossing task (Ampofo-Boateng 1991; Ampofo-Boateng 1993) all need to be addressed in one comprehensive pedestrian safety education program. Further, strategies that target the road environment to which the child is exposed should be included.

In place of direct observation in the traffic environment, these studies have used a simulated road, adjacent to a real road, to observe a subject's performance of target behaviours. Observed behaviour in these conditions and the fact that subjects were aware of being tested suggest the observed behaviour may not be representative of unobserved or actual behaviour in the traffic environment (Rothengatter 1981). However, it is neither possible nor ethical to observe large numbers of children in the road environment unassisted by an adult, because of the risk of injury to subjects (Gillam 1995). The questionable validity of observations of pedestrian behaviour conducted under test conditions on a simulated road and small sample sizes are major limitations of these studies.

Other studies have relied on self-administered questionnaires to measure the effectiveness of road safety education programs. Self-report methods are subject to social desirability bias and due to the cognitive limitations of the young respondents, tend to be unreliable. These techniques have been used in the evaluation of 'traffic clubs'. 'Traffic clubs' originated in Scandinavia and are popular in Britain (West 1993). They are system-wide road and/or pedestrian safety education programs where participation is voluntary. The program is delivered by teachers (Antaki 1986) and / or parents (West 1993; Gregersen 1994) to 3-4 year olds (West 1993) and 5-6 year olds (Antaki 1986; Gregersen 1994). The education materials include road safety related stories, songs and colouring sheets which are usually sent home to children and parents.

'Traffic clubs' have produced mixed results. The British 'Tufty Traffic Club' was assessed by testing the road safety knowledge of 185 five-year old children. Both Tufty and non-Tufty club children showed improvement in knowledge of correct pedestrian behaviour from pre to post intervention in their first year of schooling (Antaki 1986). The authors report the extent of use of Tufty club material varied between schools with some children in Tufty club schools not participating in club activities (Antaki 1986). The lack of rigorous or objective measurement of implementation of the intervention makes it difficult to attribute findings to the intervention. This study's findings are further limited by the lack of behavioural outcomes.

A more recent assessment of British 'traffic clubs' revealed improvements in some aspects of child/parent pedestrian related knowledge and behaviour, but for many target skills there were small or no differences between control and intervention groups (West 1993). Independent samples of experimental (pre-test, n=459; post-test, n=799) and control (pre-test, n=573; post-test, n=802) group parents and children were interviewed prior to the start of a major traffic club scheme and one year later.

Significant findings in this study include children running ahead of their parents less often in the 'traffic club' group compared with the control group children and more 'traffic club parents' attempting to teach their children about road safety than control group parents (West 1993). Reported strategies to maximise implementation included a personal letter of invitation; quality, free materials; and regular mail out of booklets. Process evaluation from the post-intervention parent interview included self-reported use of, and satisfaction with traffic club materials. Traffic club materials were favourably received and 53% of parents in the experimental group indicated they had used all or most of the first book. However, possible limitations of self-reported process measures include over-reporting due to social desirability bias and the self selection of parents who respond (Green 1991). The major limitations of this study were that outcomes were based on parent report in an interview of their child's pedestrian behaviour and this outcome measure was not linked to implementation data in dose-response analyses.

Rothengatter (1984) conducted a clinical trial to examine the effect of a traffic education program where parents or teachers trained four to six year old children in the road environment (Rothengatter 1984). While improved road crossing skills were found in both the treatment (n=93) and control groups (n=129), the improvement was greater in the treatment group. Improvements were shown for crossing situations in which the children had been trained (quiet streets, near parked cars for all children and also at junctions for five to six year old children). However, improvements were only significantly greater in the treatment group compared to the control group for observed crossing near parked cars, by children under five. A high level of performance in the test before treatment limited the possible improvement due to a ceiling effect for road crossing skills and traffic knowledge. While program outcomes were based on observed road crossing, the children were aware of being tested introducing the possibility of a "testing effect", therefore measuring their knowledge and cognitive ability to cross a road rather than their normal road crossing behaviour and hence influencing the validity of the measure (Rothengatter 1981). Other limitations of this study include no report of the proportion of the program parents or teachers delivered, lack of baseline equivalence between treatment and control groups and an absence of information on differences between study subjects and subjects lost to follow-up.

A Dutch study used video observations of the road crossing behaviour of 63, four to six year old children and their parents before and after a pedestrian safety training program delivered to children by their parents and teachers (Van der Molen 1983). While the study did not have a control group, the researchers report improved parent modeling and verbal instruction when crossing was observed. The children displayed the trained behaviours more frequently after the program however, they did not complete the behaviours to an acceptable standard. Additionally, not all trained behaviours were evident in the observation. The study reports 50% of parents and 70% of children observed were involved in the training program. For those who did participate in the training program there is no report of how much of the program they received nor their satisfaction with the program.

Rivara et al (1991) observed improved road crossing behaviour in a real road environment, after children (n=229) in kindergarten to Grade four received a pedestrian skills training program from a specialised pedestrian safety teacher and parent-child activity books (Rivara 1991). Program effects were assessed by conducting an analysis on matched pairs in which observations of children pre-intervention were compared with observations on the same children post-intervention. No detail on how much of the program was delivered to the children by the teacher or parents was reported, hence, student outcomes in this study were not related to program implementation. Further concerns with this study's evaluation methodology include the absence of a control group, possible selection bias due to voluntary recruitment and non-assessment of selective attrition in the group who were lost to follow-up.

In summary, the evaluation of child pedestrian safety education programs have been too few and where they have occurred they are inadequate. Few evaluated programs used randomised trials, many have lacked control groups and / or recruited small samples making it difficult to draw conclusions about program effectiveness. To date, no national or international child pedestrian safety education program has reported conducting a rigorous process evaluation. Outcome measures used in existing studies are limited by their narrow focus on separate components of the road-crossing task (eg: finding safe places to cross) and their use of observational data under test conditions or self-reported behaviours. Better information on the process of school-based pedestrian safety and road safety education programs is required so that strategies that prove to be successful can be replicated elsewhere (Dowswell 1996; Rivara 1996).

To better inform the process evaluation of a school-based pedestrian safety education program, school-based health education programs addressing other health issues that conducted a process evaluation were examined.

Evaluation of school-based health education programs

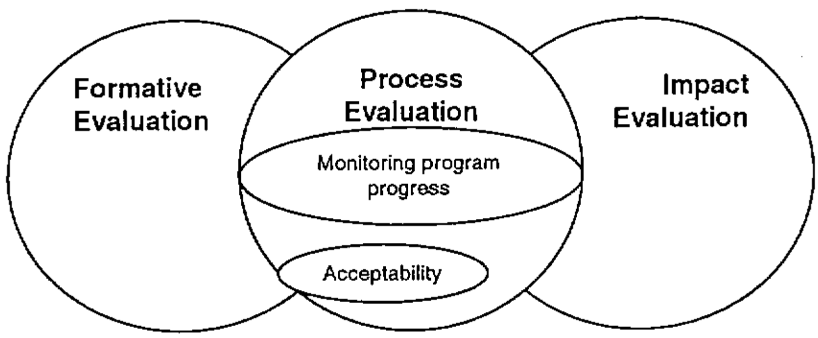
This section will review definitions of and a brief rationale for process evaluation as well as process evaluation procedures and findings of empirical school-based health education evaluations. No established theoretical framework showing how to conduct a process evaluation of school-based health education programs was found, most likely due to the paucity of research in this area.

Why conduct process evaluation?

Process evaluation is a critical component of a strong evaluation design (Rossi 1993). Green and Kreuter (1991) suggest " ... *process evaluation is a clear, descriptive picture of the quality of the program elements being put in place and what is going on as the program proceeds*" (p230) (Green 1991). Broadly defined, process evaluation assesses all procedures to which program participants are exposed (Windsor 1994).

Process evaluation links to and overlaps with both formative evaluation, where a program is devised and developed, and monitors the progress of a program leading up to impact evaluation, where program effects are examined (Windsor 1994). Figure 1 demonstrates the relationship between formative, process and impact evaluation. Assessing acceptability (eg: what program implementers liked or disliked about the program) and use of a program are process measures that can be considered part of the formative evaluation if they guide appropriate adjustments to the program (Basch 1985). Data on program acceptability and implementation can reveal program elements that can be strengthened, eliminated or retained (Hawe 1990). Information about program implementation collected in a process evaluation can monitor the progress toward the program goals assessed in outcome evaluation.

Figure 1: Relationship between types of evaluation



Process evaluation measures whether the intervention was properly implemented and what factors may have contributed to the intervention's success or failure (Rossi 1993; Dignan 1994; Windsor 1994; Glanz 1996; Allensworth 1997). A rigorous measurement of dose (level of implementation of the intervention) can also be used to assess the relationship between intervention dose and level of outcomes – or, dose-response relationship (McGraw 1996; Allensworth 1997). A positive dose-response relationship is seen as evidence of the internal validity of the study – that is, observed outcomes are attributed to the intervention rather than other influences (Windsor 1994; Allensworth 1997). Process evaluation data have been linked with study outcomes in dose-response analyses in a number of empirical trials of school-based health education programs (Basch 1985; Connell 1985; Resnicow 1992; McGraw 1996; Resnicow 1998).

Basch et al (1985) suggest failure to assess implementation of an intervention can lead to a Type III error where weak or null results are attributed to intervention failure, whereas the intervention has not in fact been implemented as intended by the program planners (Basch 1985). Inadequate implementation is a possible factor in inconsistent results of school-based health education programs (Basch 1985; Green

1991; Resnicow 1993; Resnicow 1998) highlighting the need for not only rigorous process evaluation but also strategies to maximise implementation.

Process evaluation can also provide accountability to funding agencies and guide decisions about the possible dissemination of programs (Basch 1985). Whilst not examined in this study, a process evaluation of a school-based health education program might also seek to identify characteristics that tend to differentiate teachers who faithfully employ the recommended methods from those who do not and why (Green 1991).

Process evaluation is a cheaper evaluation method than impact evaluation. Therefore, process evaluation can offer a surrogate guide to program effectiveness, especially if the program has previously demonstrated positive effects on impact measures.

What should a process evaluation assess?

The literature suggests the process evaluation of an intervention may include an assessment of:

- program reach – the proportion of program components received by participants and the proportion of the program implemented as planned;
- participant satisfaction with, or acceptability of, the program;
- quality of program materials and components; and
- external or competing events occurring in the intervention or comparison sites.

(Hawe 1990; Rossi 1993; Windsor 1994)

Process evaluation can include consideration of program inputs (resources – funds, personnel etc); implementation activities (staff performance, data collection, organisational activity, media distributed); and stakeholder reactions (level of participation among target group) (Green 1991). Collection of such process data is appropriate only if the measures are linked to the concepts of the intervention (Basch 1985; Hawe 1990; Green 1991; Windsor 1994). For example, the key concept of a pedestrian safety education program is training children to cross roads safely. If classroom teachers conduct this training then how teachers deliver the program and how this training impacts on children's road crossing skills will direct the process evaluation of the program.

As described previously, an important component of a process evaluation is assessment of the program implementation. This component is the focus of implementation research in the school-based health education literature.

Measuring program implementation

Green and Kreuter (1991) suggest four steps to assess program implementation. Firstly, researchers need to determine the critical program characteristics to be measured. Secondly, an assessment should be made of who implemented these critical characteristics, how and when they were implemented and the extent to which they matched what the program planners intended. Thirdly, researchers need suitable methods for gathering this information – observation, self-report or archival records. Finally, when and from whom the researcher will collect the data should be determined. (Green 1991) These steps offer an appropriate and practical guide to plan the measurement of implementation of a pedestrian safety education program.

Constructs of implementation

The research describes two constructs in the measurement of implementation of a classroom curriculum: 1) the **quantity** of the curriculum implemented, and 2) the **quality** of implementation of the curriculum. The two constructs are closely related and probably overlap (Resnicow 1998).

The quantity of implementation, sometimes referred to as completeness or dose (Smith 1993; Basen-Engquist 1994; Edmundson 1994; McGraw 1994), describes how much of the classroom curriculum was taught. Implementation quantity measures may include assessment of the amount of classroom instruction time (hours and minutes) spent teaching the curriculum (Basch 1985; Connell 1985; Ross 1991; McGraw 1994). The most commonly used measure of quantity is the proportion of activities or lessons completed of the total required by the program (Connell 1985;

Nelson 1988; Ross 1991; Rohrbach 1993; Smith 1993; Basen-Engquist 1994; Edmundson 1994; McCormick 1995; McGraw 1996; Resnicow 1998).

The quality of implementation describes program fidelity, or the degree to which teachers deliver program components as intended by the program planners (Basch 1985; Connell 1985; Nelson 1988; Ross 1991; Rohrbach 1993; Edmundson 1994; McGraw 1994). Measures of implementation quality examine whether protocols and methods described in the intervention are followed.

A group of standard evaluation methods have been identified in the school-based health education research that could be used to measure the quantity and quality of implementation of a pedestrian safety education program.

Quantity of implementation measures

Assessment of implementation quantity or how much of the curriculum was taught is most frequently collected by self-report methods (Ross 1991; Edmundson 1994) (Taggart 1990; Smith 1993; Basen-Engquist 1994; Resnicow 1998). Self-report measures of implementation quantity include program checklists or lesson logs on which the teachers indicate the activities completed during each program lesson (Brink 1991; Resnicow 1992; Smith 1992; Steckler 1992; Basen-Engquist 1994; Edmundson 1994; Resnicow 1998). Rossi and Freeman (1993) suggest implementation information should be collected throughout the program rather that only at the end (Rossi 1993). Post-implementation interviews with teachers can also be used to obtain self-report information about curriculum implementation (Resnicow 1998). Typically, during the interview, the teacher is asked to rate how much of each classroom activity (prompted by manuals or program materials) was completed within each program lesson.

Green and Kreuter (1991) highlight the need for a commitment to gathering objective evidence of implementation to raise the rigour of process evaluation (Green 1991). More objective measures of collecting information on implementation quantity include student report of teacher implementation of the curriculum, examination of evidence of the intervention use in student work books (Resnicow 1992) and parent report of activities sent home.

Without measures of the quantity of program implementation researchers may assume 100% implementation of an intervention and consequently when a program reports null results it may be a spurious finding, that is, Type III error. It is essential to know the degree to which an intervention has been implemented to determine its effectiveness. No matter how effective an intervention proves to be, if there is no description of the level of implementation, inferences based on outcome data alone are compromised (Basch 1984).

Quality of implementation measures

An assessment of program implementation that describes the proportion of the program taught but not as described by the program planners, may be of little value to test the effectiveness or impact of the program on the target behaviours of the curriculum. For example, classroom observations of teacher delivery of nutrition curricula for 4th and 5th grade students, identified the lowest proportion of activities taught by teachers were those most theoretically pertinent to behaviour change e.g. asking skills (Davis 1999). However, even if the activities are taught, they may not be taught as intended by planners, e.g: poor role-play teaching practise or incorrect road-crossing behaviour modeling by the teacher.

Assessment of the quality of implementation, or how well a program has been taught, is commonly assessed in self-reported questionnaires and classroom observations. Self-reported questionnaires typically ask the teacher to rate how closely the curriculum guide was followed within each lesson (Basch 1985; Pentz 1990; Perry 1990; Ross 1991; Edmundson 1994). Classroom observations can use trained observers to observe single or selected lessons, on either announced or unannounced visits to the classroom (Perry 1990; Taggart 1990; McKenzie 1993; Rohrbach 1993; Edmundson 1994; Resnicow 1998). Observers use standardised forms on which they rate whether teachers implement procedures contained in the observed lesson. Procedures include key student and teacher behaviours for which raters have yes/no or scaled rating options (Perry 1990; Taggart 1990; Rohrbach 1993; Edmundson 1994; Resnicow 1998). A summary score for the observed lesson can be calculated from ratings of each item on the schedule.

Alternatively, observation in study classrooms may assess teacher compliance to program objectives rather than the fidelity of implementing specific activities (Basch 1984). Basch (1984) suggests the dynamic nature of the implementation process may not be captured if implementation is restricted to well defined activities alone. The assessment of program objectives in classroom observation to determine the quality of implementation would be appropriate for a pedestrian safety education program as there are key behavioural objectives, eg: modelling correct road crossing procedure, that must be observed and rehearsed correctly if the behaviour is to be adopted by students.

Program resources (human and financial), testing effects, Hawthorne effect and the reluctance of teachers to be observed prevent the collection of observational data throughout an intervention's implementation. Selection strategies evident in the research include a random selection of teachers and/or sessions to be observed and observation of all teachers in one or more lessons (Basch 1985; Perry 1990; Taggart 1990; Rohrbach 1993; Edmundson 1994; Resnicow 1998). Teachers are asked to inform research staff of the days they would be teaching each session and these schedules are incorporated into the random selection or scheduling scheme. However, logistical reasons including teacher and research staff willingness and availability may override random selection (Resnicow 1989; Edmundson 1994).

Whether the observation of the session is announced in advance or unannounced, changes in teacher behaviour because he/she is being observed, is possible. The teacher may teach the lesson solely because he/she is being observed, or teach it differently, leading to the possibility of testing effects (Resnicow 1998).

Smith et al (Smith 1993) suggest it is difficult to quantitatively measure how well a teacher actually implements a curriculum. From classroom observations Smith et al found teachers adapted the curricula to their own teaching style. However, the study does not report if the modifications made by the teacher enhanced, or made little difference, to achieving the objectives of the curriculum.

Composite measure of the quantity and quality of implementation

Several studies have used a composite measure of implementation combining measures of quantity (completeness), quality (fidelity) and in some studies program acceptability (Connell 1985; Taggart 1990; Ross 1991). The composite implementation score typically combines a measure of quality, where classroom lessons have been observed for fidelity, a measure of quantity and acceptability, both derived from teacher self report.

Because quality and quantity measures of implementation assess different (although in some cases overlapping) aspects of an intervention, both constructs should be included in process evaluations. The overlap in implementation constructs occurs when a lesson or activity is considered completed (quantity) only if it was delivered as developers intended (quality). Further, if a program is not acceptable to teachers they are unlikely to implement. Therefore, while the program may have been completed, it may not have been completed as developers had planned. This highlights the advantage of using a composite measure that includes implementation quantity, implementation quality and teacher acceptability of the program. However, there is no evidence in the literature of a 'weighting' being assigned to aspects of implementation quantity, implementation quality of program acceptability. There remains therefore, an uncertainty as to whether each of these aspects equally contribute to program implementation.

Teacher / student interaction

Classroom observation of teacher behaviour and interaction with students has been used to measure the teacher-student interaction occurring in a classroom (Rohrbach 1993; Resnicow 1998). Rohrbach et al (1993) developed a program integrity index for each observed teacher by combining observational information about teacher control of the class, teacher enthusiasm, class enthusiasm and appropriateness of the delivery fidelity (Rohrbach 1993). These behaviours are generic dimensions rather than curriculum specific. Thirty-six of the 60 program teachers were observed teaching two or three lessons. Students in classrooms of 'high integrity score' teachers (high and low integrity scores were based on a median split of index scores) showed significantly greater program specific knowledge, resistance skills and program acceptability.

Resnicow et al (1998) observed teacher / student interaction and developed a 'rapport' score (Resnicow 1998). Trained observers rated teachers on items including teacher ability to: engage students in activities and discussion; enthusiastically provide social rewards to students; and evoke receptive responses from students to the lesson. Of the 37 teachers in the study, 16 were observed once and 21 were observed twice. The 'rapport' score of teachers who were observed twice was found to be significantly associated with improved student health knowledge scores. But this association was not evident for the 'rapport' score of teachers who were observed once. Hence the 'rapport' observed (in teachers observed twice) may have been a testing effect that lead to teachers teaching more of the program and/or teaching the lessons with greater quality.

Validity of implementation measures

Several school-based health education studies have validated the implementation measures included in process evaluation beyond face and content validity. Implementation measures may also be assessed for criterion validity and construct validity.

Criterion validity assesses the association between two measures of the same characteristic or phenomenon – in this case implementation. Concurrent criterion validity may be assessed by using two instruments at the same time, where one of the measures is usually a "gold standard" measure (Carmines 1979; Windsor 1994). Observed correlations of the two measures are examined. Predictive criterion validity uses a measure to predict the "gold standard" measure administered at a future time (Windsor 1994). For example, does a teacher's intention to teach an intervention predict the actual measured teaching of the intervention (gold standard).

Criterion validity of implementation measures has been examined in two major school-based health education empirical trials. A three-year evaluation of the "Know Your Body" heart disease risk factor prevention program was conducted to measure the impact of the program on a cohort of grade one through six, New York City students (treatment group, n=839; control group, n=370). Resnicow et al (1992) compared three, subjective completeness of curriculum implementation measures, with a "gold standard" objective measure. The subjective measures included 1) the teachers' self-report of how many program activities were completed and how many minutes per week spent teaching the program, 2) the head teachers' rating, and 3) project coordinator's rating of a teacher as a "high", "medium" or "low" implementer of the curriculum. Approximately four student work books from each teacher's class were collected and completed activities tabulated to determine a "gold standard" measure of curriculum implementation. The Spearman rank correlation between teacher rating by the project coordinator and the rating based on completed work book pages was higher (r = 0.68) than rating by the head teacher (r = 0.49) and the teacher self-report ratings (r = 0.56) (Resnicow 1992).

Basch et al (1995) validated teacher self-report of fidelity of implementation by observing implementation in a randomly selected sample of classrooms. Five fifth grade teachers of a health education curriculum were asked to report in a self-administered questionnaire whether each of the 282 curriculum activities (each health education lesson comprised a number of pre-determined activities) listed in the fifth grade unit were implemented as planned, modified, or omitted. Concurrent criterion validity of this self-reported measure was estimated by an observer's rating of which activities were completed on two randomly selected days for each teacher. On average, agreement between the teachers' self-report and the observed implementation was 81.5%, ranging from 25% to 100% (Basch 1985).

In contrast to criterion validity, construct validity assesses hypothesised association between two measures or outcomes that are closely related but not the same (Carmines 1979; Windsor 1994). If an instrument demonstrates the hypothesised associations, it is said to have high construct validity, or the capacity to define and measure an important construct (Windsor 1994). Construct validation tests theoretical relationships among underlying concepts against the hypothesised relationships and then revises the measures accordingly.

Green and Lewis (1986) define construct validity as:

" ... *the extent to which the hypothesised theoretical relationships between the concepts and their measures are verified or not verified on the basis of obtained data. As a process, construct validation is an ongoing effort in which relationships between concepts are tested and revised on the basis of repeated studies.*" (p 115) (Green 1986).

Green and Lewis (1986) suggest any attempt to specify *a priori* the nature of a relationship is to engage in construct validation. Empirical testing and reexamination must also follow (Green 1986). Multiple measures, taken together, provide a more comprehensive profile of the construct validity of an instrument (Carmines 1979; Green 1986). Further, the construct validity of a phenomenon involves multiple studies, over many situations, with many populations. This makes it an accessible but complex process.

Carmines and Zeller (1979) suggest construct validation involves three distinct steps: 1) specify the theoretical relationships between the concepts; 2) examine the empirical relationship between the measures of the concepts (usually correlation coefficients); and 3) interpret the empirical evidence of how this evidence clarifies the construct validity of the measure. Construct validation is informed initially by theory and once tested, construct validation informs theory.

The construct validation process firstly defines the construct (eg: implementation) and then hypothesises that an instrument measures the construct. Reflection of the empirical results also includes the theory base – asking the question what could account for the observed behaviour and is the explanation consistent with the *a priori* hypothesised relationship or the relationship originally identified. Empirical examination should begin again based on a reflection of the result of the initial empirical results, for example further correlational studies. Construct validation is based on the total network of constructs, their indicators and the hypothesised interrelationships.

Litwin (1995) (Litwin 1995) describes construct validity as the most difficult method of assessing a survey instrument, which is often only determined after years of experience with the instrument, yet it provides the most valuable and practical assessment of an instrument for researchers, particularly in the social sciences.

Several school-based health education studies have examined the construct validity of implementation measures. These studies have shown that quantity and quality of implementation are associated with student outcomes (Basch 1985; Connell 1985; Taggart 1990; Wojtowicz 1990; Parcel 1991; Resnicow 1992; Rohrbach 1993; McGraw 1996; Resnicow 1998). Two of these studies (Taggart 1990; Resnicow 1992) found associations between implementation and physiological outcomes, the others found associations for knowledge and / or attitude outcomes.

Taggart et al's (1990) process evaluation of the "Know Your Body" Project examined implementation of the KYB curriculum by 82 teachers in 13 schools. A composite implementation score combined a 1-5 quality of implementation score, determined by classroom observation, with a 0-3 quantity of implementation score, from self-reported information. This composite implementation score ranged from one, reflecting an ineffective teacher, to eight reflecting an excellent teacher who completed the entire curriculum (Taggart 1990). An effective teacher score of six or better was significantly associated with improved student cardiovascular heart disease risk factor scores on physiological outcomes (eg: blood pressure, cholesterol). Evidence of this dose-response relationship highlights the importance of measuring implementation and linking implementation to impact measures.

Resnicow et al (1992) used a project coordinator's rating of 'high', 'medium' and 'low' implementation of the 'Know Your Body' comprehensive school health education program (Resnicow 1992). As mentioned previously, this rating was validated against a gold standard measure of implementation observed in student activity books. Students who received 'high' program exposure (12% of the three-year student cohort) had significantly greater, positive program effects for total cholesterol. Few positive program effects were observed among low and moderate exposure students.(Resnicow 1992)

McGraw et al (1996) reported the relationship between curriculum implementation and student outcomes in the CATCH (Child and Adolescent Trial for Cardiovascular Health). The curriculum was one part of a multi-component intervention aiming to reduce cardiovascular disease risk factors in elementary school children. The analyses involved a cohort of 1071 children tracked through 3rd, 4th and 5th grade. Classroom curriculum implementation measures included classroom observation and a teacher self-report of classroom activities completed. Although the study reports a high correlation between teacher's self report and observational measures, dose-response analyses only included classroom observation. The study found the percentage of observed modifications to classroom sessions was associated with changes in student reported dietary self-efficacy and dietary knowledge. This indicates teacher modification of the sessions had a beneficial effect on outcomes.

Resnicow et al (1998) examined the construct validity of implementation measures for a school-based nutrition curriculum taught by a total of 40 4th and 5th grade teachers. Teachers reported implementation quantity or completeness in a lesson log and a post-implementation interview. Neither of these measures was set as a 'gold standard' and a correlation of 0.66 was found between these two, self-report measures. Quality of implementation was measured during classroom observation to determine an observed fidelity score and observed teacher rapport (with students) score. A correlation of 0.56 was found between these two quality of implementation scores. The correlation between quantity measures and observed fidelity were higher for the post-implementation interview (r=0.33) than for the lesson log (r=0.23) (Resnicow 1998). The post-implementation interview may be a more valid measure of completeness of implementation than lesson log. However, interviews cost more to administer than lesson logs. Resnicow et al (1998) notes it is unclear whether such a small gain in validity justifies the additional costs (Resnicow 1998). As described previously, the 'rapport' score of teachers who were observed twice was found to be significantly associated with improved student health knowledge scores. But this association was not evident for the 'rapport' score of teachers who were observed once. Observed fidelity scores of teachers observed twice and post-program interview completeness were also significantly associated with student health knowledge scores. Teacher implementation was not found to be associated with students' fruit and vegetable intake and asking behaviours (Resnicow 1998).

Connell et al (1985) developed a composite measure that defined 'full implementation' as: the total number of hours equal to, or greater than, a minimum prescribed; more than 80% of the activities taught; and greater than average degree of fidelity to program materials (Connell 1985). Summarising implementation in this manner allowed the researchers to demonstrate observed differences in student outcomes between classrooms where the program was 'fully implemented' and comparison classrooms (no implementation) as well as all program classrooms (less than fully implemented) and comparison classrooms. The program was a classroom-based, general health education curriculum for grades four to seven. The implementation evaluation comprised 688 program classrooms and 383 comparison classrooms. In classrooms where the program was 'fully implemented' program effects were 5% greater for program-specific knowledge, 20% greater for general knowledge, 90% greater for attitude and 85% greater for self-reported health practices, compared to the average program effects for all program classrooms. (Connell 1985)

Theoretical framework for a process evaluation

Process evaluation is essential to gather information about how a program functions to produce outcomes. Diffusion of Innovations Theory, often called Diffusion Theory, can provide a framework to plan a process evaluation of a school-based health education program (Dignan 1994). Diffusion theory helps to explain how information spreads through groups (Rogers 1995). Diffusion theory, suggests that a new idea (or an innovation) spreads (diffuses) through a given population and becomes accepted through a five-phase process. The individual passes from firstly *knowledge* or awareness of the innovation, to then form an attitude and be *persuaded* about the innovation, to a *decision* to adopt or reject the innovation, to *implementation* and finally to *confirmation* of this decision. (Rogers 1995).

A school-based health education program/intervention can be viewed as an innovation. The phases described above can help to guide program development and identify questions that can be examined by process evaluation of such an intervention. Operationalising these phases as process evaluation questions would be as follows:

Knowledge – Did the intervention reach the target population?
Persuasion – Did the target population like the intervention?
Decision – What influenced the decision of adopters and non-adopters?
Implementation – What parts of the intervention were implemented and by whom?
Confirmation – Will the target population continue with the intervention?

In answering these questions it should be noted that not everyone adopts the innovation at the same time. Research (cited by Rogers 1995) has found those who adopt an innovation early in the diffusion process (innovators and early adopters) demonstrate innovativeness characteristics that are different from those who adopt later (early majority, late majority and laggards). Innovators are more venturesome, quickly interested in a new idea and require little prompting to trigger adoption. The early adopters and early majority require more time and attention before considering adopting and the late majority and laggards, the last to take on a new idea, require adjusted methods to attract their attention and more time to observe others adopt and trial the innovation. Early adopters of an innovation are respected for their opinions and potential adopters often seek their advice. The early majority, one third of members of a system, interact frequently with peers but are rarely opinion leaders. They deliberate for some time before adopting a new idea and prefer to be neither the first nor the last in adopting innovations. The late majority (one third of members of a system) are sceptical of a new idea and require the uncertainty of the idea to be removed as well as most others in the system to adopt the idea before they feel the idea is safe to adopt. Laggards tend to be traditionalists, suspicious of innovations and make decisions about an innovation based on what has been done in the past.

The adopter category into which an individual falls can help to explain their reaction to an innovation and guide program developers to devise strategies that encourage adoption and implementation of an innovation by as many potential adopters as possible. For example, the early and late majority will probably require greater persuasion, hence more elaborate support strategies to encourage adoption and implementation, than will the innovators and early adopters.

The characteristics of an innovation also affect the rate of diffusion, the degree of implementation, and the extent to which organisations will maintain an innovation over time. Rogers suggests adoption and implementation of an innovation are more likely when innovations are perceived as: better than the practise or program it replaces (relative advantage); consistent with the values and needs of potential adopters (compatibility); simple to understand and/or use versus complex (complexity); provide opportunity for trial or experimentation with the innovation before adoption (trialability); and the degree to which results of an innovation are observable (observability). An individual's perception of these attributes of an innovation predicts an innovation's rate of adoption. These characteristics need to be maximised in an innovation if it is to be adopted. They also need to be communicated to the potential adopters (eg: at recruitment to the project, during teacher training).

Parcel et al (1989) suggests other factors such as expectations, perceived availability of resources, willingness to make changes, support and reinforcement, and self-efficacy have also been identified as factors that influence adoption of an innovation.

Process evaluation has the capacity to review a program as it progresses in order to act on successes and failures of program components during the entire period of program development and implementation. Diffusion theory provides a framework to observe the reasons for these successes and failures. Additionally this record of successes and failures of the program allows future research and new programs to profit from the experience (Dignan 1994).

Summary

The highest rate of child pedestrian injury occurs in children aged 5 to 9 years. While children have limited perceptual and cognitive skills to cross a road, especially in complex traffic situations, they are exposed to the road environment and require road-crossing training to improve their ability to safely use roads. Schools are well positioned to deliver road crossing training however, there are few examples of school-based pedestrian safety education empirical intervention trials reported in the literature.

Published reports on child pedestrian safety education programs are often limited by inadequate research methodologies. Few programs have used randomised trials, many have lacked control groups and / or recruited small samples, and to date, no national or international child pedestrian safety education program has conducted a rigorous process evaluation. Outcome measures used in the research are limited by their narrow focus on separate components of the road-crossing task (eg: finding safe places to cross) and their use of observational data under test conditions or self-reported behaviours (by the child or his/her parent).

A review of the school-based health education research identified a process evaluation as an important component of an evaluation design. Collecting information on whether a program is acceptable to the target group and the level of implementation of the program, provides one explanation for outcomes of the intervention. Measuring how much of the program has been implemented (quantity of implementation) and the extent to which this implementation matched what the program planners intended (quality of implementation) are key to a process evaluation.

If implementation data are not collected, positive outcomes can not be attributed to the program. The school health education research literature suggests process evaluation is both important and feasible. Diffusion theory provides a framework on which a process evaluation and strategies to maximise implementation of an intervention can be planned. Diffusion theory suggests that when examining the diffusion of an innovation through a given population, process information should be collected concerning: the reach of the intervention; the acceptability of the intervention; influences on the decision to adopt the intervention; parts of the intervention implemented and by whom; and the possibility of adopters continuing with the intervention. The characteristics of potential adopters and the salient characteristics of an innovation that are identified by Diffusion Theory offer a guide for the development of strategies to maximise implementation of an intervention.

Quantity of implementation has been measured in the school-based health education research using teacher self-report methods in a lesson log/check list or a post-implementation interview; student work books; and the head teacher rating of teachers' implementation of a program. Quality of implementation has been measured using self-report questionnaires and classroom observation. Each of these methods has limitations in their ability to: capture all aspects of a program; provide an objective measure of implementation; avoid testing effects; and avoid increasing the workload of teachers.

As evident in Table 1, of the major school-based health education studies that report a process evaluation, most studies have measured both the quantity and quality of implementation of the program. However, only 50% of the studies used an objective, or non-self-report measure of the quality of implementation of the program (classroom observation) and only one of the nine studies used an objective measure of the quantity of implementation (student work samples).

Table 1: Instruments used by school-based health education research to measure implementation of a classroom curriculum

	Quantity of Implementation Instruments					Quality of Implementation Instruments		
Study	Self-report lesson log	Self-report inter-view	Self-report q'aire	Head teacher rating	Student work sample	Classroom observation	Self-report questionnaire	Total
1. (Connell 1985)			✓				✓	2
2. (Basch 1985)	✓					✓	✓	3
3. (Taggart 1990)			✓			✓	✓	3
4. (Ross 1991)	✓							1
5. (Resnicow 1992)			✓	✓	✓			3
6. (Rohrbach 1993)			✓			✓		2
7. (Smith 1993)	✓							1
8. (McGraw 1996)	✓					✓		2
9. (Resnicow 1998)	✓	✓				✓		3
TOTAL	5/9	1/9	4/9	1/9	1/9	5/9	3/9	
This study - CPIPP	✓		✓		✓	✓	✓	5

Prompted by the lack of research that has used a multi-dimensional approach to measuring implementation, the proposed study will use multiple measures of implementation to comprehensively assess how much of the Child Pedestrian Injury Prevention Project school-based intervention was implemented and how well it was delivered.

Once implementation has been measured and correlations between measures examined, the associations between implementation and student outcomes can be assessed. These assessments contribute to the development of a theory base for the construct validity of the instruments measuring implementation of this study. That is, the capacity of these process instruments to measure the construct of implementation and predict student outcomes.

Chapter 3

Methods

A process evaluation of the school-based Child Pedestrian Injury Prevention Project (CPIPP) was conducted. The specific objectives were to:

1. Examine teacher and student satisfaction with the CPIPP intervention.
2. Assess the quantity and quality of the CPIPP intervention taught by teachers to their students.
3. Determine the validity of each measure of curriculum implementation by examining the association between implementation measures; the association of these measures with student outcomes; and the association of a composite measure of implementation with student outcomes.

This chapter describes the methods used in the study, and is divided into six sections: study design, study sample, intervention description, instrumentation, data collection procedures and data analysis.

Study Design

The Child Pedestrian Injury Prevention Project (CPIPP) was a quasi-experimental community intervention trial conducted in Perth, Western Australia from 1995 to 1997. The aim of the study was to design, implement and evaluate a school and community-based intervention to improve six (Grade 2) to nine (Grade 4) year old children's pedestrian safety knowledge and road-crossing behaviour, and to modify identified risks in their road environment. The study involved a cohort of students (and their parents and teachers) assessed four times over a three-year period. Western Australian children are typically six to seven years of age in Grade 2.

Three metropolitan communities in Perth (population of 1.3 million), Western Australia were selected based on similar child pedestrian injury rates and socio-demographic characteristics. Two of these communities received an intervention and the third acted as a comparison group. Community 1 (intervention group 1) received the 'high' intervention that comprised a school- and home-based pedestrian safety education curriculum as well as a community education and environmental intervention. Community 2 (intervention group 2) received the 'moderate' intervention, which included the same school-and home-based pedestrian safety education curriculum but no community or environmental intervention. The comparison group, Community 3, received a school-based nutrition education curriculum developed by CPIPP, as well as the Western Australian Health Education K-10 Syllabus that contains several road safety-related activities (the usual road safety program in all Western Australian schools). The nutrition curriculum was distributed to comparison group schools to encourage their involvement in the evaluation and reduce the possibility of a "John Henry" effect (Isaac 1981).

The school- and home-based pedestrian safety education curriculum was delivered to a cohort of students in Grade 2, Grade 3 and Grade 4. Since the study followed a cohort of students across three different school years, it is referred to as a 3-year study. Figure 2 illustrates the CPIPP study design as well as the timing of intervention delivery and data collection.

Figure 2: CPIPP study design

	1995			1996		1997	
	May	May-Oct	Nov	Feb-Sept	Oct	Feb-Sept	Oct
Intervention Group 1	O_1	X_1	O_2	X_2	O_3	X_3	O_4
Intervention Group 2	O_1	X_4	O_2	X_5	O_3	X_6	O_4
Comparison Group	O_1	X_7	O_2	X_8	O_3	X_9	O_4

O = observation
X = intervention
$X_{1,2,3}$ high intervention[a] (school and community)
$X_{4,5,6}$ moderate intervention (school only)
$X_{7,8,9}$ nutrition curriculum
[a] community wide intervention continued throughout each year

The analyses presented in this thesis involve only the process evaluation of the school-based intervention. These analyses include the student cohort, and their teachers, in the intervention conditions. Outcomes related to intervention and comparison groups are reported elsewhere (Cross In press).

The community/environmental intervention comprised the establishment of a community road safety committee which advocated for traffic management strategies; changes to speed limits around schools; development of traffic calming features; establishment of 'Safe-Routes-to-School' programs; and public education activities targeting drivers at shopping centres and community fairs. Evaluation of the environmental / community-based intervention is reported elsewhere (Stevenson 1999).

Study Sample

Selection of study participants

Selection of the three communities

The communities assigned to the three study conditions were drawn from three geographic locations. Assignment by geographic location was necessary, as one whole community needed to receive an intervention where the road environment of young children would be modified to reduce their risk of pedestrian injury. Local government areas (LGAs) in the Perth metropolitan area (population of 1.3 million) defined the three geographic locations. All Perth metropolitan LGAs (n = 23) were considered. Three areas were selected based on the following criteria: a population large enough to provide the required number of government primary schools to achieve the recruitment of approximately 800 Grade 2 students; similar child pedestrian injury rates; and similar socio-demographic characteristics. Within these parameters three communities were selected. The child pedestrian injury rate of community one was 3.3 child pedestrian injuries /10,000 licensed motor vehicles per year and 2.3 for both community two and three (National Injury Surveillance Unit 1997). Seventeen government primary schools were located within community one, 27 within community two and 45 within community three. All three communities comprised suburbs of low, moderate and high socioeconomic status. (Table 2)

Table 2: Characteristics of the three communities selected for CPIPP

Characteristic:	Community 1	Community 2	Community 3
Child pedestrian injuries / 10,000 licensed motor vehicles per year[a]	3.3	2.3	2.3
Government primary schools	17	27	45

[a] (National Injury Surveillance Unit 1997)

The assignment of the three communities to the 'condition' was constrained by the environment / community intervention. The community, particularly its local government authority administration, assigned to this condition needed to be receptive to the CPIPP intervention and evaluation methods, and provide impetus and support for the community development model of the intervention. Community 1 met these criteria and was assigned to the high intervention condition, community 2 was assigned to the moderate intervention condition and community 3 acted as the comparison group.

Selection of schools within the communities

All 17 schools in the high intervention community were invited to participate in the study. Of these, 14 (82.4%) agreed to be part of the study. All 27 schools in the moderate intervention community were invited to participate in the study. Of these, 16 (59.3%) agreed to be part of the study. Thirty of the 45 comparison group community schools were randomly selected with a sampling probability in proportion to the number of Grade 2 students on the school roll, and invited to participate in the study. Of these, 17 (56.6%) agreed to be part of the study. The Principals of the Schools in the three conditions who refused to participate cited a staff decision not to take on new programs as the reason for their decision.

Principals of the randomly selected schools were initially invited in a letter to participate in the study (Appendix 1). The letter was followed by a phone call to arrange for a senior CPIPP staff member to meet and discuss the project with the school principal and where possible, Grade 2 teachers. Guidelines for these meetings can be found in Appendix 2. Upon recruitment to the project, the school principal provided consent for student participation (Appendix 3). At the commencement of each study year participating schools were contacted to reconfirm and remind them of their commitment to the project (Appendix 4). The Curtin University Human Research Ethics Committee provided ethics approval for this project (Approval Number HR 73/94).

Sample within the school

All Grade 2 students, their parents, and their teachers in participating schools were eligible to participate. In Western Australia, most Grade 2 students are six to seven years of age. A total of 2440 6-7 year old children and their parents or guardians and 103 teachers of the children from 47 schools were recruited for the first year of the three-year study (Table 3).

Study samples for this process evaluation include students and teachers who took part in the school-based pedestrian safety intervention condition of CPIPP. Thirty intervention schools participated in CPIPP over a 2.5 year period from February 1995 to November 1997. Students recruited at baseline formed the study's student cohort, who were tracked for 2.5 years. A new group of teachers was recruited to the project in each study year as students progressed through their second (1995), third (1996) and fourth (1997) grade of school. Cohort students were grouped by their school and assigned a new teacher at the commencement of each school and study year. In most groups (classes) the generalist (classroom teacher) taught the CPIPP intervention to their students. Six intervention teachers taught two years of the program and one teacher taught the program in each of the three study years.

Table 3: Sample recruited to the study

	High Intervention Group [a]	Moderate intervention group [a]	Comparison group
Schools	14	16	17
Students	784	787	869
Parents	784	787	869
Teachers	31 [b]	30 [b]	42 [b]

[a] Study sample for process evaluation
[b] A new cohort of teachers was recruited each year

Sample size and power

As demonstrated in Table 3, the sample used for this study comprised two of the three treatment groups of the larger CPIPP study. Therefore the sample size estimate for this study is based on that for the larger CPIPP study (n=784 and 787 students and parents in high and moderate intervention groups respectively). The sample size estimate to test treatment effects of the larger CPIPP study is based on data from a case-control study undertaken in Perth between 1991 and 1993 (Stevenson 1995). The principal outcome measure used for the estimate was the child's current knowledge of road safety. Health knowledge has been shown in other school-based intervention studies to be the outcome most responsive to health education programs (Connell 1985; Tobler 1986; Errecart 1991; Parcel 1991; Bruvold 1993; Ennett 1994; Kelder 1995; Donnelly 1996). In the Perth study approximately 32% of children aged 6 to 14 years could provide more than one road safety instruction (Stevenson 1995). Based on this value, under simple random sampling, comparisons between samples of 430 children would have 90% power at a (two sided) significance level of 0.05 to detect a difference in the child's road safety knowledge of 10% or more between the intervention groups and the comparison group (Borenstein 1988).

This number (430 per group) was adjusted upward to account for the study's design effects – sampling within schools and sample attrition. Firstly, since schools rather than individual students were allocated to treatment condition, sample size calculations were inflated to account for the design effect of clustering of student responses within schools. Failure to do so may result in spuriously inflated intervention effects and unacceptable levels of Type I error (Murray 1990). Using the formula of Murray (Murray 1990) [Design effect = 1 + (k-1)r], where k is the average class (or cluster) size and r is the intracluster correlation], assuming average class/cluster sizes of 25 and an ICC of 0.02 (the intracluster correlation of school-based research topics typically ranges from 0.001 to 0.05 (Murray 1990) and the relative homogeneity of the intervention groups) the sample size obtained under simple random sampling needed to be increased by a factor of 1.48 [1+(25-1)(0.02)]. By multiplying the sample size obtained under simple random sampling by 1.48, it was necessary to recruit a sample of 637 Grade 2 children in each group.

Secondly, based on previous Western Australian school-based research it was expected that 10% of the student sample would be lost to follow-up in each study year. The sample size of 637 per group was therefore increased by a factor of 1.3 to account for attrition. In sum, after adjusting the sample size for the study's design effects, 828 Grade 2 students in each group were required to be recruited (a total of 2,484 Grade 2 students).

A total of 2,440 6-7 year old children and their parents or guardians and 103 teachers of the children from 47 schools were recruited at baseline and tracked for 2.5 years.

Intervention Description

The CPIPP education materials were designed to address deficiencies identified in previous research (Stevenson 1995) concerning the existing provision of school-based pedestrian safety education for 6 to 9 year olds. This research identified that many students in this age-group were not exposed to road safety education at school, road safety education was not a compulsory component of the curriculum and for those students who could recall road safety lessons at school, activities did not include road crossing practise.

The CPIPP school-based intervention comprised a school and home-based pedestrian safety education curriculum that was developed following an extensive formative evaluation (Cross 1995). The formative evaluation process included a series of discussion groups with Grades 2, 3 and 4 classroom teachers along with literature and education materials review. The findings of this process identified three key areas to guide the development of the pedestrian safety education curriculum. Firstly, the literature supported the school as an appropriate channel for road safety education. Further, the school-based road safety education program should be designed to target behaviours prior to initiation. The program needed to: include lessons taught by the classroom teacher that are linked to a comprehensive school health education syllabus; link to subjects other than health education; include home activities; have lessons taught in ongoing booster sessions; and be a whole-school approach (Cross 1995).

Secondly, the formative process found that activities needed to address age-specific content; skills; behavioural practise on real roads; and clear behavioural messages (no rote messages) (Cross 1995).

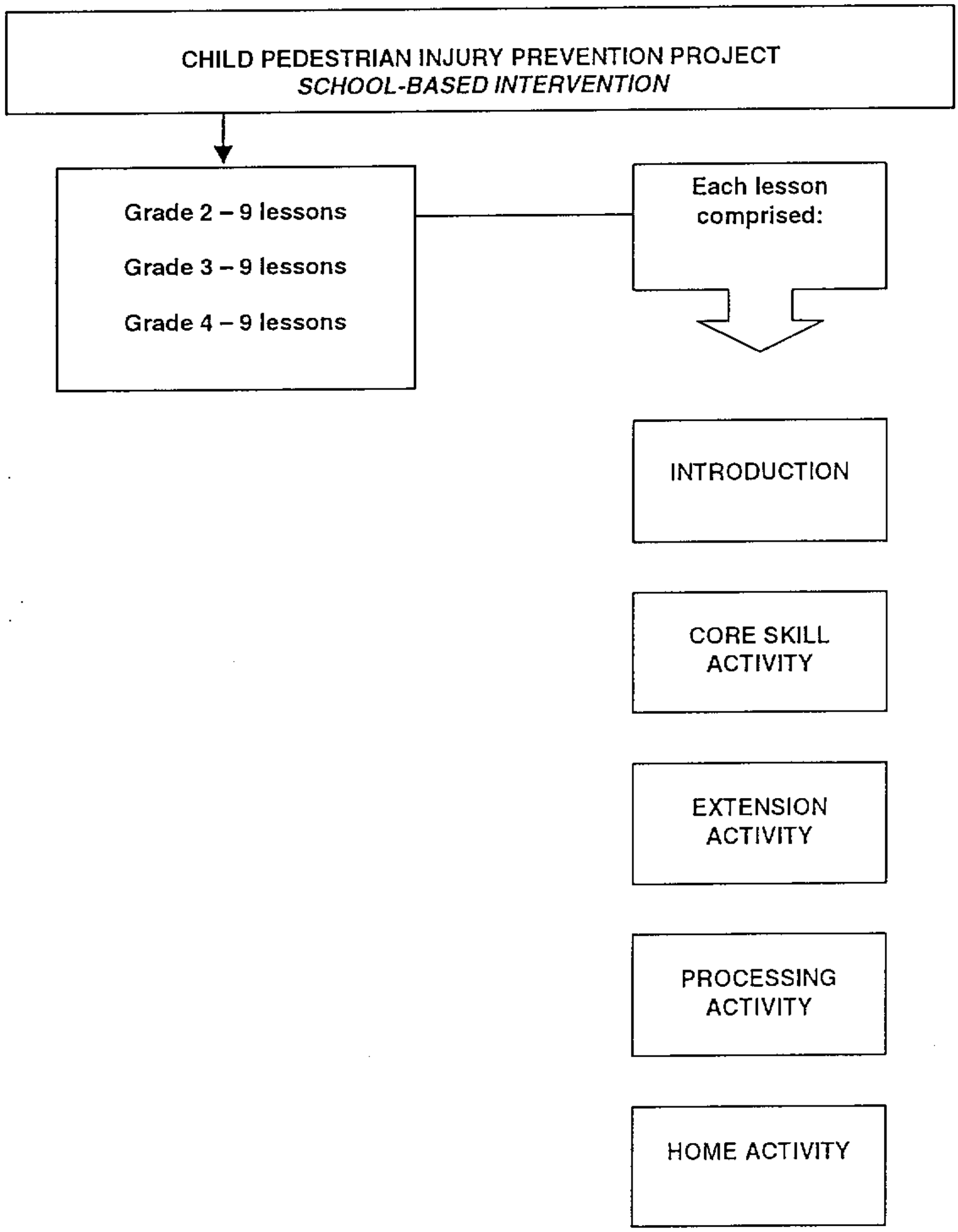
Thirdly, in order to maximise teachers' implementation the formative process found pedestrian safety lessons needed to have pre-identified core behavioural activities; include processing activities; and contain user-friendly materials that require low teacher preparation (Cross 1995).

Equipped with this formative information, experienced school curriculum writers, namely the author and other CPIPP staff, developed the lessons. For each year of the project, road safety and education specialists reviewed the curriculum and five teachers pilot tested the lessons with their class. Feedback from the expert panel and teachers was incorporated into the draft lessons. Additionally, data collected as part of the first two study years' process evaluation were used to further inform the development of the following year's educational materials.

The resulting CPIPP school- and home-based intervention was a classroom health education program comprising three developmentally appropriate curricula, one for Grade 2 students, one for Grade 3 students and one for Grade 4 students (Figure 3). Each curriculum contained nine, 40-minute pedestrian safety lessons including 'classroom' activities and 'home' activities. Teachers were asked to implement these lessons and send home the corresponding 'home' activity in three clusters or boosters of three lessons. Each year teachers were asked to teach three lessons at the beginning of each of the three school terms when children returned from their vacation breaks.

The classroom activities addressed pedestrian safety-related knowledge, affective education, social skill development (including decision-making and assertive communication), and simulation and practise of pedestrian safety behaviours. A key focus of the classroom lessons were activities that provided students with pedestrian skills training in the 'real' road environment or a simulated road outside the classroom. All strategies were designed to be student-centred, interactive and actively involve parents. The curricula were designed to be delivered using a cross-curricular format with applications in health education, science, language, art, mathematics, and physical education.

Figure 3: CPIPP school-based intervention



Each curriculum lesson comprised:

- An *introductory activity* that reviewed safer road crossing procedures and / or the previous lesson's home activity;
- A *core skill activity* that covered the key behavioural issue of the lesson and in most lessons required road crossing practise;
- An optional *extension activity* was provided in some lessons, for example a road crossing crossword, song or craft activity – all were designed to reinforce key behavioural messages of safer road crossing behaviour;
- A *processing activity* provided questions for reflection and discussion of experiences in the lesson and allowed students to personalise and verbalise their behavioural intentions for safer road crossing; and
- A *home activity* comprised a work sheet teachers were asked to distribute to students to take home and complete with a parent. Home activities aimed to actively involve parents in the pedestrian safety education of the children and reinforce messages learnt at school. Activities included parents assessing their child's road crossing technique on a road near their home and planning for improvement.

Each year at the pre-intervention training teachers were asked to teach their students at least the core, home and processing activities from each of the nine CPIPP lessons. They were asked to teach the optional (extension and introductory) activities if they had time. Teachers were requested to teach the lessons as described in the teachers' guide.

Strategies to maximise curriculum implementation

A criticism of previous school-based pedestrian safety and health education programs has been insufficient program implementation to test the effectiveness of an intervention (Gillam 1995). A review of the literature identified a range of strategies to maximise curriculum implementation (Perry 1990; Parcel 1991; Smith 1993). The strategies used by CPIPP included user-friendly materials, teacher training, completion of an implementation plan by teachers, and follow-up support.

At the commencement of each study year, prior to initiating the curriculum, all intervention group teachers were invited to participate in the project and to attend a half-day training to familiarise participants with the CPIPP education materials. In each study year a new group of teachers were recruited to the project. In 1995, all Grade 2 teachers (n=61) from the 30 intervention schools attended the training, 97% (n=64) of Grade 3 teachers attended in 1996 and 85% (n=62) of Grade 4 teachers attended in 1997. For teachers who did not attend the centralised training, project staff conducted an individual mini-training at his or her school. The mini-trainings increased the number of teachers trained in 1996 to 98% (n=65) and 90% (n=65) in 1997.

The majority of teachers attending the training reported the content of the training would help them to teach the CPIPP curriculum (1995: Strongly agree - 54%; Agree - 44%; Disagree – 1%; 1996: Strongly agree - 66%; Agree - 34%; 1997: Strongly agree - 78%; Agree - 22%). The training evaluation form is included in Appendix 5.

Methods used to encourage teachers to attend the training included using a venue located within the school district; funding to employ replacement teachers for those attending the training; and two training dates from which teachers could choose one that best suited them. The author conducted all trainings. The project coordinator and chief investigators attended the training to answer questions concerning the conduct of the project. Training content included: an introduction to the Child Pedestrian Injury Prevention Project; the rationale for child pedestrian safety (child pedestrian injury and mortality rates and their consequences; physical, perceptual and cognitive limitations of children in the road environment and when crossing the road); integration of CPIPP curriculum into the WA health education syllabus; CPIPP curriculum components and lesson components; key behavioural messages of the program – safer road crossing procedures and the need to avoid rote learning of the crossing procedure; barriers and enablers to practising road crossing with students in the road environment, including involving parents; the CPIPP evaluation schedule; and planning for when they would teach the nine pedestrian safety lessons.

Incentives to maximise teacher implementation included providing all teachers with: a personal copy of the materials to use with their class; a ream of paper to assist with the photocopying of student worksheets; a scrap book within which each student stored their pedestrian safety related work; pedestrian safety related stickers for students; and a CPIPP pen for teachers and school principals.

Instrumentation

The process evaluation of the CPIPP school-based intervention required information from intervention school students and teachers. The instruments used to collect this information are shown in Table 4. Demographic and teaching practise characteristics of teachers participating in the study were collected in a self-report questionnaire administered prior to curriculum implementation in each study year. Characteristics of the student cohort were obtained from a student self-administered questionnaire.

Teacher satisfaction with the CPIPP intervention (study objective one) was assessed by three questions in the post-intervention teacher self-report questionnaire. Student satisfaction with the CPIPP intervention (study objective one) was assessed by one question in the student self-administered questionnaire.

Four data collection methods were used in each study year to collect information on teachers' quantity (completeness) and quality (fidelity) of curriculum implementation (study objective two). These included:

- an analysis of student **work samples**;
- a self-report lesson **log** that teachers were asked to complete after each lesson and return to project staff after every three lessons;
- a post-intervention teacher **self-report questionnaire**; and
- an instrument used by project staff to **observe** teachers teaching one intervention lesson.

Eighteen variables measuring implementation were derived from these four methods. Five of these variables (independent variables) were examined for evidence of an association with student outcomes (dependent variables) targeted by the curriculum (study objective three). The three student outcome variables: pedestrian safety knowledge, road-crossing behaviour, road-playing behaviour were created by summing questions from the student self administered questionnaire. Information on possible confounders (SES, gender and exposure to the road environment) to the relationship between dependent and independent variables were also obtained from the student self-administered questionnaire.

The association between a composite implementation measure with student outcomes was also examined (study objective three). This composite measure was the mean of four of the implementation variables.

Table 4: Summary of process evaluation instruments in CPIPP school-based intervention

Instrument	Sample character-istics	Study Objective 1	Study Objective 2		Study Objective 3		
		Satisfaction with the curriculum	Implementation rates		Dependent variables - student outcomes	Covariates	Independent variables – implementation variables
			Quantity	Quality			
Student Self-administered questionnaire	✓	✓			✓	✓	
Teacher Pre-intervention questionnaire	✓						
Post-intervention questionnaire		✓	✓	✓			✓
Work sample assessment			✓				✓
Log			✓	✓			✓
Classroom observation				✓			

Student Questionnaire

As demonstrated in Table 4, the student questionnaire provided information concerning student demographic characteristics and explanatory variables (covariates); student satisfaction with the CPIPP intervention; and student outcomes targeted by the curriculum.

Instrument development

Data from students were collected using a self-report questionnaire. The questionnaire was designed to evaluate the impact of the school-based pedestrian safety education curriculum. As no valid and reliable instrument measuring pedestrian safety knowledge and road crossing behaviour for Grade 2 students had been developed, a questionnaire was designed and tested for the study.

The content of the questionnaire was based on the objectives of the curriculum. The proposed instrument included questions that assessed students':

- Pedestrian safety knowledge (safer places to cross, adult accompaniment, traffic search strategies, using footpaths);
- Self-reported road crossing behaviour (adult accompaniment when walking alongside the road, adult accompaniment when crossing the road);
- Self-reported road playing behaviour (playing on the road, playing on the footpath, playing on the driveway);
- Exposure to the road environment (mode of transport to school, frequency of walking to school);
- Parental support (how often parents talk to child about how to cross the road safely); and
- Awareness and use of guarded crossings near school.

The developmental age and hence reading level of Grade 2 students suggested the instrument layout and design should include:

- One question per page;
- Large font size (18 point);
- Pictorial response options;

- Students required to circle their response;
- Limited number of questions;
- Low literacy requirements; and
- Identifying information to be entered directly on to the front of the questionnaire from the CPIPP database so students did not have to write anything on the questionnaire.

An expert panel comprising epidemiologists, injury surveillance specialists, health promotion professionals and teachers was used to assess the face and content validity of the proposed student questionnaire. The panel agreed the questionnaire provided an adequate measure of student's pedestrian safety knowledge and road related behaviours.

The proposed student self-report questionnaire was pilot-tested on 109 Grade 2 students (51 males and 57 females) not in the CPIPP study who shared similar demographic characteristics with those in the study sample. The pilot-test involved a test-retest procedure to examine the reliability of the questionnaire as well as item difficulty. The second administration of the questionnaire was conducted on the same students, two weeks after the initial test. The two-week time period between tests aimed to reduce the likelihood of students choosing the same answers because of immediate recall as well as to reduce the likelihood of maturation effects (Thorndike 1977). Validity and reliability analyses for the student questionnaire are included in Chapter 4.

A composite pedestrian safety-related knowledge index was developed by combining the 10 knowledge items from the questionnaire (baseline questionnaire items 1-9, 11). The questions were scored '1' for a correct answer and '0' for an incorrect answer. The 10 items assessed several dimensions of pedestrian safety included in the curriculum including, safer places to cross the road, adult accompaniment, traffic search strategies and using footpaths.

Two behaviour indices were developed from questionnaire items concerning students' behaviour on or near the road. The student reported road-crossing behaviour index was the summation of baseline questionnaire items 14, 15, and 22 and student reported road-playing behaviour the summation of baseline questionnaire items 17, 18, 19. The questions were scored '1' for desirable or low risk behaviour and '0' for undesirable or high-risk behaviour.

Question 14 asked students whom they walked with if they walked to school. The coding for this item was '1' (desirable behaviour) for 'with an adult' and 'I don't walk to school' and '0' (undesirable behaviour) for 'by yourself', 'with other primary school children', or 'with teenagers'. The possible responses for item 15 *(Who do you usually cross the road with?)* were worded and thus coded in a similar manner to question 15. Question 22 asked students if they would be allowed to cross the road alone. . The coding for this item was '1' (desirable behaviour) for 'No' the student would not be allowed to cross the road alone and 'I don't cross roads' and '0' (undesirable behaviour) for 'Yes' the student would be allowed to cross the road alone.

Questions 17, 18 and 19 asked students if they ever played on the footpath, road or driveway respectively. The coding for these items was '1' (desirable behaviour) for 'No' the student does not play in these road environments and '0' (undesirable behaviour) for 'Yes' the student does play in these environments.

The coding for these behaviour indices is based on the key behavioural message of the curriculum that children under 10 years of age need adult assistance when crossing a road. A total score of zero for the road-crossing behaviour index indicated students were walking along and crossing roads in their neighbourhood and on their way to school without adult help. A total score of zero for the road-playing behaviour index indicated students reported playing on the footpath, the road and on the driveway. For both of the behaviour indices the score of '3–lowest risk', or desirable behaviour, indicated they reported taking none of these risks.

While students' exposure to the road environment was not an outcome measure it was a possible explanatory variable in the analyses. It was measured by the summation of two items on the questionnaire (baseline questionnaire items 12, 13). Instrument items indicating students' reported exposure to the road environment included mode of transport to school and frequency of walking to school. The coding for item 12 was '1' (low exposure) for car or bus as mode of transport to school and '0' (high exposure) for walking and bike. The coding for item 13 used a weighting procedure where the frequency of walking to school on none, or only a few days a year was coded '2' (lowest exposure), one to three days a week was coded '1' (low exposure) and walking to school four to five days a week was coded '0' (high exposure). The 'exposure' score (using total score) of '0' indicated the students had high 'exposure' to the road environment, that is, they reported walking or riding their bikes to school on four to five days of the week. The highest possible score for this variable was '3' which indicated lowest exposure to the road environment. The mean exposure score of the four data collection points was entered in the model as a covariate.

A copy of the 23-item student self-report questionnaire administered at baseline can be found in Appendix 6.

Questions added at post–test

Twenty-two of the 23 questions used at baseline were included in the follow-up questionnaires. One question (baseline questionnaire item 16) was deleted because of possible ambiguity and similarity to the baseline questionnaire item 10, concerning awareness of a crossing attendant near school. Four process evaluation questions were included in each of the three follow-up questionnaires. These process questions asked students about their: road crossing practise with their teacher (post-test '95 questionnaire item 16); satisfaction with the classroom lessons (post-test '95 questionnaire item 24); satisfaction with the home activities 'passport' (post-test '95 questionnaire item 25); and perception of classroom lessons helping him/her to be safer near roads (post-test '95 questionnaire item 26).

Information from these process questions was used to develop the following year's educational intervention. Additionally, question 24, *"Did you like most of the lessons you did this year on crossing the road?"* was used to examine study objective one - student satisfaction with each of the three curricula. The comparison group questionnaires did not contain the process questions.

The student self-report questionnaire administered at post-test 1995, 1996 and 1997 is contained in Appendices 7-9. To assess program impact, the same instrument was administered to the student cohort at baseline and three post-tests (as outlined in Figure 2).

Administration of the student questionnaire

Trained CPIPP staff members administered the questionnaires to all students at the pilot-test, baseline (May 1995) and at each of the three post-tests (November 1995, October 1996 and October 1997). Because of the students' age (6 years at baseline) and associated reading level, the administrators read all questionnaire items slowly and aloud to students. The administrators used an enlarged questionnaire (large enough for those at the back of the class to see) to point to each of the pictures when reading each item to the students. Administrators attended a two-hour training prior to the pilot, baseline and all post-tests to ensure standardisation of administration. The questionnaire was administered as part of a normal class session and took 20 to 30 minutes to complete. These techniques are consistent with other school-based research studies (Antaki 1986; Resnicow 1992).

To secure high response rates, teachers were trained to administer follow-up questionnaires to students who were absent on the day of the initial administration. Research staff collected these late questionnaires from the schools.

The baseline questionnaire was administered prior to delivery of the intervention. Each post-test administration of the questionnaire was scheduled to take place two weeks after teachers had been asked to complete the nine-lesson pedestrian safety curriculum. At the baseline administration of the questionnaire, students were each given an apple for completing the questionnaire. At subsequent administrations of the questionnaire students were given a road safety sticker.

Validation of students' self-report road crossing behaviour

The primary behavioural message of the curriculum for both students and parents was children under the age of 10 require adult accompaniment when crossing the road. As mentioned above, the three-item, road-crossing behaviour index on the student questionnaire asked students to report whether or not an adult accompanied them when crossing (2 items) or walking alongside (1 item) the road. A technique similar to that used by Stevenson, was used to validate students' self-reported road crossing behaviour (Stevenson 1996).

At post-test 97, a sub-sample (n=80) of students in the study cohort who reported walking to school and whose parents gave permission for research staff to follow them, participated in the validation study. The sub-sample observed reflected the student cohort on key characteristics, namely socioeconomic status, age and gender.

Firstly, the validation study involved a trained observer following a student from their home to school using the 'moving observer' technique, described by Routledge et al (Routledge 1974). The researcher, with parent consent, waited, discretely, outside the student's home, and once the student began his/her journey, followed him/her at a distance of approximately 15 metres (49ft) until he/she reached school. During the journey the observer recorded the student's behaviour for each road crossed. Included in the observation schedule were items where the observer recorded if an adult accompanied the student when crossing the road and walking alongside the road.

Secondly, after observing the student's road crossing behaviour on the journey to school, the observer would identify herself (only females observed children walking to school) at the school office and requested a brief interview with the student she had observed. The interview was conducted inside or just outside each student's classroom. The observer/interviewer asked the student two questions that were used for this validity study:

1) adult accompaniment during the journey to school – *"If you walked to school today was it with an adult?"*
2) adult accompaniment on the first road crossed on the journey to school – The child was asked to point out on a map the first road crossed this morning – *"When you crossed this road with whom did you cross?"*

It was expected children would best recall either the first or the last road they crossed during the journey to school. For most students the last road crossed was likely to be outside the school where a crossing attendant (an adult) assists children across the road. Therefore, the first road crossed was used in the interview.

Principals, teachers and parents had received a letter informing them of the observation and interview procedures that would take place. Active parent permission was required before a student was observed and interviewed.

The premise of this validation technique was that if correlations were high between student-reported behaviour at the interview and what was observed 10-15 minutes prior, then student-reported behaviour was a valid measure of student road crossing behaviour. That is, students are able to recall and report with reasonable accuracy their road crossing behaviour. Validity analyses for the student's self-reported road crossing behaviour are included in Chapter 4.

Teacher questionnaires

Pre-intervention teacher self-report questionnaire

Intervention teachers' demographic and teaching practise characteristics were collected in a self-report questionnaire. The questionnaire was administered to teachers at the training prior to curriculum implementation.

The development of this instrument commenced with a literature search for valid and reliable instruments. Appropriate scales and variables that may influence teacher implementation of the curriculum were identified in previous school-based health education research (Parcel 1991; Edmundson 1994; Gingiss 1994). The final instrument included questions that assessed teachers' health education and pedestrian safety-related knowledge, attitudes and teaching behaviours, as well as their demographic characteristics. A composite pedestrian safety-related knowledge index was developed by summating twelve knowledge items from the questionnaire (questions 30-41). Three scales based on Roger's description of adopter characteristics used by Gingis et al (1994) (Gingiss 1994) were developed to measure the characteristics of teacher: innovativeness (questions 23.1-23.8); need for collegial support (questions 23.9-23.11); and conservatism (questions 23.12-23.18).

The same expert panel used for the student questionnaire was used to assess the face and content validity of the draft teacher questionnaire. The questionnaire was then pilot-tested on a convenience sample of 30 Grade 2 teachers not involved in the CPIPP trial. Modification to the wording and layout of questions was made based on feedback from these teachers. The expert panel agreed that the modified questionnaire provided an adequate measure of teachers' health education and pedestrian safety-related knowledge, attitudes and teaching behaviours, as well as their demographic characteristics.

The stability of the questionnaire was examined using the test-retest procedure on a convenience sample of 20 Grade 2 teachers not in the CPIPP study and who were not asked to respond to the initial pilot-test. The second administration of the questionnaire was conducted on the same teachers, two weeks after the initial test. The two-week time period between tests aimed to reduce the likelihood of teachers choosing the same answers because of immediate recall (Thorndike 1977).

Validity and reliability analyses for the pre-intervention teacher self-report questionnaire are included in Chapter 4. A copy of the questionnaire can be found in Appendix 10.

Administration of the teacher pre-intervention self-report questionnaire

At the commencement of each study year, the new grade level of teachers of the student cohort completed the self-administered questionnaire at the teacher training. These trainings were conducted in May 1995, February 1996 and February 1997.

Teacher instruments measuring curriculum implementation

As discussed in Chapter 2, the literature identifies two dimensions of curriculum implementation:

- Completeness of implementation; a measure of quantity or how much of the intervention was taught; and
- Fidelity of implementation; a measure of quality of implementation or how well the intervention was taught.

(Rohrbach 1993; Basen-Engquist 1994)

Four data collection methods were administered in each study year to collect information on teachers' completeness and fidelity of curriculum implementation. These include:

- a post-intervention teacher **self-report questionnaire**;
- an analysis of student **work samples**;
- a self-report lesson **log** that teachers were asked to complete after each lesson and return to project staff after every three lessons; and
- a checklist used by project staff to **observe** teachers' teaching one intervention lesson.

The teacher self-report questionnaire contained questions about how much of each lesson he/she taught (completeness) and one general question asked teachers how well they taught the intervention – self-reported fidelity. Student work samples measured completeness of the written component of the core and home activities. Teacher lesson logs measured completeness of all activities in the lessons: core, home processing and optional activities. Teachers were also asked to report on their lesson logs if, and where, they conducted road-crossing practise (a key component of the intervention). This was considered a measure of fidelity to program objectives, and in each study year six of the nine lessons required road-crossing practise to be completed to meet the objectives of the core activity. Classroom observation measured fidelity to program objectives in one of the nine CPIPP lessons each year. (Table 5)

Table 5: Information collected in CPIPP process instruments

	COMPLETENESS Quantity of Implementation				FIDELITY Quality of Implement -ation	Satisfaction with the curriculum
Instrument:	Core Activity	Process Activity	Home Activity	Optional Activities		
Teacher post-intervention q'aire	✔	✔	✔	✔	✔	✔
Student work sample	✔		✔			
Teacher lesson log	✔	✔	✔	✔	✔	
Classroom observation (one lesson)	✔	✔	✔	✔	✔	

Post-intervention teacher self-report questionnaire

The objective of the post-intervention teacher self-report questionnaire was to assess teachers' satisfaction with, and implementation of, the curriculum. The process evaluation information included: amount of time (in minutes) spent teaching pedestrian safety; materials other than the CPIPP curriculum used to teach road safety; satisfaction with the CPIPP teacher training; satisfaction with the CPIPP curriculum and support materials; and pedestrian safety knowledge.

The questionnaire also contained items concerning curriculum implementation including: CPIPP curriculum lessons taught; self-assessment of how well they taught the curriculum; and where the road-crossing practise was conducted.

The 1996 and 1997 administration of the questionnaire asked teachers to give greater detail about the magnitude of the CPIPP curriculum lessons he/she taught.

For each of the nine curriculum lessons, teachers were asked to report the number of activities each lesson they completed, using a three-point scale – "most" of the lesson, "some" of the lesson, or "none" of the lesson. The teachers' definition of 'the lesson' could have included the core, home and processing activities of the lesson, or they could have interpreted 'the lesson' as the core, home, processing and optional activities. To allow the comparison of this "global report" with other implementation measures used in this study, responses were converted to binary format using two coding methods. The first, more conservative method (coding method 1) coded "most" as "yes" and "some" or "none" as "no". In the second method (coding method 2), "most" and "some" were coded "yes" and "none" was coded "no". In 1996 and 1997, the proportion of the nine lessons reported as completed was calculated for each eligible teacher's class. This question was not asked in 1995 administration of the questionnaire.

One item on the post-intervention teacher self-report questionnaire asked teachers to provide a self-assessment of their implementation quality for the whole curriculum. Teachers were asked to rate how well they taught all the nine pedestrian safety lessons to their students using a three-point scale. Responses included: "very adequately", "adequately" and "inadequately". It should be noted that unlike the other implementation measures this measure is not a continuous variable having only three possible values.

A copy of the post-intervention teacher self-report questionnaire is contained in Appendix 11.

Administration of the teacher post-intervention self-report questionnaire

In November 1995, September 1996 and September 1997 a post-intervention self-report questionnaire was mailed to teachers. A cover letter (Appendix 12) attached to the questionnaire thanked teachers for their involvement in CPIPP and confirmed the administration date of the student self-report questionnaire. Several incentives were provided to maximise the return rate of the teachers' post-intervention self-report questionnaire. These incentives included:

- A tea bag attached to the questionnaire with the suggestion in the cover letter that teachers enjoy a cup of tea during its completion.

- An instant lottery ticket with the questionnaire with the suggestion in the cover letter that teachers have some fun on completing the questionnaire.
- Teachers were asked to mail completed forms to the project office, using a pre-addressed and pre-paid envelope.
- In the cover letter teachers were encouraged to return the questionnaire within 10 days to be placed in a draw for a $50 gift voucher at a popular department store.
- Administrators of the student questionnaire asked teachers for their questionnaire if it had not been returned.
- A follow-up questionnaire was mailed to teachers if the original questionnaire was not returned within three weeks of its initial distribution.

These strategies built upon successful compliance strategies developed in previous research studies completed by the Centre for Health Promotion Research at Curtin University.

Student work sample checklist

An assessment of student work books as a measure of completeness of curriculum implementation was modelled on the method used by Resnicow et al (1992) (Resnicow 1992). At the completion of each study year, a random sample of five student work books from each class (1995: n=325 work books; 1996: n=325 work books; 1997: n=310 work books) was collected and assessed. Work books were examined for evidence of work sheets for core and home activities from each of the curriculum lessons (see Table 5). The instruments used in each study year to assess student work samples are contained in Appendices 13-15.

Of the nine lessons delivered in each year of the study, five lessons in the 1995 curriculum, eight lessons in the 1996 curriculum and nine lessons in the 1997 curriculum included a work sheet activity for students to complete in the classroom. A work sheet activity for students to complete at home with their parents (home activity) and return to school was also included in nine lessons in the 1995 curriculum, nine lessons in the 1996 curriculum and six lessons in the 1997 curriculum. Teachers were asked at the teacher training to encourage students to paste their class and home work sheets in the student work books.

Collection of student work books

Each study year, prior to administration of the post-test student questionnaire, a list containing names of a random sample of five students in every class receiving the CPIPP curriculum was generated. Research staff administering the student questionnaire were given this list and asked to collect CPIPP curriculum work books belonging to the students named on the list (Appendix 16). Immediately after being assessed by a trained CPIPP research staff member using a work book checklist (Appendix 13-15), they were returned to students (usually within two weeks of collection).

The same rater assessed all work books. If there was evidence the activity work sheet had been used, eg: work sheet completed, partially completed or any written words or drawing related to the activity on the work sheet it was assessed as completed. If there was evidence of a completed activity work sheet in any one book among the five student work books collected, the teacher was considered to have taught the activity. The proportion of core activities and home activities completed were calculated for each class. As described above, not all lessons included a classroom core activity work sheet *and* a home activity work sheet, therefore this measure was not a full representation of the curriculum. However, every lesson did include either a classroom core activity work sheet *or* a home activity work sheet.

Teacher lesson log

One section of the teacher lesson log measured completeness of implementation and the other section measured fidelity of implementation. The 'log book' method of monitoring curriculum implementation, where teachers record curriculum activities completed, has been employed in many school based health education program evaluations (Basch 1985; Parcel 1991; Ross 1991; Smith 1993; Edmundson 1994; Resnicow 1998). The CPIPP teacher lesson log was modelled on these instruments and designed to be simple for teachers to complete. All CPIPP lesson activities were listed on the log for teachers to check off the activities they taught. Sufficient space was provided on the log for teachers to comment on activities if they wished to do so. The log for the required teaching activities was included in the back of the CPIPP curriculum teachers' guides.

Each year at the pre-intervention teacher training sessions, teachers were told how to use the logs. Firstly, teachers were asked to record on the log whether they taught activities (Yes/No) or if they modified activities and the nature of the modification. Teachers were asked to record reasons for not teaching activities and to describe what they liked/disliked about each activity. Teachers were asked to record for each lesson: how many minutes they spent teaching, and where the class practised road crossing.

The author assessed all logs for the modification of activities. Activities recorded on the log as modified were re-coded 'Yes', the activity was taught, if the described modification still achieved the lesson objective. The lesson log form provided space for teachers to describe the modification. If after reading the description of the modification the author/rater determined the modification as not achieving the objective of the activity, or there was no explanation of the modification, it was re-coded 'No'. Conservatively, it was assumed the activity was not taught when insufficient details were provided to determine whether the activity objectives had been met. A non-response was re-coded 'No', on the assumption teachers did not teach the activity if they did not respond to the item. This re-coding ensured implementation was not over-estimated. However, it may have led to an underestimation of curriculum implementation.

In each study year the proportion of the core activities, home activities, processing activities and optional activities, reported as completed in the lesson log, was calculated for each eligible teacher's class.

The teacher lesson log was also used to obtain quantitative data about where teachers conducted road-crossing practise with their students. Road-crossing practise on a real or simulated road was the key procedure of the core activity in six of the nine lessons in each study year. Completion of this procedure was hypothesised as an indicator of implementation fidelity. In 1996 and 1997 teachers were asked to record on their lesson log where they practised road crossing. This information was not collected from 1995 teachers. To collect this information teachers were asked to respond to the open-ended question: *'Where did you practise road crossing with your class?'* for each of the nine lessons. Responses were grouped into five categories that classified where the road-crossing practise was conducted:

1. On a real road.
2. In a car park (usually the teacher car park); driveway to the school; or an access road within the school grounds.
3. On a simulated road on a basketball court; the playground; or the undercover area in the playground.
4. On a simulated road in the classroom.
5. Did not practise road crossing; or no response.

Categories two and three were collapsed to form one category – simulated road, and categories four and five were collapsed to form one category – no practise outdoors.

1. Real road
2. Simulated road
3. No road crossing practise outdoors

In each study year the proportion of the six lessons teachers reported practising road crossing on the real road and on a simulated road were calculated for each eligible teacher's class.

Collection of teacher lesson logs

Teachers were asked at the training to return completed lesson logs after teaching every three, of the nine-lesson curriculum. Strategies to maximise the lesson log return rate included:

- Two weeks prior to the end of each of the three school terms the curriculum was to be implemented, intervention teachers were sent a facsimile letter offering support for the program's implementation and encouraging them to return completed lesson logs (Appendix 17).
- Follow-up lesson logs were mailed to teachers if all original lesson logs were not returned by one week before administration of the student post-test questionnaire.

Examples of the lesson logs for the three study years are contained in Appendices 18-20.

Classroom observation

The classroom observation instrument measured teachers' fidelity to program objectives in one CPIPP lesson. In each of the three study-years all teachers were scheduled to be observed teaching one lesson during the nine-lesson curriculum. The methodology of the classroom observation and the design of the instrument was based on previous school-based health education research (Basch 1985; Perry 1990; Taggart 1990; Rohrbach 1993; Edmundson 1994; Resnicow 1998). The observation schedule was modelled on that used by Taggart et al (1990) (Taggart 1990). The schedule was modified to reflect the objectives of the CPIPP curriculum and teaching practises in Australian schools.

Trained CPIPP project staff conducted classroom observations. The author conducted all classroom observations in 1995 and 1996. In 1997, two CPIPP staff members (trained by the author) also conducted classroom observations. Inter-rater reliability in 1997 was not assessed, as two of the raters did not conduct a sufficient number of observations (Carmines 1979). Intra-rater reliability in all study years using blinded observations was not assessed due to budget limitations of the project.

Observers used a standardised form on which teacher fidelity to intervention objectives and teaching style was rated. The observation form can be found in Appendix 21.

Ratings of three curriculum procedures were made using a three-point scale ranging from 1 (low fidelity) to 3 (high fidelity). *Fidelity scores* from the classroom observation were constructed by taking the mean rating of three single item constructs:

1. The observed activity was conducted as described in the teachers' guide (a copy of the description of the activity contained in the teachers' guide was attached to the observation form) ;
2. Road crossing procedures were described as outlined in the teachers' guide; and
3. Complete sentences rather than a jingle such as "stop, look and listen" were used when describing road-crossing procedures.

The critical intervention component - road-crossing practise on a real road - was not assessed in the observation because not every core activity directed the teacher to road crossing practise on a real or simulated road. Additionally, teachers were observed for half an hour during which time they did not always complete this lengthy component of the lesson.

Although teaching style is not a measure of implementation fidelity, it was assessed in the observation to consider its effect on implementation. Resnicow et al (1998) found a moderate degree of validity in a similar measure that observed teachers' "rapport" with students (Resnicow 1998). Also during the classroom observations the observer rated the teacher from one (low) to three (high) for each of eight teacher / student behaviours. *Teaching style scores* from the classroom observation were constructed by taking the mean rating of these eight observed teacher / student behaviours (possible score of one to three):

1. Teacher enthusiasm;
2. Student enthusiasm;
3. Lesson organisation;
4. Clarity of teacher instructions;

5. Teacher encouragement of discussion;
6. Students' active participation;
7. Teacher movement to monitor student work; and
8. Student interest in activities.

Administration of the classroom observations

Teachers were informed about the observation during the training and were asked to suggest three suitable dates for the observation to take place. CPIPP project staff selected one of the three dates for each teacher, based on an efficient scheduling for all teachers to be observed. No teacher was observed teaching lessons one, two or three. Teachers were observed teaching the lesson they were due to teach at the time of the observation – this could have been one of lessons four through nine. Teachers were contacted by phone one week prior to the selected date to confirm the observation. Appointments for observations were made initially by phone followed by a confirmation fax (Appendix 22).

The advantages and limitations of each measure of implementation are summarised in Table 6.

Table 6: Advantages and limitations of CPIPP curriculum implementation measures

Implementation Measure	Advantages	Limitations
Student work books	Objective, not teacher–report of implementation. High response rate, almost complete data.	Only measures written activities with paper evidence.
Teacher lesson log	Overcomes recall bias by being returned after every three lessons. Asks about every aspect and activity in the intervention – comprehensive.	Self-report. May underestimate due to incomplete return. Eg. sent in the first and second log but not the third, however may have taught the activities. May overestimate due to social desirability. Lower response rate
Post-intervention teacher self-report questionnaire	Global impression by teachers of the whole intervention.	Self-report. Lower response rate. Not specific to each activity or lesson. Recall bias.
Classroom observation	Objective, not self-report.	Somewhat subjective by the rater. Teachers observed are a self-selecting group as they were the teachers who would allow us to observe. Those who did not allow us to observe may have been weaker teachers. Only measures one lesson. Teachers may not teach another lesson, and they may teach differently when some one is not observing them. The instrument lacks sensitivity. Teachers may complete more of the lesson after the half-hour observation.

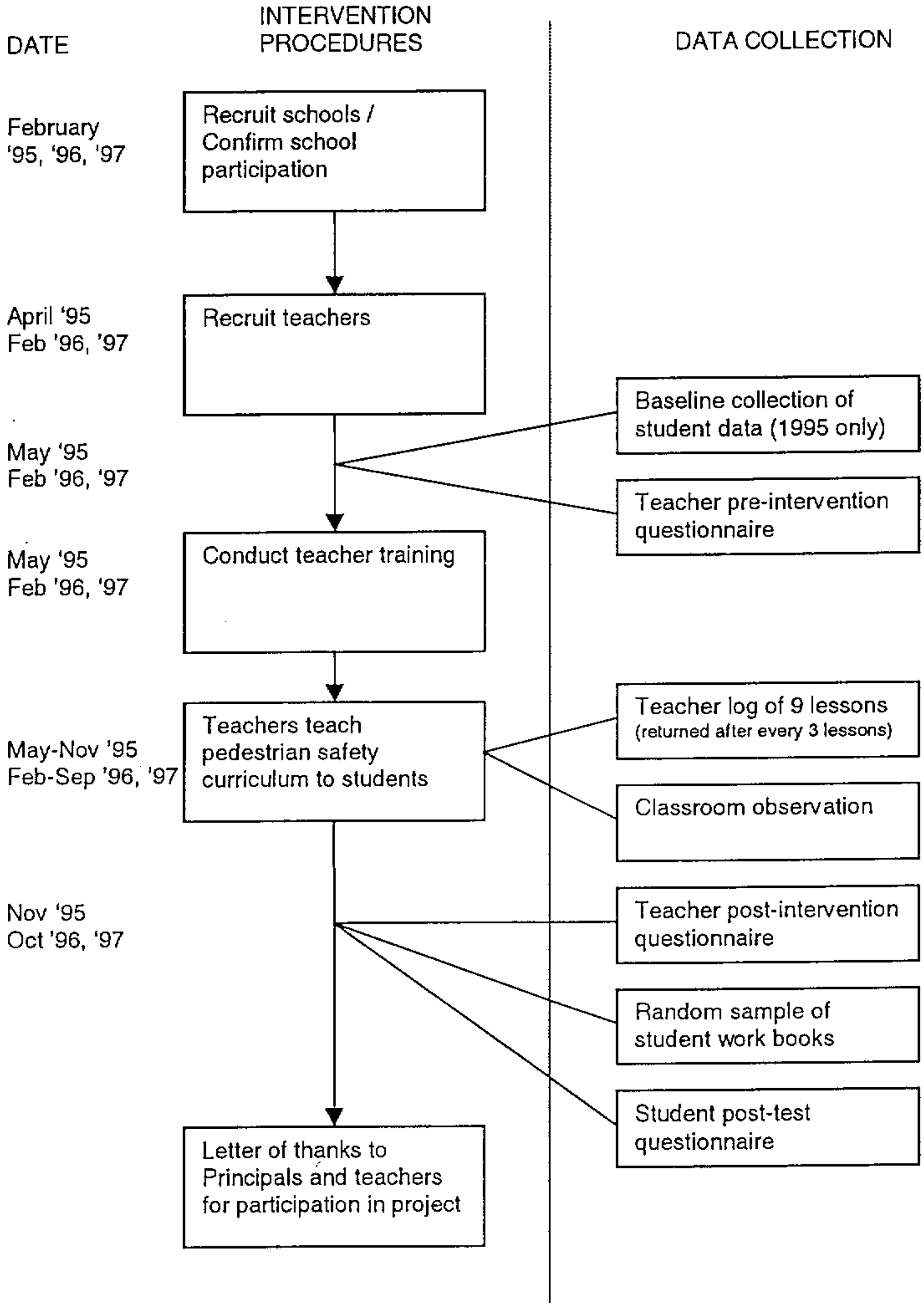
Data Collection Procedures

Data used in the analyses were collected from two groups:

- the student cohort; and
- teachers of the student cohort.

Process and impact data provided by students were collected via a self-report questionnaire on four occasions in the three years of the study. Process evaluation information from the cohort of teachers recruited each year was collected via self-report questionnaires and observation schedules described previously in this Chapter. Chronological order of recruitment procedures, intervention delivery and data collection in each study year are summarised in Figure 4.

Figure 4: Summary of CPIPP school-based intervention and data collection procedures conducted each year



Data Analysis

All computer analysis of the quantitative data in the study was undertaken using SPSS for Windows Software, version 7.5 (Norris 1997). The analyses involved the preliminary assessment of student and teacher data sets to ensure the entry and coding of data had been performed correctly. Frequencies were computed to detect incorrect entries. In all cases the incorrect entries were further examined and verified using the original questionnaires. Frequencies were also assessed to verify responses were within the defined range of possible values. In addition, all missing responses were checked against the original questionnaire.

The distribution of continuous variables was assessed via histograms, and normal probability, detrended normal and box plots, to examine skewness.

Uni-variate statistics were computed for the final data-sets. Proportions and/or percentages were presented and the respective denominator (n). Variations in proportions for categorical variables between high and moderate intervention groups were assessed using the Pearson Chi-square test. Differences in means for continuous variables between high and moderate intervention groups were examined using unpaired t-tests.

Exploratory bivariate correlations among implementation variables (where teacher implementation score was the unit of analysis) were conducted. Table 7 describes the variables used in these analyses. Spearman's rank correlation coefficients were computed between teacher implementation scores in the teacher data set due to the non-normal distribution of the data.

Pearson correlation coefficients were calculated between dependent (student outcomes) and independent (three-year-average implementation score) variables used in the multivariate analyses. Finally multivariate analyses were undertaken using Multiple Linear Regression and Analysis of Covariance (ANCOVA).

Multivariate analyses examined the effects of the levels of implementation dose on student outcomes after controlling for possible confounders. The multiple regression analysis looked at a linear association between implementation (student dose score) and student outcomes (response). In addition to the linear analyses, ANCOVA analyses were conducted to examine the possible threshold effects of implementation. This was achieved by contrasting the higher levels of implementation with the lowest levels of implementation. To determine higher and lower levels of implementation, implementation scores were divided into quartiles. The quartile ranking of the five implementation scores were entered separately as independent variables in the ANCOVA analyses to measure the association between student outcomes and four levels of implementation dose. Table 9 lists the variables used in the multivariate analyses.

Description of the independent variables

Independent variables used in the data analyses were developed from the study's four instruments measuring implementation of the curriculum. Seventeen variables measuring implementation were derived. Twelve of the variables measured completeness (quantity) of implementation and five measured fidelity (quality) of implementation. Six of the completeness variables measured by student work sample assessment and teacher lesson log included variables that measured the core, home, processing and optional activities separately. These variables were examined to see if the measurement of individual components achieved higher correlations with the same component measured by another instrument. Analyses involving these six variables are included in Appendix 23. The six completeness of implementation variables used in the analyses for study objectives two and three were conceptually representative of the entire lesson. These variables combined two or more activities in the lesson (eg: teacher log of core, home and processing activities). Table 7 describes the 17 variables.

While the 11 implementation measures appear to measure different dimensions of the intervention using all 11 variables (implementation variables) in the analyses is likely to incur Type I error. To limit the number of independent variables (implementation variables) it was hypothesised, *a priori,* that implementation variables with:

- Empirical evidence of higher correlations with other implementation variables; and

- Substantive evidence of: objective implementation measures (eg: student work samples); measures of the behavioural aspect of the intervention (road crossing practise); and / or measures covering more than one activity (eg: core and home activities),

would be selected for further examination of construct validity, ie, examination of a dose-response relationship between implementation measures and student outcomes.

Empirical evidence of an association between implementation measures was determined by calculating Spearman's rank correlation coefficients among the 11 implementation variables.

Based on the criteria described above, five of the 11 variables were selected for inclusion as independent variables in the multivariate analyses. These variables are:

- Student work sample core, home activities;
- teacher log of core, home, processing activities;
- teacher post-intervention self-report questionnaire using coding method 2 (taught most or some of the lesson);
- teacher log of crossing practise on a real road; and
- teacher log of crossing practise on a simulated road.

Students eligible to receive the intervention were assigned the scores for these five implementation variables from the three teachers who taught them the CPIPP lessons over the three study years. Yearly "dose" scores (proportion of the lessons completed) for each variable were averaged to determine a **three-year-average dose score** for each of the implementation variables. Table 8 demonstrates the calculation of students' three-year-dose score. Dose variables assigned to students were:

1 Student work sample record of core and home activities

(Students' three-year dose score is the mean of the proportion of core and home activities where paper evidence was present in at least one of a random sample of five student work books from their class for each of the three study years.)

2 Teacher log of core, home and processing activities

(Students' three-year dose score is the mean of the proportion of the core, home and processing activities their teachers reported teaching in their lesson log in each of the three study years.)

3 Teacher post-intervention self-report questionnaire coding method 2

(Students' three-year dose score is the mean of the proportion of the nine lessons where teachers reported teaching all or some of the lesson in the second and third study years.)

4 Teacher log of crossing practise on a real road

(Students' three-year dose score is the mean of the proportion of the nine lessons teachers reported teaching students to cross on a real road, in the second and third study years.)

5 Teacher log of crossing practise on a simulated road

(Students' three-year dose score is the mean of the proportion of the nine lessons teachers reported teaching students to cross on a simulated road, in the second and third study years.)

If a student's teacher reported he/she did not teach the intervention, students were assigned a zero dose for that year. Students whose teacher did not submit the implementation instrument were assigned zero dose for the non-returned implementation measure only, although they may have been assigned an implementation dose if another measure was returned.

A **composite measure of implementation** was derived to provide an overall implementation index using multiple measures of implementation. This measure was hypothesised as a more complete measure of the entire intervention as it measured all aspects of the curriculum. Four implementation variables provided empirical and substantive justification for inclusion in a composite implementation measure. Each student's scores for these four implementation variables were averaged to develop a **composite implementation score.**

The empirical criteria, set *a priori*, for the selection of variables to be included in this composite score, was that individual variables should demonstrate a positive and significant association with at least student pedestrian safety knowledge. Students' pedestrian safety knowledge was the outcome most likely to be associated with the implementation of classroom curricula. Of the five variables described above, only the teacher log of crossing practise on a simulated road did not meet the criteria and therefore, was not included in the composite measure of implementation.

Table 7: Implementation variables used in bivariate correlations of teacher implementation scores

	Implementation Variable	Variable type	Study years data collected	n	How implementation was scored
1	Student work sample evidence of core activities	Continuous ~	'95 '96 '97	5 8 9	Proportion of core activities where paper evidence was present in at least one in a random sample of five student work books.
2	Student work sample evidence of home activities	Continuous ~	'95 '96 '97	9 9 6	Proportion of home activities where paper evidence was present in at least one in a random sample of five student work books.
3	Student work sample evidence of core & home activities	Continuous *#	'95 '96 '97	14 17 15	Proportion of core and home activities where paper evidence was present in at least one in a random sample of five student work books.
4	Teacher log of core activities	Continuous ~	'95 '96 '97	9 9 9	Proportion of core activities teachers reported teaching in their log.
5	Teacher log of home activities	Continuous ~	'95 '96 '97	9 9 6	Proportion of home activities teachers reported teaching in their log.
6	Teacher log of processing activities	Continuous ~	'95 '96 '97	9 9 9	Proportion of processing activities teachers reported teaching in their log.
7	Teacher log of optional activities	Continuous ~	'95 '96 '97	26 19 15	Proportion of optional activities teachers reported teaching in their log.
8	Teacher log of core & home activities	Continuous	'95 '96 '97	18 18 15	Proportion of core and home activities teachers reported teaching in their log.
9	Teacher log of core, home & processing activities	Continuous *#	'95 '96 '97	27 27 24	Proportion of core, home and processing activities teachers reported teaching in their log.
10	Teacher log of core, home, processing & optional activities	Continuous	'95 '96 '97	53 46 39	Proportion of core, home, processing and optional activities teachers reported teaching in their log.
11	Teacher post-intervention self-reported implementation coding method 1	Continuous	- '96 '97	 9 9	Proportion of lessons teachers reported teaching all of the lesson.

12	Teacher post-intervention self-reported implementation – coding method 2	Continuous *#	- '96 '97	- 9 9	Proportion of lessons teachers reported teaching all or some of the lesson.
13	Observed fidelity	Continuous	'95 '96 '97	3 3 3	Mean rating of three observed behaviours rated from 1(low fidelity) to 3 (high fidelity).
14	Observed teaching style	Continuous	'95 '96 '97	8 8 8	Mean rating of eight observed behaviours rated from 1(low) to 3 (high).
15	Teacher log of crossing practise on a real road	Continuous * #	- '96 '97	- 6 6	Proportion of the nine lessons teachers reported teaching students to cross a real road.
16	Teacher log of crossing practise on a simulated road	Continuous *	- '96 '97	- 6 6	Proportion of the nine lessons teachers reported teaching students to cross a simulated road.
17	Teacher post-intervention self-assessed fidelity	Ordinal	'95 '96 '97	- - -	Teachers' report of how well they taught curriculum: 3 - very adequately, 2 – adequately, 1 – inadequately.

* Five independent variables assigned to students and used in bivariate correlations and multivariate analyses with student outcomes
# Four variables averaged for the composite implementation measure
~ Six implementation variables included in analyses reported in appendix 23

Table 8: Example calculation of three-year student dose for the six implementation measures

Variable:	1995 dose	1996 dose	1997 dose	Three-year total score	Three-year-average score	Number of lessons
Student work sample evidence of core & home activities STUDENT A	0.5 +	0.7 +	0.8	= 2.0	2.0/3 = 0.67 [a]	67% of 27 lessons = 18 lessons
Teacher log of core, home & processing activities STUDENT A	0.8 +	0.7 +	0.8	= 2.3	2.3/3 = 0.77 [a]	77% of 27 lessons = 21 lessons
Teacher self report of lesson completion (method 2) STUDENT A	Not collected In 1995	0.9 +	0	= 0.9	0.9/2 = 0.45 [a]	45% of 18 lessons = 8.1 lessons
Teacher log of crossing practise On a real road STUDENT A	Not collected In 1995	0.2 +	0.3	= 0.5	0.5/2 = 0.25 [a]	25% of 18 lessons = 4.5 lessons
Teacher log of crossing practise On a simulated road STUDENT A	Not collected In 1995	0.3 +	0.4	= 0.7	0.7/2 = 0.35	35% of 18 lessons = 6.3 lessons
Composite implementation score Mean of the three-year average for the first four implementation variables [a] STUDENT A					2.14/4 = 0.54	

[a] Variables included in the composite implementation measure
Note: Zero dose assigned when teacher: reported he/she did not teach any lessons; or did not respond to the implementation measure.

Description of the dependent variables

Three, continuous outcome variables were developed from the student self-report questionnaire. The student outcome variable, **pedestrian safety knowledge**, was a summation of 10 pedestrian knowledge-based items (questionnaire items 1-9, 11) scored '1' for a correct answer, or '0' for an incorrect answer. The 10 items assessed several dimensions of pedestrian safety that were included in the curriculum namely safer places to cross the road, adult accompaniment, traffic search strategies and using footpaths.

Three items (questionnaire items 14, 15, 22) measuring student self-reported road crossing behaviour were summed to provide the outcome variable **road crossing behaviour**. A score of '0' (greatest risk) for this outcome variable indicated students were walking along and crossing roads in their neighbourhood and on their way to school without adult help.

Three items (questionnaire items 17, 18, 19) measuring student self-reported road playing behaviour were also summed to provide the outcome variable **road playing behaviour** (0 greatest risk to 3 lowest risk). A score of '0' indicated the students were playing on the footpath, the road and on the driveway. For both of the behaviour indices the score of '3 –lowest risk' indicated they reported taking none of these risks.

For the two behavioural outcome variables described above and the student exposure to the road environment index which follows, higher scores are in the criterion direction. For each variable the criterion direction is desirable behaviour. That is, students receive a higher score for safer behaviour. This safer behaviour is in fact a 'lower' exposure to the road environment.

Description of the covariates

The research suggests factors influencing a child's risk of pedestrian injury may include their exposure to the road environment, socio-economic status and sex (Stevenson 1995). These factors were entered as covariates in all analyses.

Each student was assigned a socio-economic status value. This value was determined according to the Index of Relative Socio-Economic Disadvantage as described by the Australian Bureau of Statistics based on the postcode of the school the student attended (Castles 1994). The student school postcode was chosen as students typically live within a five-kilometre radius of their school. Higher scores on this index equate to socio-economic advantage. This index uses data collected as part of the 1991 census (the most recent data at the time of writing) and summarises variables related to households' economic resources, education and occupation.

Two items on the student self-report questionnaire (items 12 and 13) measured student exposure to the road environment. The two items were summed to provide the continuous covariate "exposure". Higher scores on this variable demonstrated desirable pedestrian safety behaviour, that is, lower exposure to the road environment. The coding for item 12 was '1' (low exposure or safer behaviour for this age group) for car or bus as mode of transport to school and '0' (high exposure) for walking and riding a bike. The coding for item 13 used a weighting procedure where the frequency of walking to school on none, or only a few days a year was coded '2' (lowest exposure), one to three days a week was coded '1' (low exposure) and walking to school four to five days a week was coded '0' (high exposure). The 'exposure' score (using total score) of '0' indicated the students had high 'exposure' to the road environment, that is, they walked or rode their bike to school and did so on four to five days of the week. The highest possible score for this variable was '3' which represented the lowest exposure to the road environment. The mean exposure score of the four data collection points was entered in the model as a covariate.

To determine the most parsimonious model, the three covariates were forced into the models and taken out one at a time if they were not significant. Table 9 summarises the variables used in multivariate analyses.

Table 9: Dependent, covariate and independent variables used in multivariate analyses

Variable	Variable Type
DEPENDENT:	
Pedestrian safety knowledge [1]	Continuous
Student-reported road-crossing behaviour [1]	Continuous
Student-reported road-playing behaviour [1]	Continuous
COVARIATE:	
Gender	Binary
Socioeconomic status [2]	Continuous
Student-reported exposure to the road environment [3]	Continuous
INDEPENDENT:	
Student work sample evidence of core & home activities [4]	Continuous
Teacher log of core, home & processing activities [4]	Continuous
Teacher post-intervention self-reported implementation – coding method 2 [5]	Continuous
Teacher log of crossing practise on a real road [5]	Continuous
Teacher log of crossing practise on a simulated road [5]	Continuous
Composite implementation index [6]	Continuous

[1] Change from baseline to post-test'97 where higher scores are in the criterion direction
[2] Based on Index of Relative Socioeconomic Disadvantage score for students school postcode
[3] Mean score across four data collections
[4] Three-year dose score
[5] Two-year dose score
[6] Mean of four independent variables

Summary

This chapter has described the stages undertaken to conduct the process evaluation of the Child Pedestrian Injury Prevention Project. The first step in this study saw the development of a research design and sample selection techniques required for a multi-component intervention trial addressing child pedestrian injury in Western Australia. Following this stage, a school-based intervention targeting the pedestrian safety knowledge and behaviours of the CPIPP student cohort was developed. The intervention included the development of Grades 2, 3 and 4 curricula as well as strategies to support and enhance their implementation. Survey instruments were then developed to examine the process of intervention delivery and the impact of the school-based intervention. Data collection procedures were established and data analyses planned.

The four instruments developed to measure teacher implementation of the CPIPP pedestrian safety education curriculum and the student instrument to measure the impact of the curriculum outlined in this chapter will be used to assess the process evaluation of the CPIPP school-based intervention. This process evaluation will be achieved in Chapter 4 by answering the objectives of the study. The study's objectives are summarised in the following three questions:

1. Were teachers and students satisfied with the CPIPP intervention?
2. How much of the CPIPP intervention was taught by teachers to the student cohort?
3. Which measure of implementation was the best predictor of student outcomes?

Chapter 4

Results

This chapter presents the uni-variate and multivariate results of the process evaluation of the Child Pedestrian Injury Prevention (CPIPP) school-based intervention. The first section of the chapter describes the validity and reliability testing of two of the study's instruments, followed by the demographic characteristics, response rates, and sample representation of the teachers and students receiving the CPIPP intervention. The analyses in the remainder of the Chapter address the objectives of the study.

As alluded to in Chapter 3, the analyses presented in this Chapter consider the CPIPP school-based treatment condition only. Outcomes related to the intervention and comparison groups and the community-based intervention in the larger CPIPP study are reported elsewhere (Stevenson 1999; Cross In press).

Validity and reliability testing of the instruments

Student questionnaire

Similar to other primary school based research, the reliability analysis on the student questionnaire was lower than would be expected in older children or adults (Rivara 1991; Gore 1992; Resnicow 1992; Parcel 1995). The Kappa statistic on individual items with categorical responses ranged from 0.04 to 0.68 (Table 10). However, the lower than desirable (a minimum of 0.4 according to Haas (1991) (Haas 1991)) Kappa scores for some items were due to limited variation in student responses. The Kappa score is an inappropriate reliability statistic for these items as the proportion of agreement is much greater than the Kappa scores and most of the agreement is limited to only one of the rating choices (Haas 1991).

As described in Chapter 3, three indices were developed by summing items in the student questionnaire, namely, pedestrian safety knowledge, road crossing behaviour and road playing behaviour. These three constructs were viewed as indices rather than scales based on the recommendations of Bollen and Lennox (1991) that if a construct does not measure an underlying psychological trait it should not be considered a scale. Therefore, internal consistency was not assessed (Bollen 1991).

Reliability analyses of the three indices examined correlations between the test and retest scores for each index. It should be noted that question numbers on the baseline questionnaire are not the same as those on the pilot questionnaire reported in Table 10. Copies of these two instruments can be found in Appendices 6 and 24 respectively. The test-retest correlation for the 10-item pedestrian safety knowledge index (using total score for test-retest questions 1-5, 7-10, 12) was 0.47. The student reported road-crossing behaviour index (total score for test-retest questions 15, 16, and 21) achieved a correlation of 0.61 and the student reported road-playing behaviour index (total score for test-retest questions 18a, 18b, 18c) achieved 0.42.

Students' exposure to the road environment was measured by the summation of two items on the questionnaire. The test-retest correlation for the 2-item exposure to the road environment variable (using total score) was 0.70. Instrument items indicating students' exposure to the road environment included mode of transport to school and frequency of walking to school (test-retest questions 13,14).

Item difficulty for knowledge questions are included in Table 10. A question was considered too difficult if less than 30 per cent of students answered correctly and too easy if more than 90 per cent answered correctly or in the criterion direction (Seal 1992). Items found to be too easy or too difficult were either removed from the questionnaire or re-worded prior to the baseline administration of the questionnaire to the student cohort.

With information gained from this pilot test; stability reliability, item difficulty and feedback from the expert panel, a number of changes were made to the wording of questions, the wording of responses, and the illustrations.

Table 10: Test-retest stability reliability and item difficulty (knowledge items only) of the pilot student questionnaire. (n = 108)

Question	Item	Test-retest Kappa Statistic (Standard Error)	Test-retest % agreement	% of students answering knowledge item correctly at pre-test
Knowledge – Safer place to cross	1	0.28 (0.08)	65.8	76.1 [a]
Knowledge – Safer place to cross, adult accompaniment	2	0.08 (0.08) *	66.1	80.7 [a]
Knowledge – Safer place to cross	3	0.12 (0.06)	35.3	58.6
Knowledge – Safer place to cross, adult accompaniment	4	0.28 (0.01) *	73.3	77.8 [a]
Knowledge – Using the footpath	5	0.44 (0.10)	80.6	80.6 [a]
Knowledge – Walking alongside a road	6	0.08 (0.12) *	87.8	92.5 [b]
Knowledge – Traffic search strategies crossing between parked cars	7	0.38 (0.09)	75.7	10.3 [a]
Knowledge – Traffic search strategies crossing after alighting a bus	8	0.04 (0.07) *	72.6	82.1 [a]
Knowledge – Traffic search Strategies	9	0.25 (0.09)	68.7	73.3 [a]
Knowledge – Traffic search Strategies	10	0.17 (0.07)	51.0	57.0
Awareness of crossing attendant	11	0.68 (0.07)	86.0	-
Knowledge – Safer place to cross	12	0.38 (0.12)	86.2	82.6 [a]
Exposure – Mode of transport to school	13	0.63 (0.08)	83.5	-
Exposure – Frequency of walking to school	14	0.48 (0.07)	67.0	-
Behaviour (road crossing) – Adult accompaniment walking to school	15	0.55 (0.07)	70.3	-
Behaviour (road crossing) – Adult accompaniment when crossing a road	16	0.44 (0.07)	65.7	-
Use of crossing attendant	17	0.46 (0.07)	69.2	-
Behaviour (road playing) –				-
footpath	18	0.22 (0.14)	81.0	
road	18	0.49 (0.12)	85.4	
driveway	18	0.31 (0.10)	71.6	
Parent support – Frequency of parent talking about safer road crossing	19	0.36 (0.07)	58.9	-
Behaviour (road crossing) – Adult accompaniment crossing a road	20	0.39 (0.07)	59.3	-
Behaviour (road crossing) – Adult accompaniment crossing a road	21	0.34 (0.08)	61.6	-
Behaviour (road crossing) – Adult accompaniment crossing a road	22	0.50 (0.08)	77.3	-

[a] Item reworded
[b] Item removed from the questionnaire
* Most of the agreement limited to one rating choice

Validation of students' self-report road crossing behaviour

A validity study was conducted to assess the ability of students to accurately report their road crossing behaviour. As described in Chapter 3, this validity study involved firstly the observation of adult accompaniment of students during the journey to school and specifically on the first road crossed, and secondly, student-report of this behaviour at an interview 10-15 minutes later.

A correlation of 0.83 was found between student self report (in the post-journey to school interview) and observed adult accompaniment during the journey to school. A lower correlation of 0.8 was observed between student self report (interview) and observed adult accompaniment on the first road crossed. The premise of this validation technique was that if correlations were high between student-reported behaviour at the interview and what was observed 10-15 minutes prior, then student-reported behaviour was a valid measure of student road crossing behaviour. That is, students are able to recall and report with reasonable accuracy their road crossing behaviour.

Trained observers conducted the observation and interview of children in this validity study. The observers' inter-rater reliability was assessed using video scenarios, at the training and three weeks after the observation period had commenced. Observer agreement on individual items in the observation schedule ranged from 81% to 92%.

Teacher self-report questionnaire

The results of the reliability analyses for the pre-intervention teacher self-report questionnaire are shown in Table 11. The Kappa statistic on individual items with categorical responses ranged from 0.13 to 1.0 (Table 11). Lower than desirable (a minimum of 0.4 according to Haas (1991) (Haas 1991)) Kappa scores for some items was due to limited variation in responses. A copy of the test-retest questionnaire can be found in Appendix 25.

As a result of information gained from this pilot test; stability reliability, item difficulty and feedback from the expert panel, a number of changes were made to the wording of questions and the wording of responses. A copy of the final version of the pre-intervention teacher self-report questionnaire may be found in Appendix10.

Table 11: Test-retest stability reliability and item difficulty (knowledge items) of the pilot teachers' pre-intervention self-report questionnaire. (n = 20)

Question	Item	Variable type	Kappa Statistic (Standard Error) / Pearson's Correlation Coefficient	% agreement on test and retest responses	% of teachers answering knowledge item correctly at pre-test
Year level of students	3	Categorical	1.00 (0.00)	100	na
Number of students in class	4	Continuous	0.99	na	na
Teaching status *	5	Categorical	1.00 (0.00)	100	na
Gender *	6	Binary	0.77 (0.22)	95	na
Age *	7	Categorical	1.00 (0.00)	100	na
University education *	8	Categorical	1.00 (0.00)	na	na
Years of teaching experience*	9	Continuous	0.99	na	na
Years of experience teaching Grade 2 students *	10	Continuous	0.99	na	na
Tertiary health education training	11	Binary	0.36 (0.17)	70	na
Health education training in the last 5 years *	12	Categorical	0.41 (0.16)	58	na
Road safety training in the last 2 years *	13	Binary	0.77 (0.22)	95	na
Time allocated to health ed.	14	Continuous	0.88	na	na
Pedestrian safety taught this year *	15	Binary	1.00 (0.00)	100	na
Subjects (5 choices) in which pedestrian safety is taught	16	Binary	0.46 (0.31) – 1.00 (0.00)	80-100	na
Where road crossing practise was conducted last year (6 choices)	17	Binary	0.20 (0.23) – 1.00 (0.00)	68-100	na
Guest speaker invited to classroom	18	Binary	0.78 (0.15)	90	na
Importance of pedestrian safety as a health topic *	19	Categorical	na	75-85	na
Importance of health education for students	20	Categorical	na	55-95	na
Status of health education and 4 other subjects	21	Categorical	0.60 (0.25) – 1.00 (0.00)	90-100	na

Question	Item	Variable type	Kappa Statistic (Standard Error) / Pearson's Correlation Coefficient	% agreement on test and retest responses	% of teachers answering knowledge item correctly at pre-test
Use of road safety education resources:	22				
Seen them (9 resources)		Binary	0.38 (0.22)-1.00 (0.00)	74-100	na
Used them (9 resources)		Categorical	0.50 (0.31)-1.00 (0.00)	53-100	
Adopter characteristics scale items (18)	23	Ordinal	na	43-80	na
Modifies lessons	24	Categorical	0.38 (0.20)	70	na
Required to teach too many programs	25	Categorical	0.81 (0.12)	90	na
Send home activities	26	Categorical	0.42 (0.21)	75	na
Contacts health agencies	27	Categorical	0.65 (0.19)	85	na
Asked to lead school committees	28	Categorical	0.83 (0.17)	95	na
Acceptance of new programs	29	Categorical	0.35 (0.20)	69	na
Knowledge – pedestrian safety	30	Binary	0.48 (0.16)	65	30
Knowledge – pedestrian safety	31	Binary	0.67 (0.13)	80	50
Knowledge – pedestrian safety	32	Binary	0.50 (0.16)	70	50
Knowledge – pedestrian safety	33	Binary	0.67 (0.13)	80	35
Knowledge – pedestrian safety	34	Binary	0.66 (0.12)	80	80
Knowledge – pedestrian safety	35	Binary	0.78 (0.19)	75	75
Knowledge – pedestrian safety	36	Binary	0.89 (0.12)	95	100
Knowledge – pedestrian safety	37	Binary	0.63 (0.23)	90	10
Knowledge – pedestrian safety	38	Binary	0.78 (0.19)	74	68
Knowledge – pedestrian safety	39	Binary	0.13 (0.16)	60	65
Knowledge – pedestrian safety	40	Binary	0.00 (0.19)	60	70
Knowledge – pedestrian safety	41	Binary	0.50 (0.16)	70	70
Child pedestrian in his/her school killed *	42	Binary	1.00 (0.00)	100	na
Child pedestrian in his/her class killed	43	Binary	0.64 (0.33)	95	na
Child pedestrian in his/her school injured *	44	Binary	0.50 (0.23)	85	na
Child pedestrian in his/her class injured	45	Binary	0.47 (0.20)	74	na
Responsibility for decision to be involved in CPIPP	46	Categorical	na	90	na

na – not applicable
* Variables used in "Teacher sample characteristics"

Characteristics of the Samples

As mentioned in Chapter 3, study samples for this process evaluation include students and teachers who participated in the school-based pedestrian safety intervention condition of the Child Pedestrian Injury Prevention Project (CPIPP). Thirty intervention schools participated in CPIPP from February 1995 to November 1997. Students recruited at baseline formed the study's student cohort, who were tracked for 2.5 years. A new group of teachers was recruited to the project in each study year as students progressed through their second (1995), third (1996) and fourth (1997) grade of school. Cohort students were grouped by their school and assigned a new teacher at the commencement of each school and study year. In most groups (classes) the generalist (classroom teacher) taught the CPIPP intervention to their students, however, as shown in Table 12, some teachers taught more than one class in some years.

Table 12: Number of classes[a] (and teachers[b]) for each year of CPIPP

Study Condition	1995	1996	1997
High Intervention Group (14 schools)	32 (31)	32 (31)	38 (38)
Moderate Intervention Group (16 schools)	36 (30)	35 (35)	35 (34)
Total	68 (61)	67 (66)	73 (72)

[a] Classes were both homogonous and heterogenous year groupings.

[b] Some teachers taught more than one health education class.

Characteristics of the teacher sample

Prior to the commencement of the intervention each year, the characteristics of teachers were assessed using a self-report questionnaire. In 1995, 1996 and 1997 the baseline characteristics of teachers for the high intervention group and the moderate intervention group did not differ significantly. In analyses testing the differences between these two groups, all variables were tested except for: gender in 1995 and

1996, due to the small number of male teachers in the sample; road safety training in the last two years in 1995 and 1996, due to the small number of teachers participating in road safety training; and awareness of a student pedestrian injury reported by 1995 teachers, due to the small number of teachers not aware of a student pedestrian injury in their teaching career. For some teacher characteristics cells with low numbers were collapsed to meet the assumptions of chi-square analyses. The unvariate comparisons between high intervention group teachers and moderate intervention group teachers are listed in Appendix 26.

As there were no significant differences between high and moderate intervention teachers, the groups were collapsed into one to examine the characteristics of teachers between 1995, 1996 and 1997 (Table 13). All characteristics were tested for differences between the three study years.

Significant differences between teachers in the three study years were apparent for five baseline characteristics. There was an association between gender and study year (χ^2 =10.7, df = 2, p=0.005) with more male teachers (22.6%) in the 1997 teacher cohort compared to 1995 (4.9%) and 1996 (7.8%) cohorts. Whereas teaching experience overall was similar across the three years, on average the 1995 teacher cohort had taught Grade 3 students for significantly more years (6.5 years) than 1996 teachers had taught Grade 4 students (4.3 years) (p=0.022). There was an association between road safety training in the last two years and study year (χ^2= 16.42, df = 2, p=0.000) with more 1996 and 1997 teachers participating in training (1996: 20%; 1997: 29%) compared to 1995 teachers (2%). An association was also found between the amount of time spent teaching pedestrian safety lessons in the previous year and study year (χ^2 =11.52, df = 2, p=0.003) with more 1995 teachers teaching 3-6 hours of pedestrian safety in the previous year (45%) compared to 1997 teachers (17%).

To determine if teachers had a heightened awareness of the need to teach pedestrian safety, teachers were asked if at any time in their teaching career they taught at a school where a student had been killed or injured whilst a pedestrian. There was an association between teacher awareness of a child who was attending their school who had been injured while crossing a road and the study year (χ^2=7.35, df = 2, p= 0.025) with more teachers in 1995 aware of a pedestrian injury (85.2%) compared to teachers (64.1%) in 1996.

Other demographic characteristics of the teacher sample are included in Table 13.

Table 13: Intervention teacher sample characteristics by study year (high and moderate intervention groups combined)

Variable	1995 n=61	1996 n=64	1997 n=62	χ^2 (df)	P value
	n(%)	n(%)	n(%)		
Age				5.9 (4)	0.21
20-29	7 (11.9)	16 (25.4)	7 (11.5)		
30-39	15 (25.4)	14 (22.2)	14 (23.0)		
40 or older	37 (62.7)	33 (52.4)	40 (65.6)		
Gender				10.7 (2)	0.00
Male	3 (4.9)	5 (7.8)	14 (22.6)		
Female	58 (95.1)	59 (92.2)	48 (77.4)		
Teaching status				0.52 (2)	0.77
Full time	47 (77.0)	51 (79.7)	51 (82.3)		
Part time	14 (23.0)	13 (20.3)	11 (17.7)		
University education				1.89 (2)	0.39
Completed 3 years of university	36 (61.0)	33 (51.6)	30 (49.2)		
Completed 4 or more years of university	23 (39.0)	31 (48.4)	31 (50.8)		
Teaching experience				F=1.97	0.14
Mean (years)	14.6	14.0	16.8		
Experience teaching the Grade level				F=3.71	0.02 (1995v 1996)
Mean (years)	6.5	4.3	5.2		
Health education training in the last 5 years				8.11 (4)	0.09
0 hours	36 (63.2)	32 (50.0)	26 (41.9)		
1-3 hours	16 (28.1)	17 (26.6)	20 (32.3)		
4+ hours	5 (8.8)	15 (23.4)	16 (25.8)		
Road safety training in the last 2 years				16.42 (2)	0.00
Yes	1 (1.7)	13 (20.3)	18 (29.0)		
No	58 (98.3)	51 (79.7)	44 (71.0)		
Importance of pedestrian safety as a health topic for students				5.53 (4)	0.24
Most important health topic	24 (40.0)	19 (30.2)	15 (24.6)		
Second most important health topic	32 (53.3)	35 (55.6)	35 (57.4)		
Third/fourth most important health topic	4 (6.7)	9 (14.3)	11 (18.0)		
Hours spent on pedestrian safety lessons last year				11.52 (2)	0.00
Did not teach the Grade level	21 (36.2)	25 (40.3)	28 (46.7)		
0 - 2.9 hours	11 (19.0)	20 (32.3)	22 (36.7)		
3 - 6 hours	26 (44.8)	17 (27.4)	10 (16.7)		
Child pedestrian in his/her school killed				0.71 (2)	0.70
Yes	20 (32.8)	17 (26.6)	20 (32.3)		
No	41 (67.2)	47 (73.4)	42 (67.7)		
Child pedestrian in his/her school injured				7.35 (2)	0.03
Yes	52 (85.2)	41 (64.1)	46 (74.2)		
No	9 (14.8)	23 (35.9)	16 (25.8)		

Note: Totals do not add to entire sample due to missing data

Characteristics of the student sample

The student sample for this study comprised high and moderate intervention group students who completed baseline and all three post-tests (post-test 95, post-test 96, post-test 97). Characteristics of these 1,049 longitudinal cohort students who received the CPIPP intervention are summarised in Table 14.

Fifty one percent (n=535) of the students were female. The mean age of the students at baseline was 6.4 years. Approximately one third of students resided in lower socio-economic status (SES) suburbs, one third in middle SES suburbs and one third in higher SES suburbs. At baseline, 35.7% of cohort students reported they walked to school or rode their bicycle to school on most days. Forty percent of cohort students reported crossing one or more roads alone each day.

The characteristics of the high intervention group students and moderate intervention group students are presented separately in Appendix 27.

Table 14: Characteristics of students in the longitudinal cohort

Variable	n=1049 n(%)
Gender	
Male	514 (49.0)
Female	535 (51.0)
Age	
(mean years at baseline)	6.43
Socio-economic status [a]	
Low	353 (33.7)
Middle	324 (30.9)
High	372 (35.5)
Exposure to the road environment	
Mode of transport to school (on most days at baseline)	
Walk	282 (27.1)
Bike	89 (8.6)
Car	608 (58.5)
Bus	61 (5.9)
Proportion of students crossing 1or more roads alone each day (% at baseline)	40.0

[a] Based on tertiles of postcode level 1991 Western Australian census data for the Index of Relative Socio-economic Disadvantage of the students' school postcode.

Response rates

Teacher response rates

Process evaluation data were collected from intervention group teachers recruited in each year of the project using five instruments. Response rates for these instruments are reported as the proportion of eligible classes from which teachers:

- provided a random selection of five, **student workbooks**;
- completed a **lesson log** of activities and lessons taught to students;
- were **observed** teaching a CPIPP lesson;
- completed a **pre-intervention** self-administered **questionnaire**; and
- completed a **post-intervention** self-administered **questionnaire.**

Student Work Samples (Student Workbooks)

Response rates for student work samples are shown in Table 15. In 1995, 96% (65 of the 68) of teachers of eligible classes provided a random selection of five student workbooks. In 1996, 100% (67 of the 67) of teachers of eligible classes provided student workbooks for assessment. In 1997, 100% (73 of the 73) of teachers of eligible classes provided student workbooks for assessment.

Teacher Lesson Log

In 1995, 99% (67 of the 68) of eligible teachers completed a log of all nine CPIPP lessons. In 1996, 93% (62 of the 67) of eligible teachers completed lesson logs. In 1997, the teacher lesson log response rate was lower (68%) when 50 of the 73 eligible teachers completed lesson logs. The lower response rate in 1997 is due in part to: four teachers refusing to teach the lessons to his/her students because they were unwilling to take on a new program; two new classes were created after the intervention commenced; and five teachers attended the teacher training but subsequently did not teach the intervention. Response rates for the teacher lesson log are shown in Table 15.

Classroom Observation

In 1995, 71% (48 of the 68) of eligible teachers were observed teaching one CPIPP lesson. In 1996, 75% (50 of the 67) of eligible teachers were observed and in 1997, 32% (23 of the 73) of eligible teachers were observed. The response rates for classroom observation are shown in Table 15.

Whereas the original target was to observe all eligible teachers, response rates for classroom observation were lower than response rates to all other process evaluation instruments. The reluctance by teachers to have an observer in their classroom while teaching contributed to these lower response rates. Only teachers who returned phone calls and agreed to be observed were observed. As described in Chapter 2, teachers were contacted by phone a week prior to a pre-arranged time to observe his/her class in a CPIPP lesson. Making this phone contact was difficult as teachers could only be contacted in their morning and lunchtime breaks and they did not always return phone calls when a message was left for them. The lower response rate in 1997 was due to a new 1997 project officer having difficulty contacting teachers to arrange observation times and this project officer not having a vested interest in achieving high response rates for this measure. Additionally, project research assistant staff were tiring of this difficult task of making phone contact with teachers by the third and final year of the project.

Pre-intervention Teacher Self-report Questionnaire

Prior to the commencement of each study year, teachers recruited to teach the CPIPP intervention were asked to complete a self-administered questionnaire. Completed questionnaires were obtained from 100% of the 61 eligible teachers in 1995. These 61 teachers taught the 68, 1995 classes (see Table 12). In 1996, 97% (64 of the 66) of eligible teachers completed questionnaires. In 1997, 88% (62 of the 72) of eligible teachers completed questionnaires. Response rates for the pre-intervention teacher self-report questionnaire are shown in Table 15.

Post-intervention Teacher Self-report Questionnaire

Each year, at the completion of the nine-lesson CPIPP intervention, teachers were asked to complete a self-administered questionnaire. In 1995, 98% (60 of the 61) of eligible teachers completed the questionnaire. In 1996, 91% (60 of the 66) of eligible teachers completed the questionnaire. In 1997 the response rate was lower at 62% (45 of the 72 eligible teachers). This lower 1997 response rate was due in part to 16 teachers taking long service leave at the time of administering the questionnaire, and during the follow-up period. Replacement teachers were able to provide student work books and lesson logs, however they were not able to report on curriculum implementation for the whole year which was required in the post-intervention teacher self-report questionnaire. The response rates for this instrument are shown in Table 15.

Table 15: Response rates for intervention process evaluation instruments

Instrument	**1995**	**1996**	**1997**
Eligible classes:	n=68	n=67	n=73
Student workbooks			
Respondents	[a]65	67	73
Response rate %	96	100	100
Teacher lesson log			
Respondents	67	[b]62	[c]50
Response rate %	99	93	68
Classroom observation			
Observations	48	50	[c]23
Response rate %	71	75	32
Eligible teachers:	n=61	n=66	n=72
Pre-intervention teacher self-report questionnaire			
Respondents	68	64	[c]63
Response rate %	100	96	86
Post-intervention teacher self-report questionnaire			
Respondents	67	61	[c,d]46
Response rate %	99	91	63

The following information was provided by teachers who did not complete instruments:

[a] 3 teachers reported their students had taken their workbooks home; these teachers were observed teaching one lesson

[b] 2 teachers were trained in the intervention but subsequently did not teach it (student work books returned empty); 3 teachers returned student workbooks but did not submit lesson logs

[c] 4 teachers refused to participate in the intervention (student workbooks returned empty); 2 classes were created after the intervention commenced (student workbooks returned empty); 5 teachers were trained in the intervention but subsequently did not teach it (student work books returned empty); 12 teachers returned student workbooks but did not submit lesson logs

[d] 16 teachers were on long service leave when the questionnaire was administered

Student response rates

As described in Chapter 3, students were administered a self-report questionnaire to evaluate the impact of the CPIPP school-based pedestrian safety education intervention. Of the 1,571 intervention group students available at baseline, 1,531 (97%) completed the questionnaire. Sixty nine per cent (n=1,049) of baseline students completed follow-up questionnaires in all three post-tests - 1995, 1996 and 1997. These 1,049 students who responded at baseline and all three follow-up points comprise the "student cohort". Of those students lost to follow-up, 22% moved to schools not in the same community, and the remaining 9%, whose names were still on class lists, were sick or unable to complete the questionnaire during the administration and follow-up period. Separate response rates for the high and moderate intervention groups are presented in Appendix 28.

Table 16: Response rates of intervention group students recruited from baseline to post-test 1997

	Baseline	Post-test 1995	Post-test 1996	Post-test 1997	Longitudinal Cohort
Longitudinal cohort students surveyed	n=1571	n=1531	n=1402	n=1211	n=1531
Respondents	1531	1402	1211	1049	1049
Response Rate	97%	92%	86%	86%	69%[a]

[a] Percent of baseline respondents who responded at all post-tests

Sample representation

The representation of the sample of teachers

Selective and differential attrition are not reported for the representativeness of the teachers because in all three years, no teachers were lost to follow-up. That is, all teachers who provided baseline information in the pre-intervention teacher self-report questionnaire completed at least one other implementation measure. Therefore, the representativeness of the teachers was assessed by comparing baseline demographic data for teachers who:

- completed lesson logs with those who did not;
- were observed teaching a CPIPP lesson with those who were not;
- completed a post-intervention self-report questionnaire with those who did not.

The demographic variables used in these analyses included: teachers' age, gender, teaching status, university education, years of teaching experience and road safety training in the last two years. These data were obtained from the teacher pre-intervention self-report questionnaire. Gender and teaching status of teachers who did not complete this questionnaire was obtained from their school Principal.

Demographic characteristics of teachers who completed their lesson logs and teachers who did not complete their lesson logs did not differ, except for the gender of teachers. As evident in Table 17, there were 22% more females in the group of teachers who completed lesson logs than in the group of teachers who did not complete lesson logs (χ^2 = 11.523, df = 1, p = 0.001).

While the response rate for observation of teachers was low (71% in 1995, 75% in 1996 and 32% in 1997), the demographic characteristics of the teachers who were observed and those not observed did not differ, except for the gender of teachers. There were 11% more females in the group of teachers who were observed than in the group of teachers not observed (χ^2 = 5.742, df = 1, p = 0.017).

Demographic characteristics of teachers who completed and those who did not complete the post-intervention self-report did not differ, except for the gender of teachers and teaching status. There was an association between gender and completion of the questionnaire (χ^2 = 15.891, df = 1, p = 0.000) with 24% more females completing the questionnaire. However, the gender difference is likely to be an artefact of the small numbers of male teachers in the sample. In fact two cells in the chi square analyses have fewer than 5 subjects hence the finding should be interpreted with caution. Sixteen percent fewer full time teachers completed the questionnaire (χ^2 = 4.408, df = 1, p = 0.036).

These data are summarised in Table 17.

Table 17: Comparison of respondents and teachers who did not respond to implementation instruments

Variable	Respondents	Non-respondents
	%	%
Teacher Lesson Log	n = 179	n = 29
Age (% 40 years or older)	59	65
Gender (% female) [a]	91	69
Teaching status (% full time)	77	79
University education (% completed 4 or more years of university)	45	56
Teaching experience (mean years)	15.1	13.7
Road safety training in the last 2 years (% yes)	17	17
Classroom Observation	n = 121	n = 87
Age (% 40 years or older)	56	66
Gender (% female) [b]	93	82
Teaching status (% full time)	76	80
University education (% completed 4 or more years of university)	45	48
Teaching experience (mean years)	14.3	16.1
Road safety training in the last 2 years (% yes)	19	12
Post-intervention self-report q'aire	n = 174	n = 34
Age (% 40 years or older)	63	43
Gender (% female) [a]	92	68
Teaching status (% full time) [b]	75	91
University education (% completed 4 or more years of university)	43	62
Teaching experience (mean years)	15.3	12.9
Road safety training in the last 2 years (% yes)	15	28

[a] Significant difference between groups (p< 0.01)
[b] Significant difference between groups (p< 0.05)

Teacher sample representation was further examined by considering the extent to which high and moderate intervention group teachers who did not provide implementation information, were similar for demographic features. Differences between these groups were not tested because cell numbers were low. These data are summarised in Table 18.

The characteristics of high and moderate intervention group teachers who did not respond to implementation measures are similar. However the proportion of females in the moderate intervention group is lower.

Table 18: Comparison of characteristics of high and moderate intervention group teachers who did not respond to implementation instruments.

	Non-respondents	
Variable	**High Intervention Group Teachers**	**Moderate Intervention Group Teachers**
	%	%
Teacher Lesson Log	n = 16	n = 13
Age (% 40 years or older)	71	60
Gender (% female)	81	54
Teaching status (% full time)	75	85
University education (% completed 4 or more years of university)	63	50
Teaching experience (mean years)	13.5	13.8
Road safety training in the last 2 years (% yes)	13	20
Classroom Observation	n = 48	n = 39
Age (% 40 years or older)	68	64
Gender (% female)	90	72
Teaching status (% full time)	81	77
University education (% completed 4 or more years of university)	49	47
Teaching experience (mean years)	16.3	15.9
Road safety training in the last 2 years (% yes)	13	11
Post-intervention self-report q'aire	n = 17	n = 17
Age (% 40 years or older)	46	40
Gender (% female)	76	59
Teaching status (% full time)	88	94
University education (% completed 4 or more years of university)	50	73
Teaching experience (mean years)	12.1	13.5
Road safety training in the last 2 years (% yes)	21	33

Representation of the student sample

The representation of the student sample was assessed both within and between intervention groups. This was achieved by considering:

- selective attrition between cohort and lost to follow-up students; and
- differential attrition for lost to follow-up students between the high and moderate intervention groups.

Selective Attrition

Selective attrition was examined by comparing demographic and outcome data for cohort students with data for the lost to follow-up students (students who did not complete all of the baseline and three follow-up questionnaires). The results from the comparison are summarised in Table 19. Cohort and lost to follow-up students differed on two characteristics: SES and road crossing behaviour. The lost to follow-up group comprised 10% more students attending schools in suburbs of lower SES compared to cohort students ($\chi^2 = 17.69$, df=2, p=0.000), as well as having a lower (t=2.8, p=0.005) mean baseline road crossing behaviour score compared to cohort students.

Table 19: Comparison of baseline characteristics for intervention group students in the longitudinal cohort and students lost to follow-up

Variable	**Cohort students** n = 1049	**Students lost to follow-up** n = 482
Sex (% male)	49.0	53.9
SES (% lower SES) [a]	33.7	43.6
Exposure to the road environment (0-higher exposure to 3-lowest expo) Mean (sd)	1.76 (1.19)	1.68 (1.16)
Pedestrian safety knowledge (score out of 10) Mean (sd)	6.09 (1.80)	6.04 (1.88)
Road crossing behaviour [a] (0-greatest risk to 3-lowest risk) Mean (sd)	2.00 (1.02)	1.84 (1.07)
Road playing behaviour (0-greatest risk to 3-lowest risk) Mean (sd)	2.11 (0.80)	2.18 (0.82)

[a] Significant difference between groups (p< 0.01)

Differential Attrition

Differential attrition was examined by comparing demographic and outcome data for high and moderate intervention group students lost to follow-up. The results from this comparison are summarised in Table 20. High and moderate intervention group students who were lost to follow-up differed on the demographic characteristic SES. The moderate intervention group students comprised 26.4% more students attending schools in suburbs of lower SES compared to the high intervention group ($\chi^2 = 35.4$, df=2, p=0.000).

Table 20: Comparison of baseline characteristics of high intervention students who were lost to follow-up and moderate intervention students who were lost to follow-up

Variable	High Intervention Group n = 229	Moderate Intervention Group n = 253
Gender (% male)	55.5	52.6
SES (% lower SES) [a]	29.7	56.1
Exposure to the road environment (0-higher exposure to 3-lower expos) Mean (sd)	1.66 (1.18)	1.69 (1.15)
Pedestrian safety knowledge (score out of 10) Mean (sd)	6.13 (1.87)	5.96 (1.89)
Road crossing behaviour (0-greatest risk to 3-lowest risk) Mean (sd)	1.83 (1.09)	1.84 (1.04)
Road playing behaviour (0-greatest risk to 3-lowest risk) Mean (sd)	2.14 (0.83)	2.22 (0.82)

[a] Significant difference between groups (p< 0.01)

Study Objective One

Examine teacher and student satisfaction with the CPIPP intervention

Teacher satisfaction with the intervention

Because no significant differences were evident between the baseline characteristics of high and moderate intervention group teachers within each study year, the high and moderate intervention groups were collapsed for further analyses. Also, because a set of nine lessons was developed each year to be taught to students by a newly recruited group of teachers, teacher satisfaction with the intervention was examined separately each year.

Three questions were included in the post-intervention teacher self-report questionnaire to determine teacher satisfaction with CPIPP lessons. Teachers' responses to these questions are shown in Table 21. In 1995, approximately 97% of teachers reported their students enjoyed the CPIPP lessons. The 1995 questionnaire did not ask teachers what proportion of the lessons their students enjoyed. In 1996 and 1997, 80% and 70% of teachers reported their students enjoyed all/most of the lessons respectively. The majority of teachers (more than 89%) in each study year reported the CPIPP lessons were developmentally appropriate for their students.

A teacher reporting he/she would teach the intervention again was assumed to reflect satisfaction with the intervention. Almost all teachers (four were not sure) who responded to the post-intervention teacher self-report questionnaire in 1995, 1996 and 1997 reported they would teach the intervention again. Of these teachers, more than half reported they would teach the lessons in a modified form. In 1996 and 1997 teachers were also asked in an open-ended question to describe the modifications they would make to the intervention if they were to teach it again. Common themes were grouped together. The most common modification related to not teaching the optional activities in future but instead focusing on core skill activities and home activities. Table 22 summarises modifications the teachers described in the open-ended question. This question was not asked in 1995.

A number of full-time teachers explained they used language and other curriculum area time to complete all the lessons' activities. Teachers described the cross-curricular nature of the intervention as a highlight of the intervention. Part-time teachers expressed difficulty finding enough time to complete all lessons.

The modifications to the intervention described by 1996 teachers, that did not affect the research protocol, were incorporated in the 1997 school/home-based education materials and teacher training.

Table 21: Intervention group teachers' satisfaction with the intervention

Eligible teachers: Teacher response	1995 n=60	1996 n=60	1997 n=45
	n(%)	n(%)	n(%)
Students enjoyed the lessons			
All/most lessons [a]	56 (96.6)	47 (79.7)	26 (70.3)
Some lessons	-	11 (18.6)	11 (29.7)
None	-	-	-
Not sure	2 (3.4)	1 (1.7)	-
Lessons developmentally appropriate for students			
Yes	56 (94.9)	57 (95.0)	34 (89.5)
No	-	2 (3.3)	2 (5.3)
Not sure	3 (5.1)	1 (1.7)	2 (5.3)
Would teach the intervention again			
Yes, in existing form	15 (25.4)	26 (43.3)	9 (22.5)
Yes, in modified form	44 (74.6)	32 (53.3)	29 (72.5)
No	-	-	-
Not sure	-	2 (3.3)	2 (5.0)

[a] 1995 response was phrased 'yes, students did enjoy the lessons'
Totals do not add to entire sample due to missing data

Table 22: Frequencies of modifications [a] teachers [b] would make to the intervention if they taught it again

Modification	1996 n=32	1997 n=29
	n (%)	n (%)
Lesson structure		
Teach core activity only (no extension activities)	18 (56)	10 (34)
Less discussion	3 (9)	1 (3)
Less written work; more role-play, craft, games	5 (16)	3 (10)
Time		
Both practical and written activity in one lesson is too time consuming, do one or the other; reduce to 5 or 6 lessons.	1 (3)	11 (38)
Increase to 12 lessons	1 (3)	
Home activities		
Would send home fewer activities as they are too hard to get back	5 (16)	2 (7)
General		
Modify according to my classes' needs and the time I have available	7 (22)	-

Note: Teachers could describe more than one modification. Some teachers did not describe the modifications they would make.

[a] Modifications were described in response to an open-ended question

[b] Not asked in 1995

Student satisfaction with the intervention

Student satisfaction with the CPIPP intervention was examined in the student self-report questionnaire. Table 23 presents a summary of the data. The majority of students reported they liked most of the lessons. In 1995, 84% of cohort students who responded to this question reported they liked most of the CPIPP lessons. In 1996, 85% of cohort students reported they liked most of the CPIPP (Grade 3) lessons and in 1997, 72% of cohort students reported they liked most of the CPIPP (Grade 4) lessons.

Table 23: Cohort students' satisfaction with the intervention (n=1049)

Student response	**Grade 2 curriculum 1995**	**Grade 3 curriculum 1996**	**Grade 4 curriculum 1997**
	n(%)	n(%)	n(%)
Liked most of the Crossing Roads lessons			
Yes	881 (84)	888 (85)	722 (72)
No	106 (10)	104 (10)	184 (18)
Did not do any	[a]	14 (1)	36 (4)
Not sure	60 (6)	38 (4)	59 (6)

[a] "Did not do any" response not included in 1995 questionnaire
Totals do not add to entire sample due to missing data

Study Objective Two

Assess the quantity and quality of the CPIPP intervention taught by teachers to their students

To assess the extent to which the CPIPP intervention was taught by teachers to their students, two dimensions of intervention implementation were examined:

- Quantity, or how much of the intervention was taught - a measure of implementation completeness; and
- Quality, or how well the intervention was taught - a measure of implementation fidelity.

As mentioned previously, four data collection methods were administered in each study year to assess the quantity and quality of teachers' implementation of the intervention. These included:

- an analysis of student **work samples**;
- a self-report lesson **log** teachers were asked to complete after each lesson and return to project staff after every three lessons;
- a post-intervention teacher **self-report questionnaire**; and
- a checklist used by project staff to **observe** teachers' teaching of one intervention lesson.

For each of these implementation measures, an implementation rate is reported where non-respondents (teachers who: returned all work books empty (n=16); did not return all three lesson logs (n=29); did not return the self-report questionnaire (n=41); and were not observed (n=97)) are excluded from the calculation of the rate. Secondly, an implementation rate is reported where non-respondents are re-coded as "zero" implementation. This second method assumes a non-response indicates the teacher did not teach the curriculum. Some teacher lesson logs (n=30) and post-intervention self-report questionnaires (n=15) were returned incomplete. Missing data on these forms were re-coded as zero. This conservative approach assumes that if teachers did not tick the appropriate box they did not complete the activity.

Completeness of implementation

Of the four instruments previously mentioned, three were used to measure how much of the intervention was taught by teachers to their students, ie, quantity.

Student **work samples** measured only core and home activities. From Table 24 it is evident that for the classes for which work samples were submitted, on average, 76% of core and home activities were completed in 1995 and 1996, and 68% in 1997. Implementation rates of the same activities measured by teachers' lesson logs were 92% in 1995, 85% in 1996, and declined to 65% in 1997.

As described in Chapter 3, each CPIPP lesson comprised a core, home, processing and optional activity. In their **lesson logs** teachers reported completing 88% of core, home and processing activities (the activities intervention developers asked teachers to teach in each lesson) in 1995, 81% in 1996 and 60% in 1997. Teachers reported in their lesson logs completing 76% of core, home, processing and optional activities (all possible activities that could be taught in a lesson) in 1995, 73% in 1996 and 57% in 1997.

Implementation rates for core, home, processing and optional activities are listed separately in Appendix 23.

Examination of teachers' **post-intervention self-report questionnaire** in 1996, using coding method one (most of the lesson completed) revealed an implementation rate of 71% of lessons (inclusive of core, home and processing activities) whereas coding method two (most or some of the lesson completed) revealed a higher rate of 89% of lessons. In 1997, implementation rates using this measure were slightly higher: 73% of lessons (using coding method one) and 91% of lessons (coding method two).

These implementation rate data are presented in Table 24. From Table 24 it can be seen that implementation rates are lower when non-respondents are re-coded zero.

Table 24: Completeness implementation rates by lesson - mean percentage of lessons completed

Instrument	1995		1996		1997		TOTAL	
	% [a]	% [b]	% [a]	% [b]	% [a]	% [b]	% [a]	% [b]
Student work samples	n=65	n=68	n=65	n=67	n=62	n=73	n=192	n=208
Core and home activities	76	73	76	73	68	58	73	68
Teacher lesson log	n=67	n=68	n=62	n=67	n=50	n=73	n=179	n=208
Core and home activities	92	90	85	79	65	44	82	70
Core, home, processing	88	86	81	75	60	41	78	67
Core, home, processing, optional	76	75	73	68	57	40	70	60
Post-intervention teacher questionnaire			n=59	n=67	n=40	n=73	n=99	n=140
Method 1 [d] lessons completed	c	c	71	62	73	40	71	51
Method 2 [e] lessons completed	c	c	89	79	91	50	90	65

[a] Non-respondents excluded
[b] Non-respondents re-coded as zero
[c] Not collected
[d] Method 1 - "Most" of the lesson completed re-coded yes; "some" and "none" of the lesson completed re-coded no
[e] Method 2 - "Most" and "some" of the lesson completed re-coded yes; "none" of the lesson completed re-coded no

Fidelity of implementation

Information from three process instruments were used to measure fidelity of implementation and teaching style, or quality of implementation. These instruments were the classroom observation, the teacher lesson log and the post-intervention teacher self-report questionnaire.

Implementation fidelity scores determined in the **classroom observation** were a mean rating of teachers' adherence to three intervention objectives in the lesson observed. Raters used a three-point scale ranging from one (low) to three (high). The 48 teachers observed in 1995 were rated, on average, 2.40, indicating lower fidelity to program objectives than the 50 teachers observed in 1996 (mean fidelity score of 2.61) and similar to the 23 teachers observed in 1997 (mean fidelity score of 2.45). Teaching style scores were a mean rating of each teacher's adherence to eight teacher / student behaviours. Raters again used a three-point scale ranging from one (low) to three (high). Teaching style scores were similar across the three study years (1995 – 2.65; 1996 – 2.68; 1997 2.63). Table 25 presents the mean fidelity and teaching style scores for observed teachers in 1995, 1996 and 1997. No significant differences were evident between mean fidelity scores (F=2.31, p=0.104) for the three study years, nor for mean teaching style scores (F=0.183, p=0.833).

Table 25: Fidelity implementation rates by classroom observation – mean (sd) fidelity and teaching style scores

Variable	1995 n=48	1996 n=50	1997 n=23	TOTAL n=121
	Mean (sd)	Mean (sd)	Mean (sd)	Mean (sd)
Observed behaviour:				
Fidelity score [a]	2.40 (0.53)	2.61 (0.37)	2.45 (0.60)	2.50 (0.49)
Teaching style score [a]	2.65 (0.37)	2.68 (0.32)	2.63 (0.40)	2.66 (0.36)

[a] Scale: 1=low; 2=medium; 3=high.

Road-crossing practise on a real or simulated road was the key strategy of the core activities in six of the nine lessons in each study year. Completion of this procedure was hypothesised as an indicator of the fidelity of implementation. In 1996 and 1997 teachers were asked to record, on a log, where they practised road crossing. This information was not collected in 1995. In each study year the proportion of the six lessons conducted on a real road and the proportion conducted on a simulated road outdoors; were calculated for each respondent. Table 26 presents the mean percentage of road-crossing practise lessons conducted for 1996 and 1997.

Examination of **teacher log of road crossing practise** revealed 1996 teachers reported practising road crossing on a real road in 21% of the six lessons. This amounts to approximately one lesson. In 1997 teachers' reported practising road crossing on a real road in 36% of the six lessons, or about two lessons.

Teachers in 1996 reported practising road crossing on a simulated road in 45 % of CPIPP lessons. In 1997 teachers reported practising road crossing on a simulated road in 9% of lessons.

Non-respondents were excluded from the calculation of these rates. When non-respondents are re-coded zero, road crossing practise rates are between 1% and 3% lower in 1996 and between 3% and 10% lower in 1997.

Table 26: Fidelity of intervention implementation rates by teacher lesson log – mean proportion of six lessons road crossing practise was conducted

Variable	1995	1996		1997		TOTAL	
		% [a]	% [b]	% [a]	% [b]	% [a]	% [b]
Teacher report of crossing practise:		n=62	n=67	n=50	n=73	n=112	n=140
On a real road	[c]	21	20	36	26	29	23
On a simulated road outdoors	[c]	45	42	9	6	30	24

[a] Non-respondents excluded
[b] Non-respondents re-coded as zero
[c] Not collected in 1995

Teachers completed a self-assessment of their fidelity of implementation in the **post-intervention teacher self-report questionnaire**. For one item, teachers were asked to rate how "well" they taught all nine pedestrian safety lessons to their students. Table 27 summarises the frequency distribution and mean ratings for this item. In 1995, 80% of teachers (47 of the 59) who responded to the post-intervention self-report questionnaire felt they adequately implemented the lessons, with the remaining 20% (12 of the 59 teachers) rating their implementation fidelity as very adequate. Eighty three percent of 1996 teachers (49 of the 59) rated their implementation fidelity as adequate, 15% (9 of the 59) rated themselves as very adequate implementers and 2% (one of the 59), felt they inadequately implemented the lessons. Similar to 1996 teachers, 82% (33 of the 40) of 1997 teachers, rated their fidelity as adequate, 12% (5 of the 40) rated themselves as very adequate implementers and 5% (two of the 40) felt they inadequately implemented the lessons.

Mean fidelity scores across each of the study years were above two (1995 – 2.20; 1996 – 2.14; 1997 – 2.08) indicating on average, teachers felt they had moderate to high levels of implementation fidelity. Non-respondents were excluded from the calculation of these means.

Table 27 : Self-reported fidelity of implementation – teacher self-assessment of how well they taught all lessons

Variable:	1995 n=59	1996 n=59	1997 n=40	TOTAL N=158
	n(%)	n(%)	n(%)	n(%)
Teacher report of how well he/she taught all lessons:				
Very adequately (3)	12(20)	9(15)	5(12)	26(16)
Adequately (2)	47(80)	49(83)	33(82)	129(82)
Inadequately (1)	0	1(2)	2(5)	3(2)
	Mean [a] (sd)	Mean [a] (sd)	Mean [a] (sd)	Mean [a] (sd)
	2.20 (0.41)	2.14 (0.39)	2.08 (0.42)	2.15 (0.40)

[a] Non-respondents excluded

Summary of Implementation Rates

For the three study years combined and considering all implementation instruments, on average: teachers taught between 70% and 80% of the nine CPIPP lessons, that is six or seven 40 minute lessons (Table 24); observed teachers taught the CPIPP lesson with a moderate (2.5 out of three) degree of fidelity (Table 25); the majority (82%) felt they taught the lessons adequately (Table 27); and on average included road crossing practise (on a real or simulated road) in 59% of the six lessons, or about four of the nine lessons (Table 26). Teachers who did not return completed instruments were excluded from the calculation of these rates. When non-respondents to instruments are re-coded as zero implementation, completeness of implementation rates are 10% lower.

Study Objective Three

Determine the validity of each measure of curriculum implementation by examining the association between implementation measures; the association of these measures with student outcomes; and the association of a composite measure of implementation with student outcomes

Association between implementation measures

To limit the number of independent variables (implementation variables) to be used in the multivariate analyses for the third objective of this study, the association between implementation variables was examined. From the study's four instruments measuring curriculum implementation, 17 variables were derived. Twelve of the variables measured completeness (quantity) of implementation and five measured fidelity (quality) of implementation. Spearman's rank correlation coefficients among these 17 variables are presented in Appendix 29. The six variables that measure core, home, processing and optional activities separately were not representative of an entire CPIPP lesson and therefore were not included in further exploratory analyses. As described in Chapter 3, these variables were examined to see if the measurement of individual components (eg: core activites) achieved higher correlations with the same component measured by another instrument. Analyses involving these six variables are included in Appendix 23.

The 11 remaining variables comprised six completeness of implementation variables that were representative of the entire CPIPP lesson (eg: teacher lesson log of core, home and processing activities) and the five fidelity of implementation variables. These 11 variables were assessed using the hypothesised, *a priori*, criteria described in Chapter 3, for possible inclusion in the multivariate analyses. Empirical evidence of associations between these 11 variables are presented in Table 28.

Although all 11 correlations between completeness of implementation variables presented in Table 28 are significant, the correlation coefficients are low. The correlations ranged from 0.27 to 0.52. A higher correlation was observed between work sample core and home activity scores and teacher log of core and home activities ($r=0.45$, $p<0.01$) compared to other correlations achieved among completeness variables. Correlations between the teacher log variables and teacher self-report questionnaire variables were highest for the completeness of implementation variables (0.42-0.52).

In contrast, 8 of the 10 correlations between fidelity of implementation variables were not significant. The two correlations that did achieve significance were between observed teaching style and observed fidelity ($r=0.51$, $p<0.01$); and the teacher log of simulated road crossing practise and observed teaching style ($r=0.25$, $p<0.01$).

Correlations between fidelity and completeness of implementation were also examined. Twenty of the 36 correlations in this comparison were significant. However, significant correlation coefficients ranged from as low as 0.2 to –0.57. The highest correlation between fidelity and implementation was achieved between the teacher log of crossing practise on a simulated road and the teacher log of core, home and processing activities ($r=0.52$, $p<0.01$).

While the correlation coefficients in these analyses are low, one would not expect high correlations between variables that do not measure the exact same evidence of implementation. Using this empirical evidence and the substantive criteria described in Chapter 3 that was hypothesised, *a priori*, five implementation variables were selected to be used as independent variables in the multivariate analyses for objective 3 of the study.

The five implementation variables meeting the criteria include:

- student work sample record of core and home activities;
- teachers' lesson log of core, home and processing activities;
- teachers' self-report questionnaire, coding method 2 (taught most or some of the lesson);
- teachers' lesson log of crossing practise on a real road; and
- teachers'
- lesson log of crossing practise on a simulated road.

Each of these variables achieved correlation coefficients of 0.4 or greater with other implementation variables, except for teacher log of crossing practise on a real road. This variable was selected based on substantive evidence, set *a priori*, that it measured the behavioural aspect of the intervention – road crossing practise. The objective nature of student work sample record of core and home activities (paper evidence of activities completed by students) provided substantive evidence for inclusion of the student work sample variable in further analyses. The teacher log of core, home and processing activities was included because it measured all activities teachers were asked to teach to their students, ie: core, home and processing activities, which include both paper and non-paper activities. The teacher self-report questionnaire using coding method 2 also measured all curriculum activities. The teacher log of crossing practise on a simulated road was included for further analyses based on substantive evidence, that it measured the behavioural aspect of the intervention – road crossing practise.

Table 28: Spearman's rank order correlations among completeness and *fidelity* implementation variables 1995 -1997

	WORK SAMPLE Core, home *n=192*	LOG Core, home *n=179*	LOG Core, home, proc. *n=179*	LOG Core, home,proc option n=179	SELF REPORT Q'aire Method 1 *n=99*	SELF REPORT Q'aire Method 2 *n=99*	*OBSERVED Fidelity n=121*	*OBSERVED Teaching style n=121*	*LOG Real road practise n=112*	*LOG Simulated road practise n=112*	*SELF REPORT Fidelity n=158*
WORK SAMPLE Core, home	1.00	0.45**	0.45**	0.43**	0.27**	0.39**	-0.08	0.11	0.13	0.26**	0.19*
LOG Core, home		1.00			0.31**	0.33**	0.10	0.15	0.02	0.47**	0.20*
LOG Core,home,proc			1.00		0.42**	0.45**	0.08	0.15	0.02	0.52**	0.24*
LOG Core,hm,proc,opt				1.00	0.51**	0.52**	0.08	0.19**	0.14	0.44**	0.29**
SELF REPORT Method 1					1.00		0.06	0.28*	0.16	0.26**	0.20*
SELF REPORT Method 2						1.00	0.05	0.29*	0.10	0.33**	0.20
OBSERVED Fidelity							1.00	0.51**	-0.01	0.12	0.10
OBSERVED Teaching Style								1.00	-0.07	0.25*	0.11
LOG Real road practise									1.00		-0.02
LOG Simulated road prac										1.00	0.01
SELF REPORT Fidelity											1.00

* p<0.05 ** p<0.01

Shaded values are referred to in text.

Shaded variable names are those selected as independent variables in the multivariate analyses.

Correlations between individual variables (eg: log core, home) and their composites (eg: log core, home, processing) have been excluded from the table.

Association between implementation measures and student outcomes

To test the construct validity of these five measures of implementation a multivariate analysis was undertaken to determine whether an association existed between the five implementation variables and student outcomes.

Independent variables – implementation dose

The longitudinal cohort students (n=1,049) were assigned scores for the five implementation variables (student work sample record of core and home activities; Teachers' lesson log of core, home and processing activities; teachers' self-report questionnaire, coding method 2 (taught most or some of the lesson); teachers' lesson log of crossing practise on a real road; and teachers' lesson log of crossing practise on a simulated road). The scores were derived from the three teachers who taught them the CPIPP lessons over the three years of the study. Yearly "dose" scores (proportion of the activities completed) were averaged for each student across the three years of the study for each of the implementation variables. Therefore, the three-year-average score for implementation was a continuous measure from zero to one. Table 8 in Chapter 3 demonstrates an example calculation of the three-year-average score for a student and the number of lessons taught by their teachers this score represents.

Dependent variables - student outcomes

As described in Chapter 3, three student outcome variables were created by summing **pedestrian safety knowledge**, **road crossing behaviour** and **road playing behaviour** questions from the student self-administered questionnaire. These were the principal outcomes for the CPIPP intervention. Table 29 summarises the distribution of the three outcome variables at baseline, post-test 1 (1995), post-test 2 (1996) and post-test 3 (1997) for the student cohort.

Baseline data for students' pedestrian safety knowledge scores demonstrated no significant departure from normality after computing a histogram and normality plots. Most gains in the pedestrian safety knowledge of the student cohort were made between baseline (6.09 out of 10 questions correct) and post-test 1995 (7.75 out of 10 questions correct) showing possible evidence of a ceiling effect for pedestrian safety knowledge. At post-test 96, student knowledge scores were 8.26 out of 10 questions correct. At post-test 97, student knowledge had declined slightly (8.21 out of 10 questions correct).

At baseline, student-reported road crossing behaviour data showed some departure from normality. A histogram and normality plots demonstrated the data to be negatively skewed. Whilst road crossing behaviour declined during the study, that is, behaviour became more risky, the decline was greatest from post-test 96 to post-test 97.

The baseline data for the student cohort's road playing behaviour was negatively skewed. Similar to road crossing behaviour, road playing behaviour declined during the study, with the greatest decline from post-test 96 to post-test 97.

Unadjusted group means for high and moderate intervention groups separately are presented in Appendix 30.

Table 29: Distribution of longitudinal cohort student outcome variables at baseline and post-tests by study condition

Variable	n=1049
Pedestrian Safety Knowledge	
Score out of 10; Mean (sd)	
Baseline value	6.09 (1.80)
Post-test 95	7.75 (1.40)
Post-test 96	8.26 (1.28)
Post-test 97	8.21 (1.05)
Change in variable from baseline to post-test 97	2.12 (1.92)
Road Crossing Behaviour	
0 - greatest risk to 3 - lowest risk; Mean (sd)	
Baseline value	2.00 (1.02)
Post-test 95	1.93 (1.04)
Post-test 96	1.84 (1.05)
Post-test 97	1.43 (1.12)
Change in variable from baseline to post-test 97	-0.56 (1.30)
Road Playing Behaviour	
0 - greatest risk to 3 - lowest risk; Mean (sd)	
Baseline value	2.11 (0.80)
Post-test 95	2.18 (0.79)
Post-test 96	2.05 (0.85)
Post-test 97	1.72 (0.96)
Change in variable from baseline to post-test 97	-0.40 (1.14)

Unadjusted means

Data collected at all three post-tests, for each of the dependent variables, demonstrated some departure from normality. The data showed most normality when the dependent variables were converted to change scores: post-test 97 score minus baseline score. These data are summarised on Table 29.

The improvement from baseline to post-test 97 was an unadjusted group mean of 2.12 questions for pedestrian safety knowledge scores and a decline of 0.56 questions for the road crossing behaviour scores. For the variable road playing behaviour, the unadjusted group mean showed a decline of 0.40 questions.

Correlations between dependent and independent variables

Associations between the students' three-year-average dose for the five implementation variables and the change in scores between baseline and post-test 97 for student pedestrian safety knowledge, road crossing behaviour and road playing behaviours were assessed. Pearson's correlation coefficients were calculated. Table 30 presents these correlations.

Pedestrian safety knowledge was significantly correlated with the student work sample measure of core and home activities ($r=0.08$, $p<0.01$). The correlation between teacher log of core, home and processing activities and student pedestrian safety knowledge scores was 0.12 ($p<0.01$). Teacher self-report questionnaire method 2 scores achieved the highest correlation of 0.14 ($p<0.01$) with pedestrian safety knowledge.

The teacher log of road crossing practise on a real road was significantly associated with pedestrian safety knowledge ($r=0.10$, $p<0.01$). Although the correlation between teachers' log of simulated road crossing practise was significant at the 0.05 probability level, it was a negative correlation of –0.07.

While the correlation co-efficients are low, they do provide possible evidence that four implementation measures are associated (at the 0.01 probability level) with students' pedestrian safety knowledge. These four variables are:

- work sample evidence of core and home activities;
- teacher log of core, home and processing activities;
- teacher self-report of lesson completion (method 2); and
- teacher log of road crossing practise on a real road.

No implementation variable scores were significantly associated with student reported road crossing and road playing behaviours. These findings are consistent with those of Resnicow et al (Resnicow 1998) and other researchers who suggest knowledge is the most likely outcome to show evidence of a dose-response relationship after the implementation of classroom curricula. The consistency of these findings may suggest a "sleeper" effect, where a longer time period is required for a school-based health education curriculum to impact on student behaviour.

Table 30: Correlation of implementation variables with change in student outcomes for the longitudinal cohort intervention group students from 1995 to 1997

Three-year-average dose	Pedestrian Safety Knowledge [d]	Road Crossing Behaviour [d]	Road Playing Behaviour [d]
WORK SAMPLE Core, home [a]	0.08*	0.01	-0.03
LOG Core, home, processing [a]	0.12**	0.03	-0.01
SELF REPORT Q'AIRE Method 2 [b,c]	0.14**	0.06	0.03
LOG Real road practise [a, c]	0.10**	0.03	-0.05
LOG Simulated road practise [a,c]	-0.07*	-0.01	0.04

[a] n=1049
[b] n= 1021
[c] Not collected in 1995
[d] Change between baseline and final post-test scores
Note: Zero dose assigned when teacher: reported they did not teach any lessons; or did not respond to the implementation measure.
* $p < 0.05$
** $p < 0.01$

Multivariate analyses

Further analyses examined the effect of the levels of dose on student outcomes after controlling for possible confounders. Multivariate analyses included Multiple Linear Regression analyses and Analysis of Covariance (ANCOVA).

Regression Analyses

Separate regression analyses were conducted for each of the dependent variables with each of the five implementation variables, namely student work sample record of core and home activities; teacher log of core, home and processing activities; teacher self-report questionnaire, coding method 2 (taught most or some of the lesson); teacher log of crossing practise on a real road; and teacher log of crossing practise on a simulated road. Each model was adjusted for gender; SES; and student exposure to the road environment. When these variables were not significant, they were removed, one at a time, to achieve the most parsimonious model.

As evident in Table 31 only one dependent variable was significantly associated with implementation. Four implementation measures were significantly ($p<0.01$) associated with pedestrian safety knowledge. The fifth implementation variable (log of simulated road crossing practise) was negatively associated with pedestrian safety knowledge at the 0.05 probability level. This was still the case after controlling for the explanatory variables. Not one of the implementation measures was significantly associated with student reported road crossing or road playing behaviours. However, student gender was a significant explanatory variable in the regression models for road playing behaviour. Low R^2 values for all models indicate implementation does not fully explain the variation in the model describing the three dependent variables. However, the purpose of these data are to examine the impact curriculum implementation has on student outcomes.

Table 31: Regression analyses [c] of the effect of dose (implementation) measures on student outcomes

	Beta Coeffectient (R^2)		
Three year average dose :	Pedestrian Safety Knowledge	Road Crossing Behaviour	Road Playing Behaviour
WORK SAMPLE Core, home [a]	0.090** (0.02)	0.011 (0.002)	-0.020 (0.01)
LOG Core, home, processing [a]	0.136** (0.03)	0.032 (0.003)	-0.011 (0.02)
SELF REPORT QAIRE Method 2 [b]	0.140** (0.03)	0.055 (0.005)	0.028 (0.02)
LOG Real road practise [a]	0.121** (0.02)	0.032 (0.003)	-0.029 (0.02)
LOG Simulated road practise [a]	-0.063* (0.01)	-0.002 (0.002)	0.019 (0.02)

[a] n=1049
[b] n= 1021
[c] Adjusted for gender; SES; and student exposure to the road environment.
** $p < 0.01$
* $p < 0.05$

ANCOVA analyses

Further analyses were used to examine the effects of the *levels* of dose on student outcomes. As described in Chapter 3, students were categorised into four groups (or quartiles) based on their three-year-average dose for each implementation variable. Differences in the mean change in student outcomes from baseline to post-test 97 between these four dose groups were assessed using Analysis of Covariance (ANCOVA). Each of the five dose (implementation) variables was modelled separately with each of the three outcome variables – a total of 15 models.

In the ANCOVA analyses the three dependent variables (students' pedestrian safety knowledge, road crossing behaviour, road playing behaviour) represented the change in student outcomes from baseline to post-test 97. The key independent variable for each analysis was treatment exposure, or dose, coded as 1 = first quartile dose (lowest dose); 2 = second quartile dose; 3 = third quartile dose; 4 = fourth quartile dose (highest dose). Each model was adjusted for gender; SES; and student exposure to the road environment. When these variables were not significant, they were removed, one at a time, to achieve the most parsimonious model. The results of the ANCOVA analyses have been summarised and presented in Tables 32 to 36.

Implementation variable 1: student work sample record of core and home activities

Table 32 presents the results for the student cohort by level of treatment exposure measured by student work sample records of core and home activities. Student pedestrian safety knowledge was significantly different across the four levels of exposure ($F=3.73$, $p=0.001$) after controlling for covariates. Post hoc, pairwise t tests were conducted to examine differences between the quartiles. Students in the fourth quartile of dose, or highest exposure group had significantly greater ($t=3.26$, $p = 0.001$) improvement in pedestrian safety knowledge scores than students in the lowest (first quartile) exposure group, as well as the second ($t=2.31$, $p=0.021$) and third ($t=3.18$, $p=0.001$) quartiles of dose groups.

These data indicate that for students to achieve significantly greater improvement in pedestrian safety knowledge (0.53 of a question, or 0.28 standard deviations) they needed to receive 81% or more, of the program (at least 22 of 27 lessons over three years). Figure 5 illustrates this relationship.

Students' road crossing behaviour was not significantly different across the four levels of exposure ($F=0.52$, $p=0.795$) after controlling for covariates. However, road crossing behaviour for the highest exposure group (fourth quartile) and lower exposure groups were in the criterion direction. That is, whilst behaviour became more risky for all exposure groups, the decline in behaviour was marginally less for the fourth quartile of dose group (highest treatment exposure) compared to the lower exposure groups, although these differences did not achieve statistical significance.

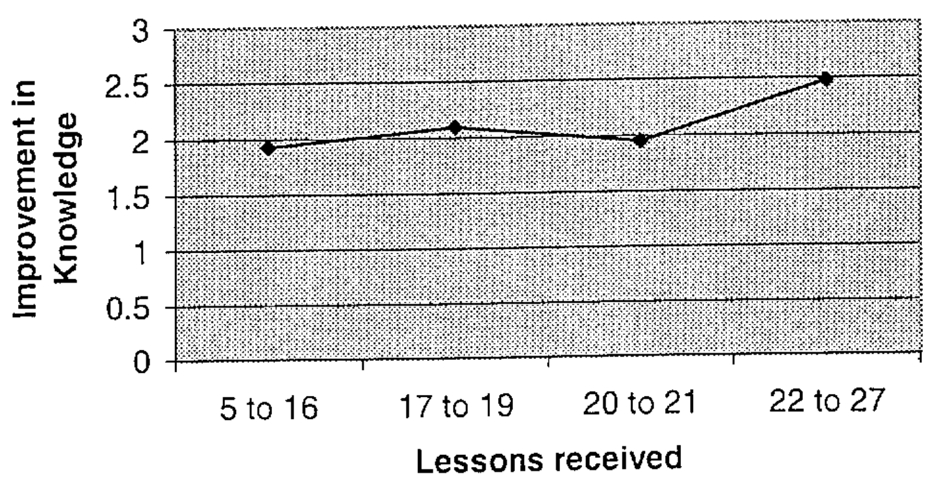
Students' road-playing behaviour was significantly different across the four levels of exposure ($F=3.23$, $p=0.004$). Similar to road-crossing behaviour, road-playing behaviour became more risky for all exposure groups. Counter-intuitively, the lowest quartile of dose showed the smallest decline in behaviour, and the third quartile group showed the greatest decline in behaviour. Student gender was also a significant explanatory variable for student road playing behaviour.

Table 32: Change in student outcome values[a] from baseline to post-test 97 by level of treatment exposure as measured by student work sample record of core and home activities

Outcome variable	F value	Level of Treatment Exposure: First (lowest) quartile dose (0.21-0.60)[b] n = 263	Second quartile dose (0.61-0.72)[b] n = 261	Third quartile dose (0.73-0.80)[b] n = 253	Fourth (highest) quartile dose (0.81-0.98)[b] n = 272
Pedestrian Safety Knowledge Change[c]	3.73**	1.93	2.10	1.95	2.48[d]
Road-Crossing Behaviour Change[c]	0.52	-0.58	-0.59	-0.59	-0.49
Road-Playing Behaviour Change[c]	3.23**	-0.29	-0.37	-0.55[e]	-0.38

[a] Higher scores are in the criterion direction
[b] Proportion of three year program - 27 lessons
[c] Adjusted for gender; SES; and student exposure to the road environment
[d] Value significantly different from first quartile group ($p<0.01$); second quartile group ($p<0.05$); third quartile group. ($p<0.01$).
[e] Value significantly different from first quartile group. ($p<0.01$)
** $p < 0.01$

Figure 5: Effects of implementation (student work samples) on student pedestrian safety knowledge



Implementation variable 2: teacher log of core, home and processing activities

When the teacher log of core, home and processing activities was used to measure implementation, pedestrian safety knowledge was significantly different across the four levels of exposure ($F=4.45$, $p=0.000$). Post hoc, pairwise t tests revealed students in the fourth (highest) quartile of dose ($t=4.22$, $p = 0.000$) and third (second highest) quartile of dose ($t=2.84$, $p = 0.004$) had significantly greater improvement in pedestrian safety knowledge scores than students in the lowest exposure group.

These associations indicate that when implementation is measured using the teacher log of core, home and processing activities, students who received 74% or more, of the program (at least 20 of the 27 lessons) achieved a significantly greater improvement (0.48 of a question, or 0.25 standard deviations) in pedestrian safety knowledge. Figure 6 illustrates this relationship.

Student road crossing behaviour was not significantly different across the four levels of exposure ($F=0.74$, $p=0.616$) after controlling for covariates. Whilst this behaviour became more risky for all exposure groups, the decline in behaviour was less for the fourth quartile of dose group (highest exposure) compared to the lowest exposure group, although these differences did not achieve statistical significance.

Student road-playing behaviour was significantly different across the four levels of exposure ($F=2.64$, $p=0.015$) after controlling for covariates. Implementation was not a significant variable in the model, however, student SES and gender were significant explanatory variables.

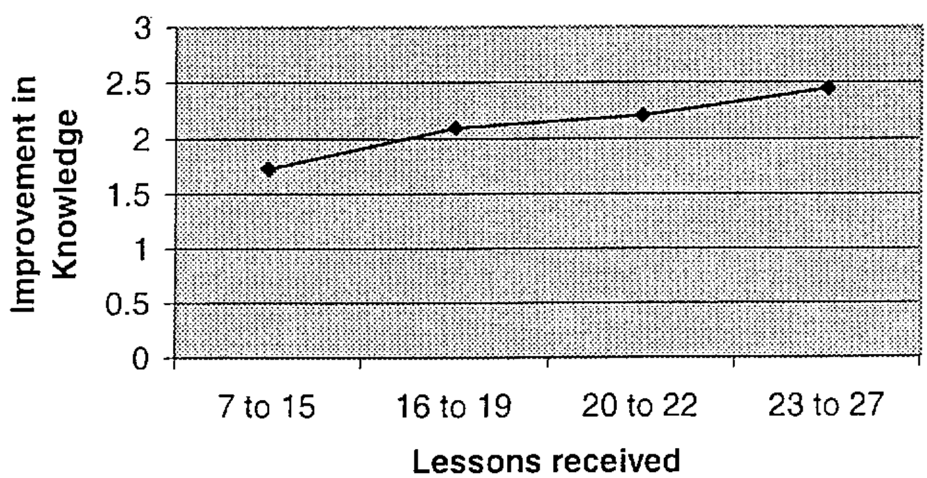
These data are summarised in Table 33.

Table 33: Change in student outcome values[a] from baseline to post-test 97 by level of treatment exposure as measured by teacher log of core, home and processing activities

		Level of Treatment Exposure			
Outcome Variable	F value	First (lowest) quartile dose (0.20-0.56) [b] n = 263	Second quartile dose (0.57-0.73) [b] n = 263	Third quartile dose (0.74-0.83) [b] n = 261	Fourth (highest) quartile dose (0.84-0.99) [b] n = 262
Pedestrian Safety Knowledge Change[c]	4.45**	1.73	2.10	2.21[d]	2.45[d]
Road Crossing Behaviour Change[c]	0.74	-0.62	-0.55	-0.62	-0.47
Road Playing Behaviour Change[c]	2.64*	-0.35	-0.50	-0.37	-0.37

[a] Higher scores are in the criterion direction
[b] Proportion of three year program - 27 lessons
[c] Adjusted for gender; SES; and student exposure to the road environment
[d] Value significantly different from first quartile group. ($p<0.01$)
** $p < 0.01$; * $p < 0.05$

Figure 6: Effects of implementation (teacher log of core, home, processing) on student pedestrian safety knowledge



Implementation variable 3: teacher self-report questionnaire coding method 2

Similar to the previous two implementation measures, students' pedestrian safety knowledge was significantly different across the four levels of exposure ($F=5.62$, $p=0.000$), when exposure is measured by the implementation measure - teacher self-report questionnaire coding method 2. Post hoc, pairwise t tests found students in the fourth quartile of dose, or highest exposure group had significantly greater ($t=2.24$, $p = 0.025$) improvement in pedestrian safety knowledge scores than students in the lowest exposure group, as well as the second ($t=3.72$, $p=0.000$) quartile of dose groups. Students in the third quartile of dose, or second highest exposure group had significantly greater ($t=2.95$, $p = 0.003$) improvement in pedestrian safety knowledge scores than students in the first quartile of dose or lowest exposure group, as well as the second ($t=4.56$, $p=0.000$) quartile of dose group.

These data indicate that for students to achieve significantly greater improvement in pedestrian safety knowledge (0.72 of a question, or 0.38 standard deviations) they needed to receive 83% or more, of the program (at least 15 of 18 lessons over two years). Figure 7 illustrates this relationship.

Student road-crossing behaviour ($F=0.97$, $p=0.447$) and student road-playing behaviour ($F=2.19$, $p=0.042$) were not significantly different across the four levels of exposure, after controlling for covariates. However, for student road-playing behaviour student SES was the significant explanatory variable in the model.

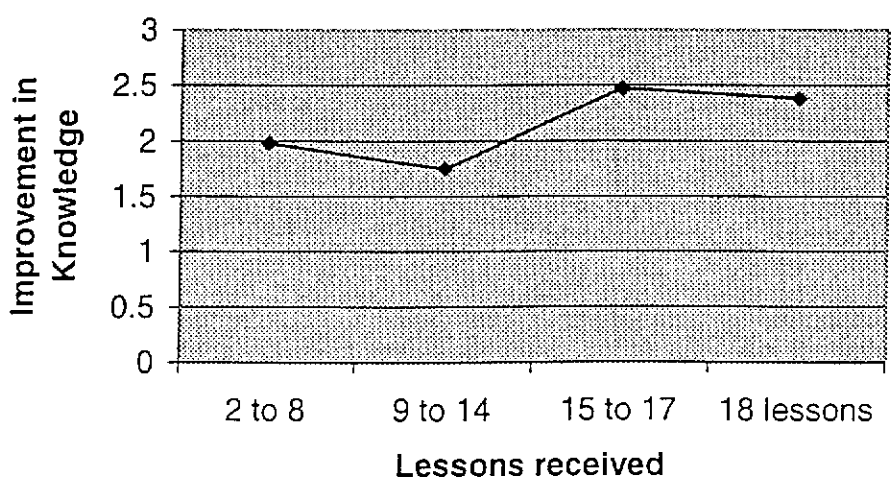
These data are summarised in Table 34.

Table 34: Change in student outcome values[a] from baseline to post-test 97 by level of treatment exposure as measured by teacher self-report of completing all or some of the lesson

		Level of Treatment Exposure			
Outcome Variable	F value	First (lowest) quartile dose (0.11-0.44)[b] n = 230	Second quartile dose (0.50-0.72)[b] n = 280	Third quartile dose (0.83-0.93)[b] n = 287	Fourth (highest) quartile dose (0.94-1.0)[b] n = 224
Pedestrian Safety Knowledge Change[c]	5.62**	1.98	1.75	2.47[d]	2.38[e]
Road-Crossing Behaviour Change[c]	0.97	-0.57	-0.69	-0.50	-0.50
Road-Playing Behaviour Change[c]	2.19*	-0.39	-0.45	-0.34	-0.39

[a] Higher scores are in the criterion direction
[b] Proportion of two years of the program – 18 lessons
[c] Adjusted for gender; SES; and student exposure to the road environment
[d] Value significantly different from first quartile group ($p<0.01$); and second quartile group ($p<0.01$)
[e] Value significantly different from first quartile group ($p<0.05$); and second quartile group ($p<0.01$)
** $p < 0.01$; * $p < 0.05$

Figure 7: Effects of implementation (teacher self report · all/some) on student pedestrian safety knowledge



Implementation variable 4: teacher log of crossing practise on a real road

In Table 35 it can be seen that student pedestrian safety knowledge was significantly different across the four levels of exposure ($F= 4.49$, $p=0.000$) after controlling for çovariates, and when measured by teacher log of road crossing practise on a real road. Post hoc, pairwise t tests revealed students in the fourth quartile of dose, or highest exposure group had significantly greater ($t=4.00$, $p = 0.000$) improvement in pedestrian safety knowledge scores than students in the lowest exposure group, as well as the second ($t=3.03$, $p=0.002$) quartile of dose groups. Students in the third quartile of dose, or second highest exposure group had significantly greater ($t=3.06$, $p = 0.002$) improvement in pedestrian safety knowledge scores than students in the first quartile of dose or lowest exposure group.

These data indicate that for students to achieve significantly greater improvement in pedestrian safety knowledge (0.59 of a question, or 0.31 standard deviations), they needed to have practised crossing a real road in 17% or more, of the curriculum lessons (at least 3 of the 18 lessons over two years). Figure 8 illustrates this relationship.

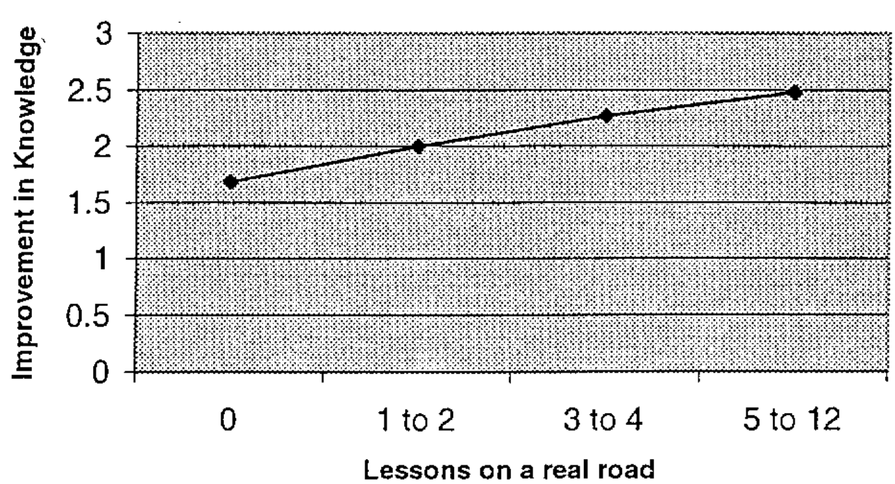
Student road crossing behaviour was not significantly different across the four levels of treatment ($F=0.68$, $p=0.662$) after controlling for covariates. Student road-playing behaviour was significantly different across the four levels of exposure ($F=3.14$, $p=0.0052$) after controlling for covariates. Implementation was not a significant variable in the model, however, student SES and gender were significant explanatory variables.

Table 35: Change in student outcome values[a] from baseline to post-test 97 by level of treatment exposure as measured by teacher log of crossing practise on a real road

		Level of Treatment Exposure			
Outcome Variable	F value	First (lowest) quartile dose (0)[b] n = 157[f]	Second quartile dose (0.06-0.11)[b] n = 411[f]	Third quartile dose (0.17-0.22)[b] n = 257	Fourth (highest) quartile dose (0.28-0.67)[b] n = 224
Pedestrian Safety Knowledge Change[c]	4.49**	1.68	2.00	2.27[d]	2.48[e]
Road-Crossing Behaviour Change[c]	0.68	-0.53	-0.64	-0.52	-0.51
Road-Playing Behaviour Change[c]	3.14**	-0.22	-0.47	-0.36	-0.42

[a] Higher scores are in the criterion direction
[b] Proportion of 18 lessons road crossing practise conducted on a real road (not collected in 1995)
[c] Adjusted for gender; SES; and student exposure to the road environment
[d] Value significantly different from first quartile group. ($p<0.01$)
[e] Value significantly different from first quartile group. ($p=0.01$); and second quartile group ($p<0.01$)
** $p < 0.01$
[f] Best spread of values for four quartiles due to tied values.

Figure 8: Effects of implementation (teacher log of road crossing practise) on student pedestrian safety knowledge



Implementation variable 5: teacher log of crossing practise on a simulated road

Student pedestrian safety knowledge (F=1.96, p=0.069) and student road crossing behaviour (F=0.46, p=0.839) were not significantly different across the four levels of exposure measured by the teacher log of crossing practise on a simulated road, after controlling for covariates.

Student road-playing behaviour was significantly different across the four levels of exposure (F=3.06, p=0.006) after controlling for covariates. Implementation was not a significant variable in the model, however, student SES and gender were significant explanatory variables.

These data are summarised in Table 36.

Table 36: Change in student outcome values [a] from baseline to post-test 97 by level of treatment exposure as measured by teacher log of crossing practise on a simulated road

		Level of Treatment Exposure			
Outcome Variable	**F value**	First (lowest) quartile dose (0-0.06) [b] n = 287	Second quartile dose (0.11) [b] n = 194	Third quartile dose (0.17-0.22) [b] n = 352	Fourth (highest) quartile dose (0.28-0.56) [b] n = 216
Pedestrian Safety Knowledge Change [c]	1.96	2.15	2.21	2.20	1.90
Road-Crossing Behaviour Change [c]	0.46	-0.60	-0.57	-0.56	-0.51
Road-Playing Behaviour Change [c]	3.06**	-0.49	-0.35	-0.42	-0.26

[a] Higher scores are in the criterion direction
[b] Proportion of 18 lessons crossing practise conducted on a simulated road (not collected in 1995)
[C] Adjusted for gender; SES; and student exposure to the road environment
** p < 0.01

Association of a composite implementation measure with student outcomes

A composite implementation measure that included practical, oral and written activities completed was examined. This measure was derived by averaging the four implementation variable scores that achieved a significant ($p<0.01$) association with pedestrian safety knowledge in the ANCOVA analyses: work sample evidence of core and home activities; teacher log of core, home and processing activities; teacher self-report questionnaire using coding method 2; and teacher log of crossing practise on a real road. Table 37 presents the Pearson's correlation coefficients between this composite implementation variable and student outcomes. Pedestrian safety knowledge was significantly correlated with the composite implementation scores ($r=0.14$, $p<0.01$). Composite implementation scores were not significantly associated with student reported road crossing or road playing behaviours.

Table 37: Correlation of composite implementation variable with change in student outcomes for the longitudinal cohort intervention group students from 1995 to 1997

Three year dose	Pedestrian Safety Knowledge [b]	Road Crossing Behaviour [b]	Road Playing Behaviour [b]
COMPOSITE implementation measure [a]	0.14**	0.06	0.01

[a] n=1049
[b] Change between baseline and final post-test scores
** p < 0.01

Regression analyses were conducted for each of the dependent variables (three student outcome variables) with the composite implementation variable as the independent variable. The model was adjusted for gender; SES; and student exposure to the road environment. When these variables were found not to be significant, they were removed, one at a time, to achieve the most parsimonious model.

As shown in Table 38 the composite implementation variable was significantly ($t=5.21$, $p=0.000$) associated with student pedestrian safety knowledge. This was still the case after controlling for the explanatory variables. The composite implementation variable was not found to be associated with student reported road crossing or road playing behaviours. However, while the estimates for pedestrian safety knowledge with the composite implementation variable (and the other implementation variables) was significant, the beta coefficients and R^2 values are low.

Table 38: Regression analyses [b] of the effect of dose (implementation) measures on student outcomes

	Beta Coefficient (R^2)		
Three-year-average dose :	Pedestrian Safety Knowledge	Road Crossing Behaviour	Road Playing Behaviour
COMPOSITE implementation measure [a]	0.160** (0.03)	0.041 (0.004)	0.008 (0.01)

[a] n=1049
[b] Adjusted for gender; SES; and student exposure to the road environment
** $p < 0.01$

Table 39 presents the results for the student cohort by level of treatment exposure measured by the composite implementation measure. Student pedestrian safety knowledge was significantly different across the four levels of exposure (F= 7.14, p=0.000). Post hoc, pairwise t tests found students in the fourth quartile of dose, or highest treatment exposure group had significantly greater (t=5.58, p = 0.000) improvement in pedestrian safety knowledge scores than students in the lowest exposure group, as well as the second (t=4.28, p=0.000) and third (t=2.64, p=0.002) quartile of dose groups. Students in the third quartile of dose, or second highest exposure group had significantly greater (t=2.96, p=0.003) improvement in pedestrian safety knowledge than students in the first quartile of dose or lowest exposure group.

These associations indicate that students who received 56% or more, of the curriculum achieved at least 0.5 (0.26 standard deviations) of a question greater improvement in pedestrian safety knowledge than students who received less of the curriculum. Figure 9 illustrates this relationship.

Student road crossing behaviour was not significantly different across the four levels of treatment (F=0.59, p=0.736) after controlling for covariates. Road crossing behaviour scores for students in the highest exposure group (fourth quartile) and lowest exposure groups were in the criterion direction. That is, whilst behaviour became more risky for all exposure groups, the decline in behaviour was less for the fourth quartile of dose group (highest treatment exposure) compared to the lower exposure groups, although these differences did not achieve statistical significance.

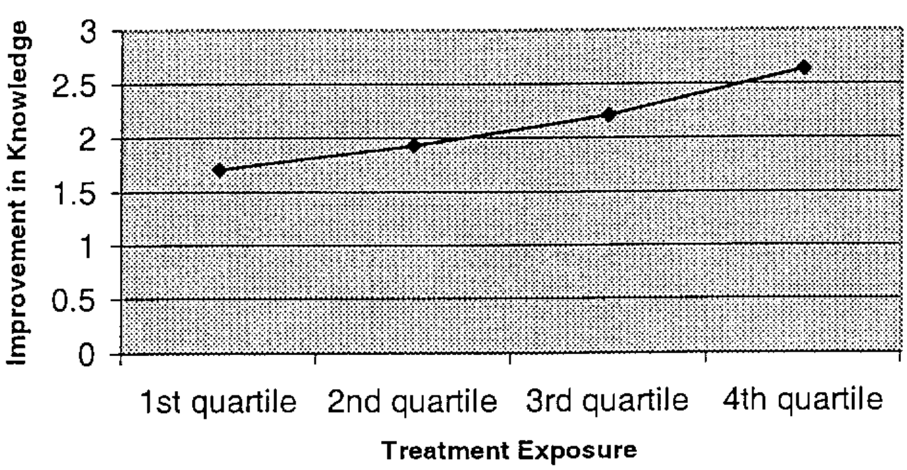
Student road-playing behaviour was significantly different across the four levels of exposure ($F=2.31$, $p=0.032$) after controlling for covariates. Implementation was not a significant variable in the model, however, student SES and gender were significant explanatory variables.

Table 39: Change in student outcome values [a] from baseline to post-test 97 by level of treatment exposure as measured by composite implementation measure scores

Outcome Variable	F value	Level of Treatment Exposure: First (lowest) quartile dose (0.18-0.44) [b] n = 262	Second quartile dose (0.45-0.56) [b] n = 262	Third quartile dose (0.56-0.69) [b] n = 263	Fourth (highest) quartile dose (0.69-0.88) [b] n = 262
Pedestrian Safety Knowledge Change [c]	7.14**	1.71	1.93	2.21 [d]	2.64 [e]
Road-Crossing Behaviour Change [c]	0.59	-0.58	-0.64	-0.53	-0.51
Road-Playing Behaviour Change [c]	2.31*	-0.33	-0.41	-0.42	-0.42

[a] Higher scores are in the criterion direction
[b] Proportion of three year program - 27 lessons
[c] Adjusted for gender; SES; and student exposure to the road environment
[d] Value significantly different from first quartile group ($p < 0.01$)
[e] Value significantly different from first quartile group ($p < 0.01$); second quartile group ($p < 0.01$); and third quartile group ($p < 0.01$)
** $p < 0.01$; * $p < 0.05$

Figure 9: Effects of implementation (composite measure) on student pedestrian safety knowledge



Summary

While teacher and student satisfaction with the CPIPP school-based intervention declined from 1995 to 1997, the majority (70-97% of teachers and 72-84% of students) responded positively to questions asked about their satisfaction with the CPIPP Grade 2, Grade 3, and Grade 4 curricula.

Evidence in student work books demonstrated that teachers taught 76% of the Grade 2 and Grade 3 curricula, and 68% of the Grade 4 curriculum. Teachers in each of the study years observed teaching a CPIPP lesson demonstrated a moderate degree of adherence to the objectives of the lesson. These mean observed fidelity scores for the three study years ranged from 2.4 to 2.68, on a scale of one - low adherence, to three - high adherence. In the same observed lesson, teachers demonstrated a moderate to high level of interaction with their students. These mean observed teaching style scores, using the same scale mentioned above, ranged from 2.61 to 2.65 across the three study years. The majority (approximately 80%) of teachers in each study year felt they taught the lessons adequately with all except three of the remaining teachers reporting they implemented the lessons very adequately to their students. Road crossing practise was deemed essential but was conducted on a real road in only 21% of the six road crossing lessons and on a simulated road in 45% of the six road crossing lessons in the Grade 3 curriculum. In the Grade 4 curriculum teachers reported crossing practise on a real road in more lessons (36%) compared to the Grade 3 curriculum, but fewer practises on a simulated road (9%).

To make a valid assessment of curriculum implementation four instruments were used. The results in this Chapter found valid measures of curriculum implementation, based on *a priori* hypothesised criteria described in Chapter 3, to be:

- student work sample of core, home activities;
- teachers' lesson log core, home, processing activities;
- teachers' self-report questionnaire using coding method 2 (taught most or some of the lesson);
- teachers' log of crossing practise on a real road; and

- teachers' log of crossing practise on a simulated road.

Following the multivariate analyses only one student outcome variable was significantly associated with the implementation variables, namely, pedestrian safety knowledge. The first four implementation variables listed above were significantly associated with students' pedestrian safety knowledge. It was apparent that the association reflected a dose-response relationship. None of the implementation measures were significantly associated, in a dose-response relationship, with road crossing behaviour or road playing behaviour.

The composite implementation variable (a mean of work sample evidence of core and home activities; teacher log of core, home and processing activities; teacher self-report of lesson completion; and teacher log of crossing practise on a real road) best predicted student pedestrian safety knowledge.

Chapter 5

Discussion

Introduction

Each year in Australia approximately 50 children (0-14 years) are killed, 700 are hospitalised and a further 2,000 are estimated to receive minor injuries as a result of being hit by a car (Federal Office of Road Safety 1999). A school-based, pedestrian safety education program has the potential to contribute to the prevention of child pedestrian injury. The Child Pedestrian Injury Prevention Project (CPIPP) used a behavioural health education curriculum combined with teacher support to enhance its implementation, to improve the pedestrian safety knowledge and behaviours of a cohort of young children over a three-year period.

A review of the literature found no rigorous process evaluation of a school-based pedestrian safety program. However, examination of the process evaluation of other school-based health education programs revealed evidence of variable implementation of classroom curriculum and a variety of methods for measuring implementation of classroom curricula. These studies were limited by the lack of multiple measures of program implementation to capture comprehensive evidence of program implementation.

To overcome the limitations of past research the present study examined the process evaluation of the CPIPP school-based intervention using five instruments measuring program implementation. Further, the process measures used in the evaluation were rigorously assessed. This Chapter discusses the findings of the study within three sections, namely, teacher and student satisfaction with the intervention, quantity and quality of the intervention taught by teachers to their students, and the association between implementation measures and student outcomes. Further to this, the implications of this study are discussed.

Before discussing the findings of the study, the limitations of the study that influence the validity of the results will be outlined.

Limitations of the Study

The findings of this study are tempered by limitations of the study related to its sample selection, attrition and instrumentation. These limitations are possible threats to the internal and external validity of the study and may have spuriously enhanced or deflated the estimates reported in Chapter 4.

Sample selection

Generalisability of the study findings to all Western Australian schools and schools outside Western Australia are limited by the nature of the study sample. The teachers and students in this study are representative of participating communities. However, they may not be representative of teachers and students in non-participating Western Australian schools or schools outside of Western Australia.

It was not possible to randomly select the three communities used in the CPIPP study. In the absence of randomisation, inherent biases are likely which may compromise the external validity of the study. To minimise the bias, the communities were selected based on similar child pedestrian injury rates and scoioeconomic indices.

Neither schools nor students were randomly selected. To achieve the required sample size all schools in the high and moderate condition communities were invited to participate in the study. Eighty-two percent of high intervention group schools invited to participate in the study agreed, whereas only 60% of moderate intervention group schools invited agreed to participate. Students within the schools were not randomly selected. All students in Grade 2 of participating schools in the first year of the study were selected. To assess possible bias from the absence of randomisation of schools and students, baseline characteristics of the high an moderate student and teacher samples were compared. Baseline equivalence between the three treatment groups was found in two of the three student outcome variables, namely pedestrian safety knowledge and road crossing behaviour, and the student demographic variables sex and exposure to the road environment (Cross In press). Differences between the groups were found for road playing behaviour and socioeconomic status (SES) only (Cross In press). All analyses were subsequently adjusted to account for SES. High and moderate intervention group teachers' demographic and teaching practise characteristics were found to be similar in each study year.

The intervention was not able to be randomly assigned and consequently treatment-allocation bias is a threat to the validity of the study.

Participant attrition

To minimise the bias introduced by non-random and/or excessive attrition of the study participants, rigorous follow-up procedures were used to ensure high response rates. All schools were retained in the study for three years despite an organisational climate of regular changes in school administrators and staff, an increasing number of new programs required of teachers to adopt and maintain, and teacher strikes initiated by the Western Australian school teachers' union. The stability of overall participation may be due to the way schools were recruited and maintained over the period of the study. Once schools agreed to participate in the study, the school principal and CPIPP principal investigator signed a formal contract for three years outlining the obligations of both schools and researchers. Principals were also asked to sign a confirmation of their agreement to participate in the study at the commencement of the second and third study years. Constant, but non-intrusive, communication between teachers and researchers, and the high quality of the CPIPP curriculum training and materials were also factors in retaining all schools in the study.

To minimise the proportion of students lost to follow-up questionnaires for students who were absent on the day they were administered, were left behind for the teacher to administer. These questionnaires were collected within two weeks of the initial administration. While the attrition rate of students was relatively low (31% over the three years of the study), a greater number of students in the lost to follow-up group resided in lower SES suburbs and were likely to walk and/or cross roads unaccompanied by an adult (student-reported road crossing behaviour) than cohort students. A comparison of the students lost to follow-up in the moderate intervention group compared to the high intervention group indicated a greater proportion of moderate intervention group students lost to follow-up resided in the lower SES suburbs. This evidence of selective and differential attrition may have spuriously deflated program effects. That is, if more lost to follow-up students (who had poorer road crossing behaviour scores at baseline) received the intervention and shown improvement in targeted behaviours, program effects may have been greater. However, the converse could also be true. Results observing the impact of the intervention on students' road crossing behaviour may have been spuriously inflated because the lost to follow-up students were likely to demonstrate at baseline poorer road crossing behaviours.

Rigorous follow-up procedures described in Chapter 3 ensured implementation information for at least one measure (namely student work samples) was obtained from all teachers. Respondents and non-respondents to implementation measures were found to be similar for all demographic and teaching practise characteristics except for gender. There was evidence that a greater proportion of females completed lesson logs; were observed in the classroom; and/or completed post-intervention self-report questionnaires, compared to non-respondents. However, this is likely to be an artifact of the small number of male teachers in the sample. Most Western Australian junior-primary classes (grades K-3) are taught by females.

Instrumentation

Error arising in the measurement of the impact of the intervention (student questionnaire) and implementation of the intervention may also have threatened the validity of this study. A number of strategies were undertaken to minimise this error.

Student questionnaire

Designing a questionnaire simple enough for the student cohort at baseline (6-7 years of age) and sufficiently challenging at final post-test (8-9 years of age) was difficult.

The developmental age and hence reading level of the student cohort at baseline required the student questionnaire to be simply worded and pictorial.

To further minimise the likelihood of the questionnaire measuring the students' reading ability rather than the students' pedestrian safety knowledge and behaviours, the questionnaire was read aloud by trained research staff to each class of students. While efforts were made to reduce the likelihood of variation during the administration of the questionnaire (administrators of the questionnaire received a standardised training), due to the size of the study many administrators with varying experience with the target group administered the questionnaire.

Despite efforts to standardise the administration of a simply worded and pictorial student questionnaire, the test-retest reliability of the instrument was low. Low to moderate Kappa scores for categorical items on the questionnaire (0.04 to 0.68) were due to limited variability in student responses for several items. For the three indices derived from the questionnaire, low to moderate correlations were achieved (0.47, 0.61, 0.42). These analyses suggest the possibility of error in the measurement of student outcomes. This is an inherent difficulty in testing the impact of an intervention under financial constraints, and with a large sample of young children. Other school-based studies have also reported lower reliability for instruments administered to younger children than would be found with older children or adults (Rivara 1991; Resnicow 1992; Parcel 1995).

However, the validity assessment of the students' ability to accurately report their road crossing behaviour (Chapter 4) suggests the road crossing behaviour index on the student questionnaire is a valid measure. In the assessment, high significant correlations were found between observed road crossing behaviour (adult accompaniment) and self-reported behaviour (adult accompaniment) in an interview after the behaviour was observed (r=0.83, r=0.80). Other researchers have also found a high association between children's self-reported pedestrian behaviour and observed behaviour (Routledge 1974; Stevenson 1996). Not withstanding the validation of student reported behaviour, it is likely to be socially desirable for students to answer 'yes' in a questionnaire that they are accompanied by an adult when crossing the road. At the very least the student responses may represent knowledge (of the appropriate behaviour) rather than actual behaviour. This study found a high level of pedestrian safety knowledge among the student cohort.

Implementation measures

Finding valid measures of curriculum implementation was explored in study objective three. It was not possible to capture all aspects of the curriculum in one measure of program implementation without unobtrusively observing or videoing every lesson for every teacher. The logistics and cost of doing this is prohibitive and may become an intervention itself. Instead of observing every teacher in every lesson, four instruments described previously were used. Rossi and Freeman (1993) suggest comprehensive program monitoring for evaluation purposes needs to include information from multiple sources (Rossi 1993). The implementation measures used in the analyses of this study were selected based on empirical and substantive criteria set, *a priori* (see Chapter 3).

As described in Chapter 3, all process instruments had limitations in measuring implementation of the curriculum. Of the instruments measuring completeness of implementation, the student work sample score was the most objective. This is primarily because it was not a measure of teachers' self-report of curriculum implementation. This instrument also achieved the highest response rate of the implementation instruments. Assessment of student work samples were also used in the 'Know Your Body' (Resnicow 1992) study as the 'gold standard' for the assessment of criterion validity of implementation measures. While assessment of student work samples is an objective measure of implementation in the CPIPP study, it was not used as the 'gold standard' for implementation as it only objectively measured the paper-based component of the core and home activities in the curriculum. Work samples did not measure road crossing practise, processing activities or class discussion. For this reason criterion validity, using student work samples as the gold standard, was not assessed.

The teacher lesson log measured all intervention lesson components but was subject to self-report bias and incomplete data for some classes. However, teachers being asked to return their lesson log after every third lesson achieved satisfactory response rates to this measure. While not conducted in this study, follow-up telephone interviews with teachers could overcome the problem of incomplete lesson logs.

The teacher self-report questionnaire gave a global impression of implementation for each lesson rather than detail about the implementation of individual activities in each lesson provided in the lesson log. This 'global' method of measuring implementation is typical of post-implementation measures used in other studies (Connell 1985; Taggart 1990; Rohrbach 1993; Resnicow 1998).

Among the instruments used to measure fidelity of implementation, the teachers' log of road crossing practise proved to be the most valid measure. Whilst the literature identified road crossing practise as a key objective in a pedestrian safety program it may be somewhat limited in measuring fidelity or quality of implementation of the entire curriculum. Further limitations of this measure arise due to the self-report nature of the teacher lesson log.

The aim of the classroom observation was to objectively assess the quality of curriculum implementation. The absence of a reliability assessment of observation scores and the apparent lack of sensitivity evident in the limited range of teacher scores for this measure, limits the evidence it provides. The cost of hiring staff to conduct double-blinded observations for reliability assessment was not within the budget of this project. Additionally, developing an instrument that could be used to observe how well a lesson was taught was difficult. The nature of the pedestrian safety curriculum meant that when some teachers were observed, much of the time allocated to observation involved children moving to the road environment for road crossing practise. Lessons that included road crossing practise required longer than 40 minutes to complete all activities in the lesson, therefore, the observation period was often too short for the length of the lesson. Smith et al (1993) suggest it is difficult to measure quantitatively, how well a teacher actually implements a curriculum. In classroom observations conducted, researchers found teachers adapted the lesson to their own teaching style. In an interview immediately after the observation, teachers thought they had implemented the lesson in the manner in which it was intended. However, whether the changes made by teachers to the curriculum prevented key lesson objectives being met was not reported. The observation schedule used in the CPIPP study measured adherence to key lesson objectives rather than individual activities and strategies described in the lesson outline. The limited the number of items on the CPIPP observation schedule and four point response scale may have limited the variability among teacher scores for this implementation measure. Because of difficulties measuring quality of implementation in a quantitative manner Smith et al did not include classroom observation in the measurement of implementation (Smith 1993) in their study.

The CPIPP classroom observation and self-reported fidelity in the teacher questionnaire did not achieve high correlations with other implementation measures. For this reason, and the poor response rate to the classroom observations these measures of implementation were not used in the multivariate analyses.

While there are limitations in the instruments used to assess implementation in this study, the methodology of converging multiple measures of curriculum-implementation and relating implementation levels to student outcomes has strengthened the findings from this study (Windsor 1994).

Other limitations

Other factors that may have influenced the results of the study are factors outside the classroom including the parent implementation of home activities, and the effects of the community-based intervention. Parents of the intervention group students were asked to complete four to six pedestrian safety activities each year with their child. While process information concerning parent and student satisfaction with and completion of home activities were collected, these data have not been included in this thesis.

High and moderate intervention group teachers received the same training and were asked to teach the same curriculum. High intervention schools also received a community / environmental road safety intervention, however only one component of this intervention was delivered at the school level and this was not part of the curriculum intervention. The school-based component of the environmental intervention included a road safety education newsletter sent home to all families (not just cohort families) in the school as well as the identification and marking of safer routes to school for those children who walked to school. High intervention group teachers were not expected to have higher implementation rates due to the community-based intervention. However, there was a possibility that high intervention schools may have had greater commitment to pedestrian safety causing teachers and students to be slightly more "attuned" to pedestrian safety due to these activities. Baseline data collected from teachers in the two study conditions found this was not the case among teaching staff. Similar attitudes to pedestrian safety were found among high and moderate intervention group teachers. The majority of teachers ranked pedestrian safety education the second most important health topic for their students.

Generalisability of the findings of this study is also restricted by the unique nature of the CPIPP curriculum. The process and impact measures developed for this study, were specific to the CPIPP school-based pedestrian safety intervention.

Discussion of the Findings

Characteristics of teachers

The majority of the 187 teachers in intervention schools involved in the three years of the study were experienced, female and full-time teachers, aged 40 years or older who had received three years of university education. The demographic and teaching practise characteristics of teachers across the three years were similar, however, in

1995, almost all teachers of the grade 2 students had received no road safety training in the last 2 years compared to 80% and 71% of teachers in 1996 and 1997 respectively. Even with this lack of training, 1995 teachers taught more hours of pedestrian safety to their previous year's students than their 1996 and 1997 counterparts. This may be partially explained by more 1995 teachers reporting they were aware of a child pedestrian in his/her school injured than 1996 and 1997 teachers. The Health Belief Model may help to explain the 1995 teachers' teaching pattern. Teaching pedestrian safety education to students is more likely to occur if a teacher perceives his/her students to be susceptible to pedestrian injury and if he/she perceives the potential seriousness of pedestrian injury. The likelihood is further increased if teachers perceive the benefits of teaching pedestrian safety outweigh the costs. Teachers' exposure to pedestrian injury constitutes an external motivation for action; in this case to teach children how to cross roads safely. (Green 1991)

These findings suggest 2nd grade teachers (1995 teacher cohort) may have a heightened sense of the need to teach pedestrian safety to their students than 3rd grade or 4th grade teachers. These differences between the study years may be a factor in both higher response rates to implementation measures and higher implementation rates in the first year of the study. Further, most improvement in student pedestrian safety knowledge was made in the first year of the study. Whilst the student questionnaire may not have been sufficiently advanced to challenge the pedestrian safety knowledge of the student cohort, the high level of performance in the first year of the study limited possible improvement in subsequent years due to a ceiling effect for pedestrian safety knowledge. A study conducted by Rothengatter (Rothengatter 1984) with four to six year-old children (n=222) found a similar ceiling effect. Rothengatter found a high level of performance in the test before treatment for observed road crossing skills and traffic knowledge (40 video taped items displaying traffic behaviour that children were required to score correct or incorrect).

Response rates

Response rates by teachers to implementation measures were highest in the first year of the study and lowest in the final year of the study. The lowest response rate in all study years was to the classroom observation. Only teachers who agreed to be observed were observed. Other researchers (Rohrbach 1993) have reported low response rates for classroom observation. Rohrbach et al (1993) report similar efforts to this study to arrange classroom observations and only 36 out of 60 teachers permitted researchers to observe any program sessions. Similar to other studies (Rohrbach 1993; Lytle 1994), this study found teachers were apprehensive about being observed in their classroom when informed about it at the teacher training. Even when teachers did agree to be observed many were nervous during the classroom observation and therefore, may not have exhibited their usual teacher behaviour and teacher / student interaction.

Sixty nine percent of students (1049 students) who completed a questionnaire at baseline completed all three follow-up tests. This response rate is greater than that of the Know Your Body (KYB) study (Resnicow 1992) that maintained a cohort (n=1209) of 41% of baseline respondents over the three-year period of the study. The Child and Adolescent Trial for Cardiovascular Health (CATCH), also conducted over three years, obtained complete data for variables required for analyses for 1,071 longitudinal cohort students, or 27% of students recruited at baseline (McGraw 1996). Sample attrition was minimised in the CPIPP study by the use of passive consent for children to participate and active consent from the school, compared to KYB where 18% of the sample attrition was due to lack of active consent or withdrawal of consent by parents for the child to participate in blood testing procedures.

Study objective one – Satisfaction with the intervention

The majority of teachers were satisfied with the CPIPP curriculum. The most common modification to the curriculum suggested by teachers was a reduction in the number of activities to be taught. Teachers suggested focusing on the key behavioural activity of the lesson – road-crossing practise. This suggested modification is one explanation for the lower than 100% implementation of the curriculum and has implications for future pedestrian safety curriculum. Nine lessons in each grade level may have been too many for teachers to teach. However, the CPIPP curriculum writers appear to have included more activities (classroom procedures) in each lesson than teachers could complete in the scheduled 40 minutes. Achieving the balance between providing a necessary dose (number of lessons, and number of procedures within each lesson) to achieve study outcomes and not giving teachers too many lessons to teach is difficult and a somewhat 'fluid' struggle for program developers. Diffusion theory (Rogers 1995) suggests the rate of adoption and likelihood of implementation of an innovation is improved when the innovation is perceived as simple versus complex and compatible with existing practises, resources and policies. Therefore, reducing the number of lessons for teachers to teach or reducing the number of procedures within a single lesson is likely to increase implementation.

However, this may be counter to findings of evaluations of the KYB program (Resnicow 1992) where few positive program effects (physiological) were observed among students who received low and moderate exposure to the program. Further, Resnicow et al (Resnicow 1996) suggested the planned dose of 12 to 16 lessons per year of the CATCH classroom curriculum may not have been sufficient dose to impact on physiological outcomes. While a pedestrian safety curriculum would require fewer lessons than the more comprehensive health topics covered in KYB and CATCH, these studies demonstrate the dichotomy between sufficient dose to create change and giving teachers too many lessons to teach within an already crowded curriculum. This also highlights the need for program developers to focus curriculum activities on the 'active ingredients' that are most likely to lead to behaviour change and to conduct extensive teacher consultation as part of a formative evaluation.

Approximately 85% of students reported they liked most of the CPIPP curriculum lessons in 1995 and 1996. In 1997, 13% fewer students expressed satisfaction with the lessons. Although the majority (72%) liked the 1997 lessons, an explanation for the decline may be that the students were tired of receiving the same key behavioural messages for three years, even though they were presented at an appropriate developmental level for 4th grade students, in a variety of activities and in more complex traffic contexts. Additionally, teacher implementation rates were lower in 1997. Whether teacher attitudes or student attitudes to the curriculum caused this decline in implementation is difficult to determine. It is likely that a combination of both teacher and student attitudes have contributed to lower implementation rates in 1997, the third and final year of the study.

Study objective two – Implementation rates

Examination of completeness of implementation rates (Chapter 4, Table 20) found the post-intervention self-report questionnaire measure of implementation provided the highest implementation rates – on average teachers taught most or some of 89% of the 3rd grade curriculum and 91% of the 4th grade curriculum lessons. Student work books provided the lowest implementation rates - 76% of 2nd and 3rd grade curriculum lessons and 68% of the 4th grade curriculum lessons. However, teachers were informed at the pre-intervention training that road crossing practise was the key strategy in each lesson, therefore de-emphasising pen and paper activities. This may have caused teachers to see them as less important and therefore reduce implementation rates for these activities in the curriculum. The teacher lesson log individually measured all activities in the lessons. Hence, it was a more comprehensive measure of the whole lesson than student work books and the teacher post-intervention self-report questionnaire. Implementation rates using the lesson log fall between the other two measures – 88% of the 2nd grade curriculum lessons were taught, 81% of the 3rd grade and 60% of the 4th grade lessons. Consistency among the measures is evident with all measures identifying similar implementation trends across the three study years, that is all measures found implementation rates highest in the 2nd grade curriculum, and lowest in the 4th grade curriculum. Implementation rates for the three study years combined indicate all instruments measured curriculum implementation within approximately 10% of each other, except for the teacher post-intervention self-report questionnaire coding method 2, which measured implementation 10-20% higher than other measures. This can be explained by the more "lenient" coding method of this measure where a teacher was recorded as having taught the lesson if he/she reported teaching "most" or "some" of the lesson.

Other school-based health education programs have reported similar implementation rates. The CATCH intervention trial found teacher self-reported implementation rates of 89% of a 4th grade curriculum (a 12 lesson curriculum) and 96% of a 5th grade curriculum (a 16 lesson curriculum) (Perry 1997).

Resnicow et al. (1998) found teachers reported completing 90% of activities in their lesson logs in 4th grade and 5th grade nutrition curricula – "Gimme 5". Each curriculum comprised 12 lessons. A post-implementation interview to assess teacher implementation of the 5th grade curriculum found implementation rates of 'most' or 'all' of 80% of the curriculum, and 'all/most/some' of 91% of the curriculum. However, classroom observation found only 47% of curriculum procedures were completed in observed lessons. The self-report "Gimme 5" implementation rates are similar to those of CPIPP self-report implementation rates, that is, ranging from 80 to 90%.

Rohrbach et al (1993) found teachers reported teaching 75% of a 5th grade 'substance abuse prevention program' (13 lessons) and 25% of the 6th grade curriculum (13 lessons) (Rohrbach 1993). This lower level of implementation of curricula targeting older students is similar to the trend found in the CPIPP study, where implementation rates were lowest in the final year of the study.

Smith et al (1993) measured teacher self-reported implementation of three health/tobacco prevention curriculum over two years (Smith 1993). Teachers could choose one curriculum to teach to 6th and 7th grade students. 'Project Smart' contained 13 lessons in each of the 6th and 7th grade curricula. Teachers reported, in a self-report check list, teaching 77% of 6th grade lessons and 75% of 7th grade lessons. The 'Teenage Health Teaching Modules' (THTM), drug education module contained 12 lessons in each of the 6th and 7th grade curricula. Teachers reported, in a self-report check list, teaching 70% of the 6th grade lessons and 66% of the 7th grade lessons. 'Growing Healthy' contained 50 hours of instruction in each of the 6th and 7th grade curricula. Teachers reported, in a self-report check list, teaching 51% of the

the 6^{th} grade lessons and 50% of the 7^{th} grade lessons. These implementation rates suggest that when teachers are required to teach a greater number of lessons in a curriculum, they teach fewer lessons, therefore increasing the possibility of the lessons most pertinent to behaviour change not being taught. However, a greater number of lessons allows teachers to select activities most suited to the needs of their students.

It is difficult to compare fidelity of implementation rates of the CPIPP curriculum to other studies. Firstly, the classroom observation and the self-reported fidelity in the teacher questionnaire did not have high response rates, nor did they achieve higher correlations with implementation measures. Further, developing an instrument that could be used to observe how well a lesson was taught was difficult. While the CPIPP observation schedule was a modified version of the schedule used by Taggart et al (Taggart 1990) it did not measure the proportion of activities completed in each lesson. Other studies see this as a measure of fidelity of implementation (Basch 1985; Rohrbach 1993; Perry 1997; Resnicow 1998). The nature of the pedestrian safety curriculum meant that when some teachers were observed much of the time allocated to observation involved children moving to the road environment for road crossing practise. Lessons that included road crossing practise required longer than 40 minutes to complete all activities in the lesson, therefore, the observation period was often too short for the length of the lesson. This limited the chance of teachers teaching all activities in the time allocated to the classroom observation. As mentioned previously, the CPIPP curriculum writers appear to have included too many procedures for teachers to feasibly complete in 40 minutes. This problem is likely to have impacted on the quality of implementation that was measured using the classroom observation.

However, measuring the key behavioural component of the program was hypothesised as an assessment of fidelity of implementation of the CPIPP curriculum. This study found teachers reported in lesson logs completing the key behavioural procedure of the curriculum (road crossing practise outside the classroom including a real road) in 44% of 3rd grade lessons and 30% of 4th grade lessons.

While more road crossing was practised outside the classroom by 1996 (Grade 3) teachers, 1997 (Grade 4) teachers conducted more crossing practise on real roads. This may have been due to greater teacher comfort in taking older children to the real road for crossing practise.

Perry et al (Perry 1998) report observations of classes revealed 75%-85% of nutrition curriculum activities in the Minnesota 5-a-Day Power Plus Program were implemented as planned. The program included 4th and 5th grade curricula each comprising 16 lessons. While the study described self-report methods for completeness of implementation, rates were not reported. Therefore, the reported implementation rates only refer to those lessons observed.

The CPIPP process evaluation used three instruments to measure completeness of curriculum implementation (student work samples, teacher lesson log, teacher self-report questionnaire) and three instruments to measure fidelity of curriculum implementation (classroom observation, teacher lesson log, teacher self-report questionnaire). No other school-based health education study has used this degree of implementation measurement to comprehensively assess curriculum implementation.

The validity of the CPIPP implementation measures, and whether the implementation rates described above provided a dose sufficient to impact on student outcomes, are the questions explored in study objective three.

Study objective three – Implementation measures and student outcomes

Association between implementation measures

While the investigation of 11 implementation variables from the four implementation instruments was somewhat exploratory, the final implementation variables used in the multivariate analyses were selected using empirical and substantive criteria hypothesised *a priori*. While this methodology is recommended in the social sciences field for the examination of construct validity (Carmines 1979; Green 1986), few studies report the steps this study has followed. Six implementation variables were hypothesised as measuring completeness of intervention implementation. The low to moderate correlations between completeness of implementation measures suggest that each measure taps a different dimension of the curriculum or the instruments are not valid. Additionally, correlation coefficients may have been lower because each measure assessed different aspects of curriculum lessons. For example, work samples assessed only paper-based activities whereas lesson logs assessed the total activity and all activities. Therefore, bivariate correlations were a necessary step in the assessment of construct validity of implementation variables.

Correlations between completeness of implementation measures (0.31 – 0.52, $p<0.01$) in this study were lower than those found by Resnicow et al (1998) (Resnicow 1998) (0.51 and 0.66, $p<0.01$).

It was hypothesised that fidelity measures would have higher correlations with each other. This was not the case; correlations among fidelity variables were low. The absence of association among fidelity of implementation measures did not support the validity of these implementation measures. The most likely cause of the lack of validity of the fidelity instruments is the absence of variability in teacher fidelity scores using the observation schedule. The observation schedule is also a relatively insensitive measure of what a teacher does over time within the classroom, given it is only assessed once. Additionally, some of the measures may not have measured fidelity of implementation. The correlation between observed fidelity score and observed teaching style was 0.51 ($p<0.01$). These variables were obtained from the observation of a teacher in one CPIPP lesson from the same form completed by the same rater on the same day, which may have contributed to the higher correlation. Resnicow et al (1998) (Resnicow 1998) found a similar correlation (0.56, $p<0.01$) between observed fidelity and observed 'rapport' between teachers and students (a similar measure to the CPIPP 'observed teaching style' measure).

While, most fidelity of implementation measures in the CPIPP study lacked construct validity, the teacher log of road crossing practise showed the most substantive and empirical evidence of a valid measure of implementation fidelity compared to the classroom observation and self-reported fidelity in the teacher questionnaire. In six of the nine lessons taught each year, the core activity asked teachers to practise road crossing. It was therefore, expected that teacher report in their lesson logs of road crossing practise outside the classroom would correlate more highly with the log of core activities and the work sample evidence of core activities than non-core activities. A correlation of 0.52 ($p<0.01$) was found between log of core, home and processing activities and log of simulated road crossing practise outdoors. While these variables were extracted from the same instrument, this result provides some evidence of the validity of the log of road crossing practise variables.

Association between implementation measures and student outcomes

It was hypothesised, *a priori*, that greater program effects would be evident among students who received a greater dose of the intervention – a dose-response relationship. A statistically significant dose-response relationship between improved pedestrian safety knowledge and level of curriculum implementation was evident. The dose-response analyses provide evidence that the CPIPP curriculum may improve the pedestrian safety knowledge of children. Children who received a greater proportion of the curriculum showed greater improvement in their pedestrian safety knowledge scores. While small coefficients and weak associations between curriculum implementation and student outcomes were evident they were intuitive and in the criterion direction for student knowledge. Significant effects on pedestrian safety knowledge were observed in this study for students who received at least 73% of the CPIPP curriculum using the teachers' lesson log to measure implementation. When work samples or post-intervention self-report questionnaire were used to measure implementation, students who received at least 81% and 83% respectively of the CPIPP curriculum demonstrated significant effects on pedestrian safety knowledge. Significant effects on pedestrian safety knowledge were observed for students who practiced crossing a real road in at least 17% of CPIPP lessons. Further, this was a test of construct validity which Carmen and Zeller (1979) suggests involves the development of theoretical relationships over a longer time period and therefore coefficients will be small while the theory develops. The development of theoretical structures that demonstrate the relationships between implementation measures, and between implementation and measures and program effects "*...requires a pattern of consistent findings involving different researchers using different theoretical structures across a number of different studies.*" (Carmines 1979) page 25.

These findings provide support for the study hypothesis that:
"There is a significant association between the change in pedestrian safety knowledge from baseline to post-test of students and intervention dose."

Other school-based health education studies have contributed to the development of theory concerning the dose-response relationships of curriculum implementation levels and program effects. A number of studies have found similarly small associations between implementation and student knowledge. Resnicow et al (1998) (Resnicow 1998) found significant associations between observed fidelity of curriculum implementation ($p<0.05$); observed teacher rapport with students ($p<0.05$); teacher self-reported completeness of implementation in a checklist ($p<0.05$) and self-reported completeness of implementation in an interview ($p<0.05$), and student nutrition knowledge targeted by a 4th and 5th grade nutrition curriculum. The post-implementation teacher self-report questionnaire measuring completeness of implementation used by Resnicow et al (1998), was not found to be associated with student outcomes. This is partly explained by high implementation rates reported using this instrument resulting in a lack of variability in implementation, limiting the ability to detect relations (Resnicow 1998). In contrast, the CPIPP process evaluation did find an association between student pedestrian safety knowledge and curriculum implementation measured by a post-implementation teacher self-report questionnaire.

Connell et al (1995) (Connell 1985) found "larger effects" (greater than 0.8 standard deviation) for program-specific knowledge after 15 hours of classroom instruction of a school-based heart health program delivered to 6th to 12th grade students. Parcel et al (1991) (Parcel 1991) found a significant ($p<0.05$) association between percentage of curriculum activities taught (teacher self-report of activities taught without modification) and student knowledge targeted by a health curriculum for 6th and 7th grade students. Rohrbach et al (1993) (Rohrbach 1993) found a significant ($p<0.05$) association between high (self-reported) implementation levels and student knowledge targeted by a 5th grade drug education curriculum.

While these studies target similar aged students to those in the CPIPP cohort with a health curriculum, they examine dose-response relationships over one or two years only. With the exception of Resnicow et al (1998) (Resnicow 1998) all used teacher self-report checklists or questionnaires to measure implementation. The CPIPP study found student work samples, lesson logs/check lists and self-report questionnaire to be valid measures of completeness of implementation. Teacher lesson logs was found to be a valid measure of fidelity of implementation and a composite implementation measure combining all implementation measures was found to be a valid measure of implementation.

No association was found between road-crossing behaviour for the different levels of curriculum implementation. A slower rate of decline in road crossing behaviour (students walking and crossing roads accompanied by an adult) in the criterion direction was found among students receiving a greater proportion of the curriculum (highest dose quartile compared to lowest dose quartile), however these differences were not significantly different. These findings provide support for the study hypothesis that:

"There is no significant association between the change in self-reported road crossing behaviour from baseline to post-test of students and intervention dose."

Whilst road crossing behaviour declined, that is, behaviour became more risky, the decline was less pronounced from baseline to post-test 96, the decline in road crossing behaviour was more pronounced from post-test 96 to post–test 97. This could be explained by the students getting older and being allowed more freedom by their parents to use roads unaccompanied.

Similarly, road playing behaviour declined, that is, behaviour became more risky, with the decline less pronounced from baseline to post-test 96, and more pronounced from post-test 96 to post–test 97. While the statistical models for road playing behaviour were significant, the differences between levels of exposure did not account for the differences. Students' gender and SES were the significant explanatory variables in these models. These findings provide support for the study hypothesis that:
"There is no significant association between the change in self-reported road playing behaviour from baseline to post-test of students and intervention dose."

Other studies report knowledge to be the outcome most receptive to health education curriculum interventions. Behavioural outcomes of the CPIPP study concerned adult accompaniment of children in the road environment. The lack of behavioural effects of the program underscore the difficulties in making changes at home (parent behaviour and supervision – may not be possible) and the importance of developing parallel and potent strategies for parental involvement in the pedestrian safety of their children and including this in the collection of process data. If parents are not accompanying children in the road environment, then road crossing training for children is essential at school – particularly road crossing practise on a real road (Rothengatter 1984; Rivara 1990; Rivara 1991; West 1993). Additionally, environmental supports for young children in the road environment are required. These may include other adult support, e.g: crossing attendants provided by police and/or community services and strategies that separate children from traffic.

Because implementation measures tap different dimensions of the curriculum a composite implementation variable was constructed. This composite variable measured both the quantity and quality of implementation. While this implementation variable also achieved small coefficients they were greater in magnitude than the single construct implementation measures. Connel et al (1985) and Taggart et al (1990) also examined exposure to health education interventions using a composite quantity and quality of implementation score. These studies found small, yet statistically significant, dose-response relationships between implementation and cardiovascular heart disease risk factor scores (Taggart 1990) and program specific student attitudes and self reported practises (Connell 1985).

A limitation of the composite measure of implementation is the lack of 'weighting' assigned to quantity and quality measures of implementation. Future research that uses a composite measure of implementation should consider involving an expert panel in the Delphi Process (Delbecq 1986) to achieve consensus on weightings that could be assigned to generic or program specific measures of implementation.

Implications of the study

Recognising the limitations of this study these findings suggest a rigorous process evaluation of a school-based pedestrian safety intervention can be conducted. Program implementation was variable among teachers of the CPIPP curriculum suggesting that full implementation of the curriculum cannot be assumed. Therefore, valid strategies for measuring implementation must be developed. This study has demonstrated the validity of three measures of curriculum implementation, namely, student work samples, teachers' lesson log, and teachers' self-report questionnaire.

This study has demonstrated that a school-based pedestrian safety curriculum can improve the pedestrian safety knowledge of 2nd and 3rd Grade students (7-8 year olds). This relationship has been demonstrated as one of dose-response. That is, the greater the number of pedestrian safety lessons students were exposed to, the greater their improvement in pedestrian safety knowledge. Further, most gains were made when students received approximately 80% of the curriculum (7 lessons per year) and road-crossing practise (in the road environment) in at least one of these lessons each year.

To further enhance the likelihood of success of this study in preventing child pedestrian injury it is important to find methods to increase the appeal of teaching pedestrian safety to teachers, as well as increasing the involvement of parents in these efforts. Both the classroom curriculum and home instruction need to consistently encourage children to be accompanied by an adult in the road environment. Further, the adult (teacher at school; parent out of school hours) should teach children how to cross roads safely by modelling appropriate behaviour and involving the child in making decisions about safer places to cross and judging gaps in traffic while their cognitive, physical and behavioural attributes continue to develop through the childhood years.

Associations in the study may be small but construct validity is theoretical and will develop over time with continued research in the area. Curriculum, impact measures and process measures will be refined. This study has contributed to this process and makes the following recommendations for the theoretical development of implementation research.

Conclusion and Recommendations

The findings of this study argue for the need to of measure teacher implementation to better understand and explain student outcomes. It is often assumed in school-based intervention trials that teachers have implemented the standardised intervention protocol. However, in reality teachers often modify a school-based intervention to better suit their student needs and the constraints and demands within their classroom and their school.

It is important to measure both completeness of implementation and the quality (fidelity) of implementation of classroom curriculum. Program outcomes will not be achieved if key strategies designed by the planners are not followed. This study demonstrated construct validity of instruments measuring completeness and fidelity of implementation – student work samples, teacher lesson logs, teacher self-report questionnaire, and a composite implementation measure. Completeness of implementation was objectively measured in this study using student work samples. Fidelity of implementation measures for example, classroom observation, are difficult to develop and expensive to administer. This study found measurement of the key behaviour of the program (road-crossing practise on a real road) using teacher self-report in a lesson log, a valid measure of fidelity of implementation. Few school-based health education program evaluations have described if teachers modified the curriculum activities and reported, using classroom observations, that key lesson objectives were often not met.

Secondly, it is important for researchers to examine the relationship between process data and program effects. It was within the scope of this study to examine the relationship between curriculum implementation and program effects. However, further research needs to explore the link between other factors in the process of curriculum delivery and program effects. These other process factors may include teacher characteristics, degree of teacher networking, the school environment (including policy, physical environment, parent and community influences) and the level of support for teachers from the school principal, parent groups and district education office. Identifying strategies that are linked to greater program outcomes will assist future researchers to develop improved health education interventions.

Future research should explore how to develop an intervention that includes the key procedures and concepts that theoretically drive the desired behaviour change but also allows teachers to make adjustments to the program to suit their teaching style and the needs of their students. Perhaps the greatest difficulty lies in measuring the implementation of such an intervention that allows teachers to select the lessons he/she will teach his/her students. While it is possible to ask for a detailed description of implementation it may be difficult to do so without the evaluation instrument becoming too arduous leading to low response rates (self-report), too costly to collect the information (interview); the possibility of information collected being inflated due to social desirability bias; and/or a possible testing effect caused by administration of the instrument measuring implementation. The findings of this study suggest the triangulation of multiple measures of implementation that include both objective (eg: student work samples) and self-report (eg: lesson logs/check lists) measures are appropriate in a process evaluation. The level of detail collected in this study was able to measure the variability of implementation of classroom curricula. It is suggested that quality of implementation measures should primarily determine if key behavioural objectives of lessons are met, however, further research is required to determine valid measures of quality of implementation.

Process information should be fundamental in the evaluation of all health education (including road safety) programs. A comprehensive process evaluation allows for the examination of a possible Type III error, that is, incorrectly attributing null or weak outcomes to a program that has not been adequately implemented. Further, if school-based health education program evaluations compare program effects for treatment groups to comparison groups, without conducting dose-response analyses within the treatment group, it is likely that effects of the intervention may be diluted or not fully explained.

This study demonstrated construct validity of instruments measuring completeness and fidelity of implementation – student work samples, teacher lesson logs, teacher self-report questionnaire, and a composite implementation measure.

Finally, while this study demonstrated implementation of the CPIPP curriculum achieved only modest improvements in student pedestrian safety knowledge and possibly arrested the decline of safe road crossing behaviour, it does support the need for a multifaceted approach to child pedestrian safety. Classroom pedestrian safety education is necessary but not sufficient to impact on child road crossing behaviours, and hence child pedestrian injury.

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Appendix 1

Letter inviting school principals to participate in the Child Pedestrian Injury Prevention Project

(Letter for intervention schools and comparison schools)

Child Pedestrian Injury Prevention Project

20 March, 1995

The Principal

Dear Sir/Madam

The Centre for Health Promotion Research (CHPR), School of Public Health at Curtin University is conducting a research project which aims to reduce the incidence of child pedestrian injury. **The child pedestrian fatality rate in this state is higher than for the rest of Australia and for both the United Kingdom and the United States.** Approval to conduct this research in schools has been granted by Mr Greg Black, Chief Executive Officer of the Education Department in accordance with the Department's Policy on Research in Government Schools.

The school component of the project will involve all Year 2 students and teachers from selected schools who agree to participate in the project, being tracked for three years, ie. through Year 2, Year 3 and Year 4. For each of these years road safety educational materials have or will be produced, disseminated and evaluated. Teachers of these students will receive extensive in-service training in the use of the materials and ongoing follow-up support at no cost to the school. Parents will also be asked to assist by completing a questionnaire and other classroom-based activities at various times throughout the duration of the project.

I would like to ask you to consider allowing your school (current Year 2 students, their parents and teachers) to be involved in this exciting and innovative project. School participation is obviously an essential and crucial component of the whole project and we can not proceed without the generous support of schools such as yours.

All schools agreeing to be involved and committing to the three year project will receive appropriate acknowledgment at the completion of the project (as well as having the benefit of the state-of-the-art curriculum materials and teacher training and support supplied during the project).

A senior member of the project team will phone you within a week to arrange a suitable time for us to meet with you and discuss the project in detail. In the meantime, should you require further details or clarification of any information please don't hesitate to contact me on 351 3807 or Dr Donna Cross on 351 7944.

Thank you in anticipation of your consideration.

Yours sincerely,

Steve Jones
Project Director

Centre for Health Promotion Research School of Public Health Curtin University of Technology GPO Box U1987 Perth Western Australia 6001 Phone: (09) 351 3807 Fax: (09) 351 2958

i:\cpipp\schools\intreq.doc

17 February, 1995

Child Pedestrian Injury Prevention Project

20 March, 1995

The Principal

Dear Sir/Madam

The Centre for Health Promotion Research (CHPR), School of Public Health at Curtin University is conducting a research project which addresses child health. Approval to conduct this research in schools has been granted by Mr Greg Black, Chief Executive Officer of the Education Department in accordance with the Department's Policy on Research in Government Schools.

The school component of the project will involve all Year 2 students and teachers from selected schools who agree to participate in the project, being tracked for three years, ie. through Year 2, Year 3 and Year 4. For each of these years nutrition educational materials will be provided at no cost to participating schools. Year 2 students will be assessed via questionnaire at various times during the project. Teachers and parents will also be asked to assist by completing a questionnaire and other classroom-based activities at various times throughout the duration of the project.

I would like to ask you to consider allowing your school (current Year 2 students, their parents and teachers) to be involved in this project. School participation is obviously an essential and crucial component of the whole project and we can not proceed without the generous support of schools such as yours.

All schools agreeing to be involved and committing to the three year project will receive appropriate acknowledgment at the completion of the project (as well as having the benefit of the state-of-the-art curriculum materials supplied during the project).

A senior member of the project team will phone you within a week to arrange a suitable time for us to meet with you and discuss the project in detail. In the meantime, should you require further details or clarification of any information please don't hesitate to contact me on 351 3807 or Dr Donna Cross on 351 7944.

Thank you in anticipation of your consideration.

Your sincerely

Steve Jones
Project Director

Centre for Health Promotion Research School of Public Health Curtin University of Technology GPO Box U1987 Perth Western Australia 6001 Phone: (09) 351 3807 Fax: (09) 351 2958

Appendix 2

Guidelines for meetings with CPIPP principals

(High, moderate and comparison group schools; and instrument pilot schools)

GUIDELINES FOR MEETINGS WITH CPIPP PRINCIPALS

GOSNELLS (INTERVENTION - SCHOOLS AND COMMUNITY)

What is the project?

- Three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway
- Project is supported by the Education Department of WA
- Aims to improve road crossing behaviours of 6-9 year olds via classroom, home and community interventions
- Three study conditions: School intervention only, community / environment and school and control (regular road safety education only).
- For Gosnells schools a three-year educational intervention will be provided for Year 2 students and their parents as well as a community-based intervention in cooperation with the Gosnells City Council

Who will it involve?

- All Year 2 students and their parents will be tracked for three years (ie: 1995, 1996, and 1997)
- All teachers of Year 2 students in 1995, all Year 3 teachers in 1996 and all Year 4 teachers in 1997.
- One administrator from each school to complete a brief questionnaire at the end of 1995, 1996 and 1997
- All Year 6 and 7 students' parents for administration of community questionnaire
- Local community members via the community-based intervention conducted by a Community Advisory Committee facilitated by the City of Gosnells and Curtin University

What do these people need to do?

- Students, their parents and teachers will be asked to complete a short questionnaire in May and November, 1995, and in September, 1996 and 1997.
- During May and November, 1995, and in September, 1996 and 1997 small group of students from each school will be observed walking to school to assess their road crossing behaviours.
- Teachers will be asked to deliver nine 40 minute road safety lessons (three per term) for Terms 2, 3 and 4 in 1995. During 1996 and 1997 the lessons have been designed to be taught during Terms 1, 2 and 3.
- A school administrator will be asked to complete a questionnaire about road safety practices in the school at the end of 1995, 1996 and 1997.
- Year 6 and 7 students' parents will be asked to complete a questionnaire to assess their road-safety related knowledge, attitudes and behaviours, as well as their perception of road safety measures implemented in their community.

What will the project provide?

- Cross curricular Road Safety educational materials linked primarily to the Health Education K-10 Syllabus.
- Home activities delivered through classroom materials to help parents teach their children about road safety.
- Resource materials including videos, posters, stickers, books, calendars to support the curriculum implementation.
- One half day road safety teacher training in May of 1995 and February 1996 and 1997 (with paid teacher relief for 1995, 1996, 1997)
- Project support staff will help teachers implement the program. The support staff will contact or visit each teacher at least once each term for 1995, 1996 and 1997.
- A program called *Safe Routes to School* to encourage safe crossing behaviour among students
- Information about the road crossing knowledge, attitudes and behaviours of Years 2 through 4 students and their parents.
- Road safety information to the community via local newspapers.
- Information about community road safety attitudes, knowledge and behaviour
- Traffic calming measures to improve the safety of roads children may have to cross.
- The educational materials will form part of a larger Education Department road safety education program for Years K through 12 students
- Copies of all materials in 1998

CLOSING

If it is convenient with the school:

- First contact with the school will be in the week beginning May 1 for administration of student, teacher and parent pre-test questionnaires and observation of student crossing behaviours.

- Teacher training will be conducted during the week beginning May 8 (second week of Term 2 if possible)

- Teachers will be asked to teach the first three lessons if possible during Weeks 3 through 5 of Term 2 and then again during Weeks 1-3 for Terms 3 and 4. A support project staff member will visit or contact each teacher each term.

- The post tests will be administered to students, teachers, an administrator and parents during Weeks 4 and 5 in Term 4. Students' crossing behaviour will also be observed at that time.

We will be sending you a letter this week detailing these dates in which we will ask you to sign indicating your approval to conduct this study in your school from 1995 to 1997.

GUIDELINES FOR MEETINGS WITH CPIPP PRINCIPALS

SWAN (INTERVENTION - SCHOOLS ONLY)

What is the project?

- Three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway
- Project is supported by the Education Department of WA
- Aims to improve road crossing behaviours of 6-9 year olds via classroom, home and community interventions
- Three study conditions: School only, community / environment and school and control.
- For Swan schools a three-year educational intervention will be provided for Year 2 students and their parents.

Who will it involve?

- All Year 2 students and their parents, tracked for three years (ie: 1995, 1996, and 1997)
- All teachers of Year 2 students in 1995, all Year 3 teachers in 1996, Year 4 teachers in 1997.
- One administrator from each school to complete a brief questionnaire at the end of each year
- All Year 6 and 7 students' parents for administration of community questionnaire

What do these people need to do?

- Students, their parents and teachers will be asked to complete a short questionnaire in May and November, 1995, and in September, 1996 and 1997.
- During May and November, 1995, and in September, 1996 and 1997 small group of students from each school will be observed walking to school to assess their road crossing behaviours.
- Teachers will be asked to deliver nine 40 minute road safety lessons (three per term) for Terms 2, 3 and 4 in 1995. During 1996 and 1997 the lessons are designed to be taught during Terms 1, 2 and 3.
- An administrator will be asked to complete a questionnaire about road safety practices in the school at the end of 1995, 1996 and 1997.
- Year 6 and 7 students' parents will be asked to complete a questionnaire to determine community knowledge and attitudes to road safety issues.

What will the project provide?

- Cross curricular Road Safety educational materials linked primarily to the Health Education K-10 Syllabus.
- Home activities delivered through classroom activities to help parents teach their children about road safety.
- Resource materials including videos, posters, stickers, books, calendars to support the curriculum implementation.
- Educational materials will form part of a larger Education Department road safety education program fro Years K through 12 students
- One half day road safety teacher training in May 1995, February 1996 and 1997 (with paid teacher relief for 1995, 1996, 1997)
- Support staff to help teachers implement the program. The support staff will contact or visit the teacher at least once each term for 1995, 1996 and 1997.
- Information about the road crossing knowledge, attitudes and behaviours of Years 2 through 4 students and their parents.
- Copies of all materials in 1998

CLOSING

If it is convenient with the school:

- First contact with the school will be in the week beginning May 1 for administration of student, teacher and parent pre-test questionnaires and observation of student crossing behaviours.

- Teacher training will be conducted during the week beginning May 8 (second week of Term 2, if possible)

- Teachers will be asked to teach the first three lessons, if possible, during Weeks 3 through 5 of Term 2 and then again during Weeks 1-3 for Terms 3 and 4. A support project staff member will visit or contact each teacher each term.

- The post tests will be administered to a school administrator, students, teachers and parents during Weeks 4 and 5 in Term 4. Students' crossing behaviour will also be observed at that time.

We will be sending you a letter this week detailing these dates in which we will ask you to sign indicating your approval to conduct this study in your school from 1995 to 1997.

GUIDELINES FOR MEETINGS WITH CPIPP PRINCIPALS

WANNEROO (CONTROL)

What is the project?

- Three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway
- Project is supported by the Education Department of WA
- Aims to improve health and safety behaviours of 6-9 year olds via classroom, home and community interventions
- Three study conditions: School only, community / environment and school and control.
- Wanneroo schools will be acting as the control group for this study. Instead of receiving the road safety education materials, Wanneroo schools will receive a three year nutrition education intervention provided during 1995 to Year 2 students and their parents. The road safety education materials will be made available to all students throughout WA after being tested during this three-year period.

Who will it involve?

- All Year 2 students and their parents, tracked for three years (ie: 1995, 1996, and 1997)
- All teachers of Year 2 students in 1995, all Year 3 teachers in 1996, Year 4 teachers in 1997.
- All Year 6 and 7 students' parents for administration of community questionnaire

What do these people need to do?

- Students, their parents and teachers will be asked to complete a short questionnaire in May and November, 1995, and in September, 1996 and 1997.
- During May and November, 1995, and in September, 1996 and 1997 small group of students from each school will be observed walking to school to assess their road crossing behaviours.
- Teachers will be provided with approximately ten 40 minute nutrition education lessons for each of Year 2 students in 1995, Year 3 students in 1996 and Year 4 students in 1997.
- Year 6 and 7 students' parents will be asked to complete a questionnaire to determine community knowledge and attitudes to road safety issues.

What will the project provide?

- Cross curricular nutrition education materials linked to the Health Education K-10 Syllabus.
- Home activities delivered through classroom activities to help parents teach their children about nutrition.
- Resource materials including posters, stickers, books, calendars to support the curriculum implementation.
- Copies of all materials in 1998

CLOSING

If it is convenient with the school:

- First contact with the school will be in the week beginning May 1 for administration of student, teacher and parent pre-test questionnaires and observation of student crossing behaviours.
- Teachers will be asked to implement the nutrition education program during Term 2.
- The post tests will be administered to a school administrator, students, teachers and parents during Weeks 4 and 5 in Term 4. Students' crossing behaviour will also be observed at that time.

We will be sending you a letter this week detailing these dates in which we will ask you to sign indicating your approval to conduct this study in your school from 1995 to 1997.

GUIDELINES FOR MEETINGS WITH CPIPP PRINCIPALS

PILOT INSTRUMENTS

What is the project?

- Three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway
- Project is supported by the Education Department of WA
- Aims to improve the health and safety of 6-9 year olds via classroom, home and community interventions
- Three study conditions: School only, community / environment and school and control.
- Before this study begins in schools from the Gosnells, Swan and Wanneroo schools we need to ensure the evaluation instruments provide the data we require. This is the reason we have contacted your school.
- All evaluation instruments will be available for you to preview prior to their administration. Unfortunately teachers will not be able to preview these instruments.

Who will it involve and what will they need to do?

- All teachers of Year 2 students to complete a 20-30 minute road safety questionnaire during each of the weeks beginning March 13 and 27.
- All students to complete a 20-30 minute questionnaire (under the supervision of the classroom teacher) administered by research assistants from Curtin University on two occasions during the weeks beginning March 13 and 27
- All parents of Year 2 students are to complete a questionnaire taken home by their children during the week beginning March 13.

What will the project provide schools who participate in the pilot testing?

- Cross curricular Road Safety educational materials (when printed)
- Home activities delivered through classroom materials to help parents teach their children about road safety.
- Resource materials including videos, posters, stickers, books, calendars to support the curriculum implementation.

CLOSING

If it is convenient with the school:

- First contact with the school will be in the week beginning March 13 for administration of student, teacher and parent pre-test questionnaires and then readministration of teacher and student questionnaires the week beginning March 27.

Appendix 3

Principal consent for school's participation in CPIPP

Child Pedestrian Injury Prevention Project

20 March, 1995

The Principal

Healthway

curtin

Dear

Thank you for taking the time to meet with one of our staff members this week to discuss the implementation of the Child Pedestrian Injury Prevention Project (CPIPP) in your school. Please find outlined below the key requirements and dates for the CPIPP project which were discussed at this meeting. If you agree to be involved in the study as indicated below would you please sign in the space provided?

What will your school be asked to do during 1995?

- Week beginning May 1, 1995* - administration of Year 2 student, teacher and parent road safety pre-test questionnaires and observation of Year 2 students' crossing behaviours (a small group of students from each school will be observed walking to school to assess their road crossing behaviours). Administration of Year 6 and 7 students' parents community questionnaire

- Week beginning May 8 (if possible)* - Year 2 road safety teacher training.

- Weeks 3 through 5 of Term 2 and then again during Weeks 1-3 in Terms 3 and 4, 1995 - teachers will be asked to implement nine 40 minute road safety lessons (three per term). During 1996 and 1997 the lessons have been designed to be taught during Terms 1, 2 and 3. (A support project staff member will visit or contact each teacher each term to assist with this implementation).

- Weeks 4 and 5 in Term 4* - an administrator, Year 2 students, their parents and teachers will be administered the 1995 post-test. Year 2 students' crossing behaviour will also be observed at that time.

** specific dates for each of these events will be arranged by phone.*

What will your school be asked to do during 1996 and 1997?

- Week 2, Term 1 (if possible) for 1996 and 1997 - Year 3/4 teacher road safety education training

- Weeks 2-4, Terms 1-3, for 1996 and 1997 - teachers will be asked to implement the Year 3/4 road safety education materials

- Weeks 7-8 Term 3, for 1996 and 1997 - an administrator, Year 3/4 students, their parents and teachers will be administered the 1996/1997 post-test. Year 3/4 students' crossing behaviour will also be observed at that time. Year 6 and 7 students' parents community questionnaire administered.

Please notice the signature of the Principal Investigator for this study, Assoc Professor Peter Howat. He has signed this document indicating he will ensure you receive all the materials and support from Curtin University, indicated below.

What will Curtin University provide as part of CPIPP?

- Cross curricular Road Safety educational materials linked primarily to the Health Education K-10 Syllabus.

- Home activities delivered through classroom materials to help parents teach their children about road safety.

- Resource materials including videos, posters, stickers, books, calendars to support the curriculum implementation.

- One half day road safety teacher training (with paid teacher relief) for 1995, 1996, 1997.

- Project support staff will help teachers implement the program. The support staff will contact or visit each teacher at least once each term for 1995, 1996 and 1997.

- A program called *Safe Routes to School* to encourage safe crossing behaviour among students.

- Information about the road crossing knowledge, attitudes and behaviours of Years 2 through 4 students and their parents.

- Road safety information to the community via local newspapers.

- Information about community road safety attitudes, knowledge and behaviour.

- Traffic calming measures to improve the safety of roads children may have to cross.

A second copy of this letter has been enclosed for your records. Would you please send ONE signed copy of this letter to our office in the return addressed envelope, by MARCH 23, 1995?

Thank you for your support and involvement in this important project. I can be contacted at Curtin University on 351 3807 if you have any questions or concerns.

Sincerely

Steve Jones
Project Director

I agree to ensure all schools involved in the CPIPP project receive the educational materials and support indicated in this letter.

____

Assoc Prof Peter Howat
CPIPP Principal Investigator

I agree to allow my school to be involved in the CPIPP project for the activities indicated above during 1995, 1996 and 1997.

____

Principal

Appendix 4

Letter reminding school principals of their commitment to CPIPP

(Letter; reconfirmation of participation; about the project)

Child Pedestrian Injury Prevention Project

Healthway
A project funded by Healthway
Curtin University of Technology

24 January, 1997

Dear ,

In 1995 and 1996 your school made a valuable contribution to the Child Pedestrian Injury Prevention Project (CPIPP). CPIPP is a three year major research project which addresses child health conducted by the Centre for Health Promotion Research (CHPR), School of Public Health at Curtin University. Information about the project is enclosed. We are now in the final year of our three year research project. Without the commitment of schools like yours we could not continue our valuable research.

Your immediate predecessor agreed, on behalf of your school, to allow this research to be conducted in your school for a three year period, that is 1995, 1996 and 1997. I would like to ask you to reconfirm your school's participation in this project by signing and returning the attached 'Reconfirmation of Involvement'. School participation is an essential and crucial component of the whole project and we can not proceed without the generous support of schools such as yours.

Attached is a copy of the letter your predecessor received. This letter includes details of what your school will be required to do over the three year period and what the CPIPP will provide to your school.

A senior member of the project team will phone you to discuss the project in detail. In the meantime, should you require further details or clarification of any information please don't hesitate to contact me on 351 2115.

Thank you in anticipation of your consideration.

Your sincerely,

Jill Officer
Project Director

enc: About CPIPP
Predecessor's letter
Reconfirmation of Involvement

I:\CPIPP\LETTER97\NEWCOP97.DOC

Reconfirmation of Involvement in the Child Pedestrian Injury Prevention Project (CPIPP)

I agree to ensure all schools involved in the CPIPP project receive the educational materials and support indicated in this letter.

____

Assoc Prof Peter Howat
CPIPP Principal Investigator

I agree to allow my school to continue to be involved in the CPIPP project for the activities indicated above during 1997.

____

Principal

Please sign and return in the enclosed reply paid envelope.

Reconfirmation of Involvement
in the
Child Pedestrian Injury Prevention Project (CPIPP)

I agree to ensure all schools involved in the CPIPP project receive the educational materials and support indicated in this letter.

____

Assoc Prof Peter Howat
CPIPP Principal Investigator

I agree to allow my school to continue to be involved in the CPIPP project for the activities indicated above during 1996 and 1997.

____

Principal

Please sign and return in the enclosed reply paid envelope.

Child Pedestrian Injury Prevention Project

Curtin University of Technology
Centre for Health Promotion Research
School of Public Health
GPO Box U1987
PERTH WA 6001
Ph: (09) 351 2115
Fax: (09) 351 2958

About the Child Pedestrian Injury Prevention Project

GOSNELLS

What is the project?

- CPIPP is a three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway, Main Roads WA and Traffic Board of WA.
- The project is supported by the Education Department of WA.
- CPIPP aims to improve road crossing behaviours of 6-9 year olds via classroom, home and community interventions.
- CPIPP is a research project with three study conditions: school intervention only, community/environment & school and comparison (regular road safety education only).
- Gosnells schools involved in CPIPP will be given a three-year education intervention for students commencing Year 2 in 1995 and their parents as well as a community based intervention in cooperation with the Gosnells City Council.

Who will it involve?

- All Year 2 students and their parents will be tracked for three years (ie: 1995, 1996 and 1997).
- All teachers of Year 2 students in 1995, all Year 3 teachers in 1996 and all Year 4 teachers in 1997.
- All Year 6 and 7 students' parents for administration of a community questionnaire.
- Local community members via the community-based intervention conducted by a Community Advisory Committee facilitated by the City of Gosnells and Curtin University.

What do these people need to do?

- Students, their parents and teachers will be asked to complete a short questionnaire in May and November, 1995 and in September, 1996 and 1997.
- During May and November, 1995 and in September, 1996 and 1997 a small group of students from each school will be observed walking to school to assess their road crossing behaviours.

- Teachers will be asked to deliver nine 40 minute road safety lessons (three per term for Terms 2, 3 and 4 in 1995. During 1996 and 1997 the lessons have been designed to be taught during Term 1, 2 and 3.
- Year 6 and 7 students' parents will be asked to complete a questionnaire to assess their road-safety related knowledge, attitudes and behaviours, as well as their perception of road safety measures implemented in their community.

What will the project provide?

- Cross curricular Road Safety materials linked primarily to the Health Education K-10 Syllabus.
- Home activities delivered through classroom materials to help parents teach their children about road safety.
- Resource materials including videos, posters, stickers, books, calendar to support the curriculum implementation.
- The education materials will form part of a larger Education Department road safety education program for Years K through 10 students.
- One half-day road safety teacher training in May of 1995 and February 1996 and 1997 (with paid teacher relief for 1995, 1996 , 1997).
- Project support staff will help teachers implement the program. The support staff will contact or visit each teacher at least once each term for 1995, 1996 and 1997.
- Information about the road crossing knowledge, attitudes and behaviors of Year 2 through 4 students and their parents.
- A program called Safe Routes to School to encourage safe crossing behaviour among students.
- Road Safety information to the community via local newspapers.
- Information about community road safety attitudes, knowledge and behaviour.
- Traffic calming measures to improve the safety of roads children may have to cross.

Child Pedestrian Injury Prevention Project

Curtin University of Technology
Centre for Health Promotion Research
School of Public Health
GPO Box U1987
PERTH WA 6001
Ph: (09) 351 2115
Fax: (09) 351 2958

About the Child Pedestrian Injury Prevention Project

SWAN

What is the project?

- CPIPP is a three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway, Main Roads WA and Traffic Board of WA.
- The project is supported by the Education Department of WA.
- CPIPP aims to improve road crossing behaviours of 6-9 year olds via classroom, home and community interventions.
- CPIPP is a research project with three study conditions: school intervention only, community/environment & school and comparison (regular road safety education only).
- Swan schools involved in CPIPP will be given a three-year education intervention for students commencing Year 2 in 1995 and their parents.

Who will it involve?

- All Year 2 students and their parents will be tracked for three years (ie: 1995, 1996 and 1997).
- All teachers of Year 2 students in 1995, all Year 3 teachers in 1996 and all Year 4 teachers in 1997.
- All Year 6 and 7 students' parents for administration of a community questionnaire.

What do these people need to do?

- Students, their parents and teachers will be asked to complete a short questionnaire in May and November, 1995 and in September, 1996 and 1997.
- During May and November, 1995 and in September, 1996 and 1997 a small group of students from each school will be observed walking to school to assess their road crossing behaviours.
- Teachers will be asked to deliver nine 40 minute road safety lessons (three per term for Terms 2, 3 and 4 in 1995. During 1996 and 1997 the lessons have been designed to be taught during Term 1, 2 and 3.

- Year 6 and 7 students' parents will be asked to complete a questionnaire to determine community knowledge and attitudes to road safety issues.

What will the project provide?

- Cross curricular Road Safety materials linked primarily to the Health Education K-10 Syllabus.
- Home activities delivered through classroom materials to help parents teach their children about road safety.
- Resource materials including videos, posters, stickers, books, calendar to support the curriculum implementation.
- The education materials will form part of a larger Education Department road safety education program for Years K through 10 students.
- One half-day road safety teacher training in May of 1995 and February 1996 and 1997 (with paid teacher relief for 1995, 1996 , 1997).
- Project support staff will help teachers implement the program. The support staff will contact or visit each teacher at least once each term for 1995, 1996 and 1997.
- Information about the road crossing knowledge, attitudes and behaviors of Year 2 through 4 students and their parents.

Child Pedestrian Injury Prevention Project

Curtin University of Technology
Centre for Health Promotion Research
School of Public Health
GPO Box U1987
PERTH WA 6001
Ph: (09) 351 2115
Fax: (09) 351 2958

About the Child Pedestrian Injury Prevention Project

WANNEROO

What is the project?

- CPIPP is a three year project conducted by Curtin University's Centre for Health Promotion Research and funded by Healthway, Main Roads WA and Traffic Board of WA.
- The project is supported by the Education Department of WA.
- CPIPP aims to improve road crossing behaviours of 6-9 year olds via classroom, home and community interventions.
- CPIPP is a research project with three study conditions: school intervention only, community/environment & school and comparison (regular road safety education only).
- Wanneroo schools will be acting as the comparison group for this study. Instead of receiving the road safety education materials, Wanneroo schools will receive a three year nutrition education intervention commencing in 1995 with the Year 2 students and their parents. the road safety education materials will be made available to all students throughout WA after being tested during this three-year period.

Who will it involve?

- All Year 2 students and their parents will be tracked for three years (ie: 1995, 1996 and 1997).
- All teachers of Year 2 students in 1995, all Year 3 teachers in 1996 and all Year 4 teachers in 1997.
- All Year 6 and 7 students' parents for administration of a community questionnaire.

What do these people need to do?

- Students, their parents and teachers will be asked to complete a short questionnaire in May and November, 1995 and in September, 1996 and 1997.
- During May and November, 1995 and in September, 1996 and 1997 a small group of students from each school will be observed walking to school to assess their road crossing behaviours.

- Teachers will be provided with approximately ten 40 minute nutrition education lessons for each of Year 2 students in 1995, Year 3 students in 1996 and Year 4 students in 1997.
- Year 6 and 7 students' parents will be asked to complete a questionnaire to determine community knowledge and attitudes to road safety issues.

What will the project provide?

- Cross curricular nutrition education materials linked primarily to the Health Education K-10 Syllabus.
- Home activities delivered through classroom materials to help parents teach their children about nutrition.
- Resource materials including videos, posters, stickers, books, calendar to support the curriculum implementation.
- Copies of all materials in 1998.

Appendix 5

Teacher training evaluation form

CROSSING ROADS TEACHER TRAINING EVALUATION	
Name:______________________________	School:______________________________
Date: ______________	

Please rate this training by circling the response that best represents how you feel.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure
1. I learned new information about pedestrian safety.	1	2	3	4	5
2. The material was clearly presented.	1	2	3	4	5
3. I had enough opportunities to ask questions and clarify information.	1	2	3	4	5
4. The *Crossing Roads* materials seem easy to teach from.	1	2	3	4	5
5. The content of this workshop will help me teach the *Crossing Roads* pedestrian safety program	1	2	3	4	5
6. I have a clear understanding of what I am required to do for the project's evaluation.	1	2	3	4	5
7. How well prepared do you feel to teach the 9 pedestrian safety lessons in the *Crossing Roads* Teachers' Guide.	Very adequately	Moderately adequately	Adequately	Inadequately	Not sure

8. The components of the training which were most useful to help me teach the *Crossing Roads* program were:

____

____

9. What other information could have been provided which would have been useful to help you prepare to teach the *Crossing Roads* program?

____

____

10. Other comments:

____

____

Thank you for participating in this study

Appendix 6

Baseline student self-administered questionnaire

Child Pedestrian Injury Prevention Project

curtin
University of Technology
Perth Western Australia

OFFICE USE ONLY
Student ______ (1-4)
School ______ (5-8)
Instrument ____ (9-10)
Version ___ (11-12)
Int/Control ___ (13)
Year ___ (14-15)

What is your first name? ________________________________ (16-26)

What is your last name? ________________________________ (27-37)

What is your school year? ________________________________ (38)

What is your teacher's name? ________________________________ (39-49)

What is your Health teacher's name? ________________________________ (50-60)

How old are you? ____________ years (61-62)

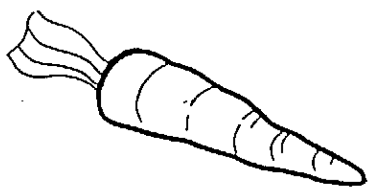
Which are you? ___________ Boy __________ Girl (63)

Please answer the next questions as best you can, like in the example below. Circle what you think is the right answer.

EXAMPLE

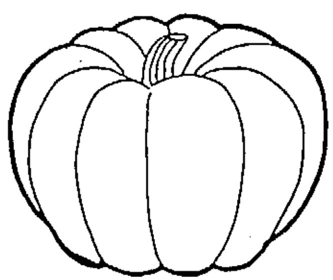
1. Which food is a fruit?

1) carrot

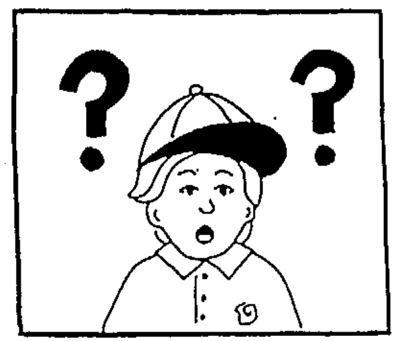


2) apple

3) pumpkin



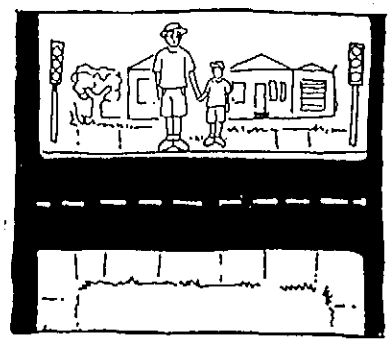
4) don't know



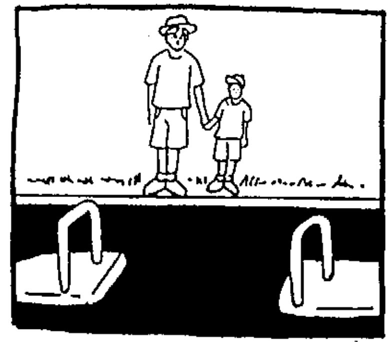
Circle what you think is the right answer

1 Where is the safest place for the boy to cross the road?

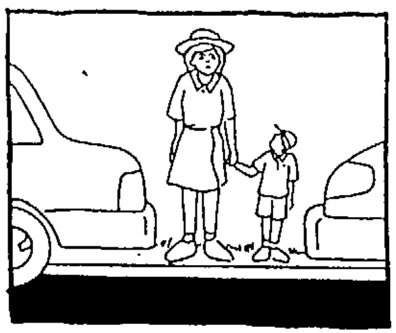
1) at the mid block
with an adult



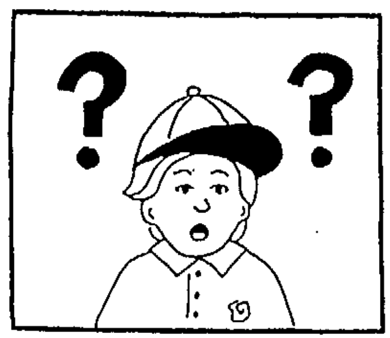
2) at the marked crossing
with an adult



3) near the parked cars
with an adult



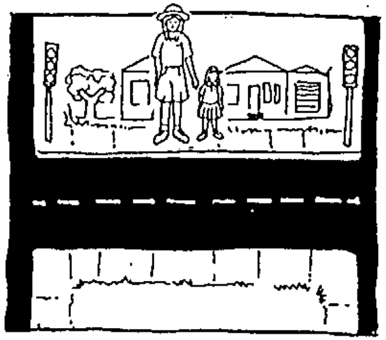
4) don't know



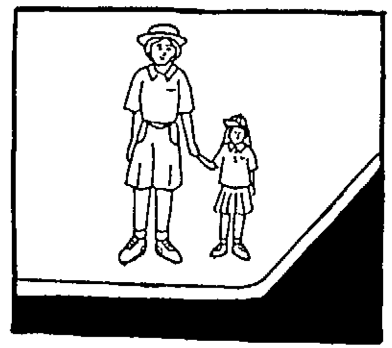
Circle what you think is the right answer

2 Where is the safest place for the girl to cross the road?

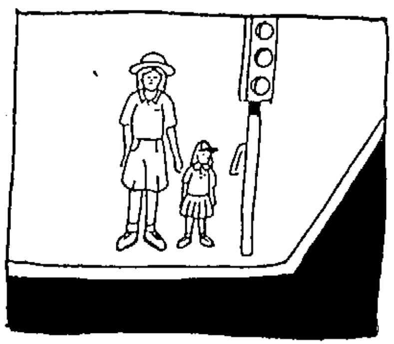
1) at the mid block
with an adult



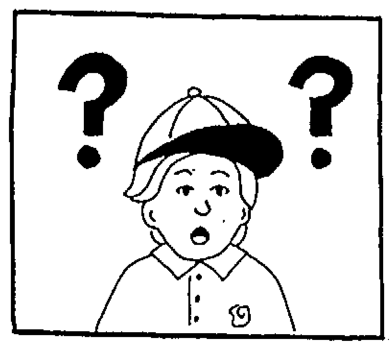
3) at the corner
with an adult



3) at the traffic lights
with an adult

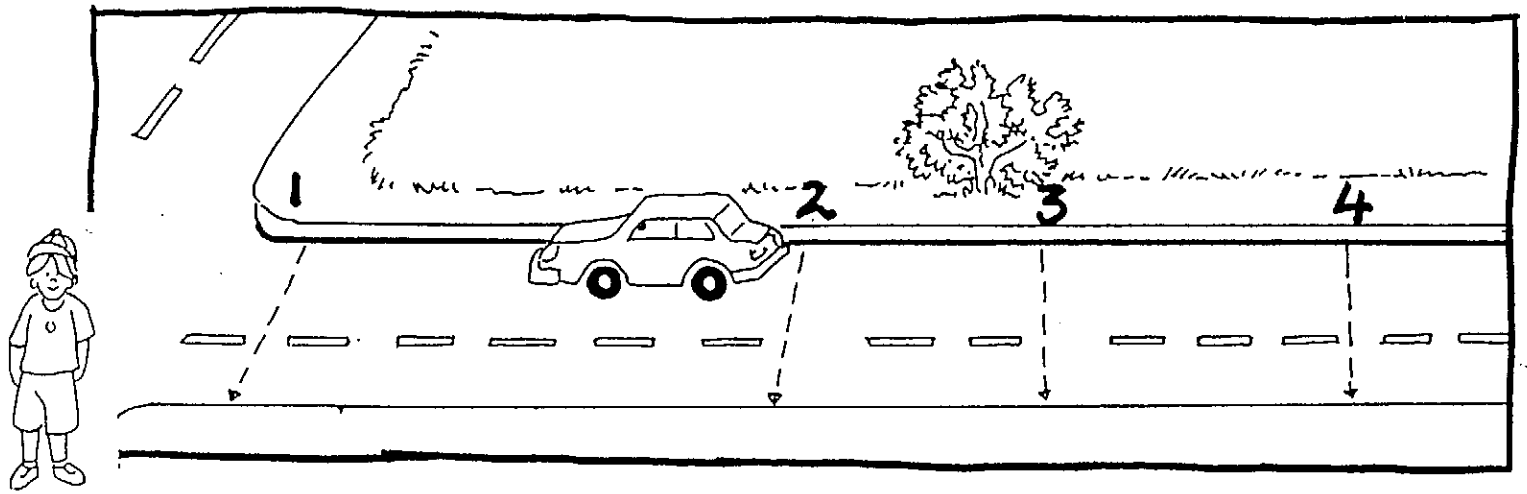


4) don't know



Circle what you think is the right answer

3 Where is the <u>safest</u> place for the boy to cross the road?



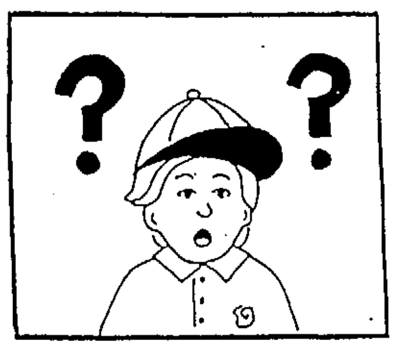
1) near the corner

2) near the parked car

3) near the big tree

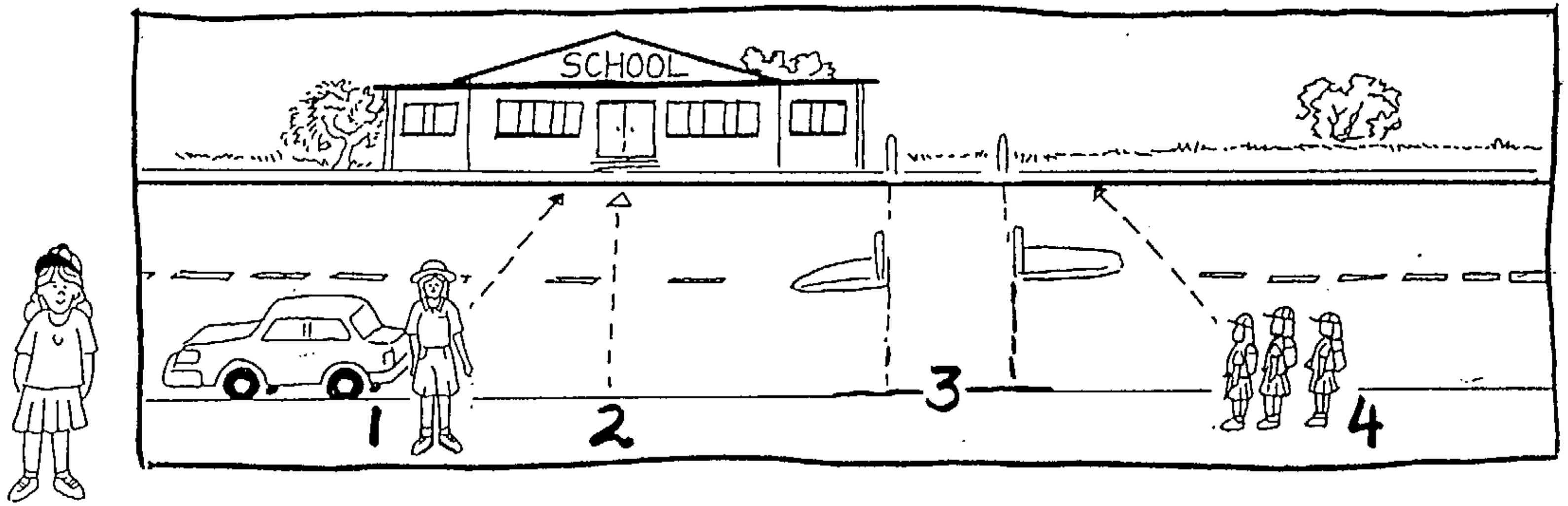
4) on the straight piece of road

5) don't know



Circle what you think is the right answer

4. Where is the <u>safest</u> place for the girl to cross the road?



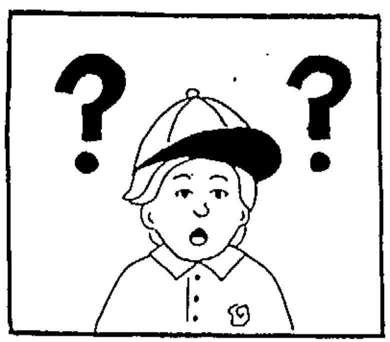
1) at the parked car with an adult

2) in front of the school

3) at marked crossing

4) with friends

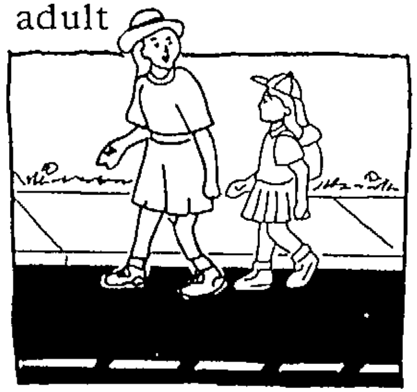
5) don't know



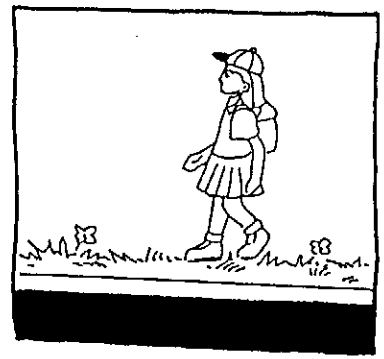
Circle what you think is the right answer

5. Where is the <u>safest</u> place for the girl to walk?

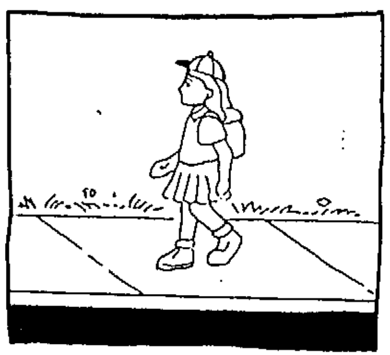
1) on the side of the road with an adult



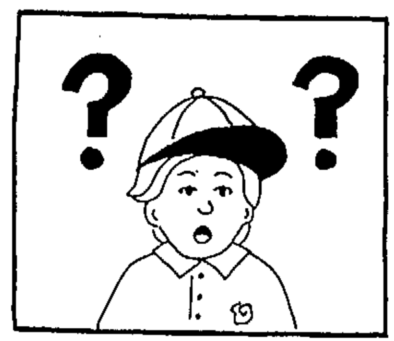
2) on the grass on the side of the road



3) on the footpath



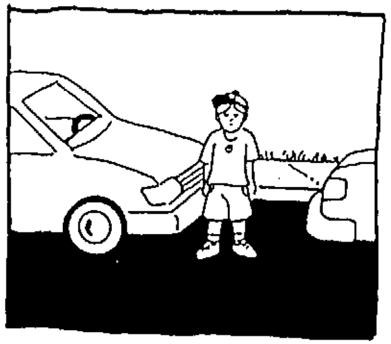
4) don't know



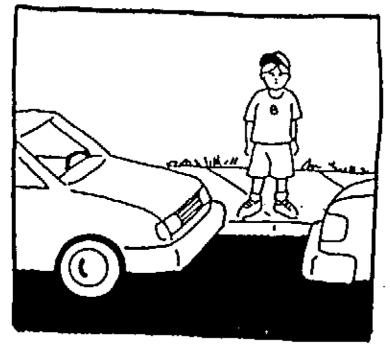
Circle what you think is the right answer

6. Where should the boy stop to look before crossing the road?

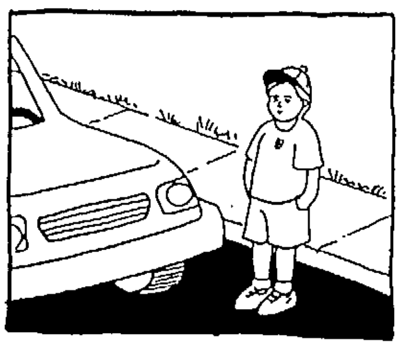
1) next to the road at the edge of car



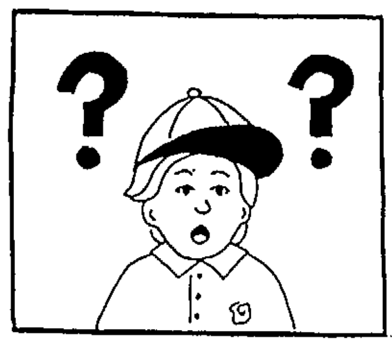
2) on the footpath



3) between the footpath and the car



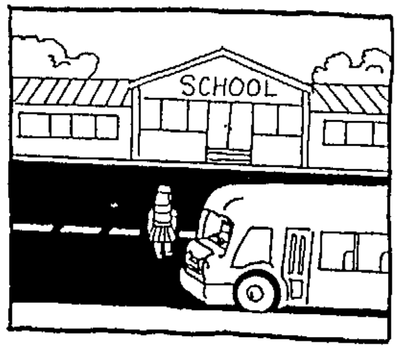
4) don't know



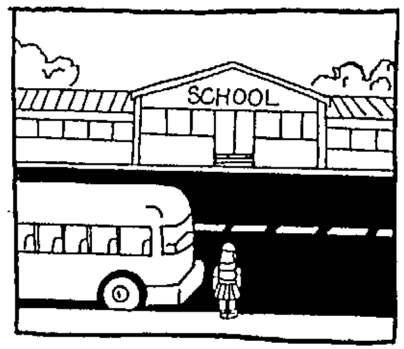
Circle what you think is the right answer

7. After getting off the bus the girl should:

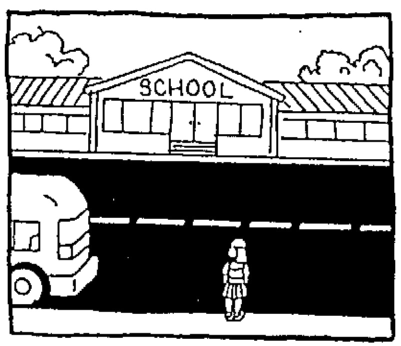
1) walk to the edge of the bus and cross when the road is clear



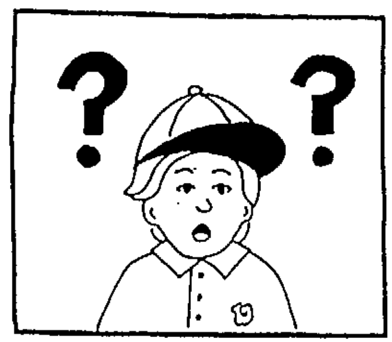
2) cross behind the bus when the road is clear



3) wait until bus has pulled away and cross when road is clear



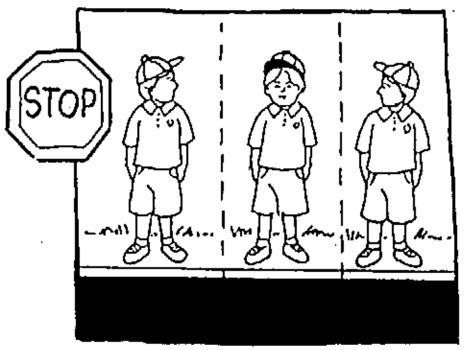
4) don't know



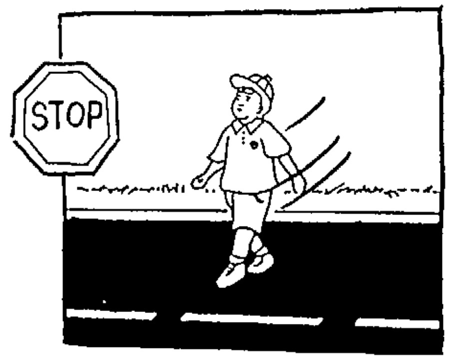
Circle what you think is the right answer

8. When the boy has found a safe place to cross the road he should:

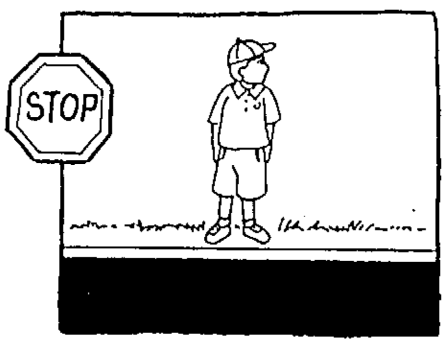
1) stop and look in all directions



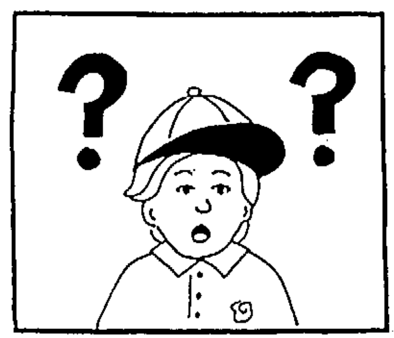
2) stop and look one way before walking across quickly



3) stop and look one way



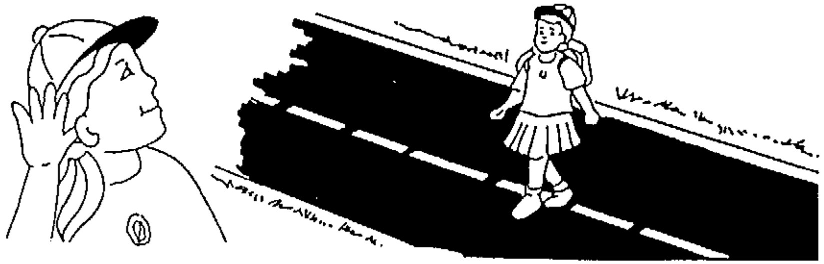
4) don't know



Circle what you think is the right answer

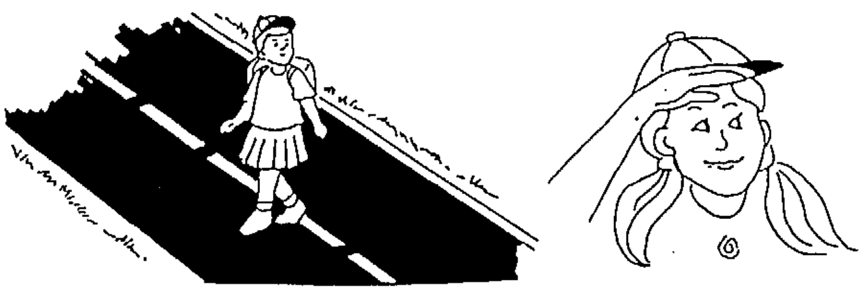
9. When the road is clear the girl should cross by:

1) listening for traffic and looking straight ahead

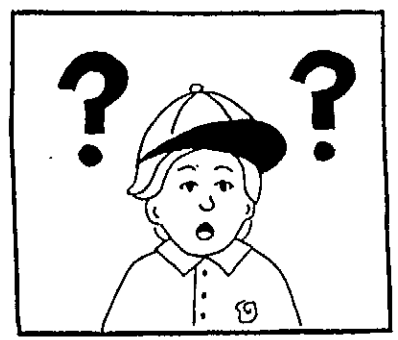


2) watching and listening for traffic

3) walking slowly looking only in one direction

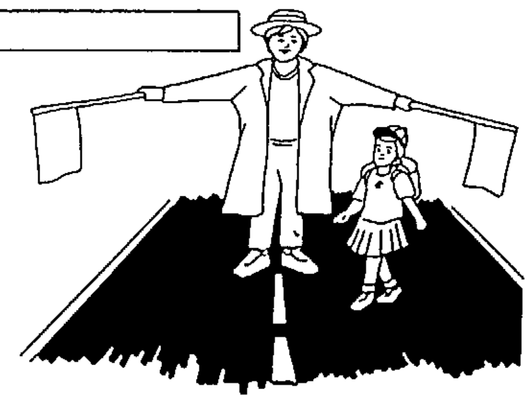


4) don't know



Circle what you think is the right answer

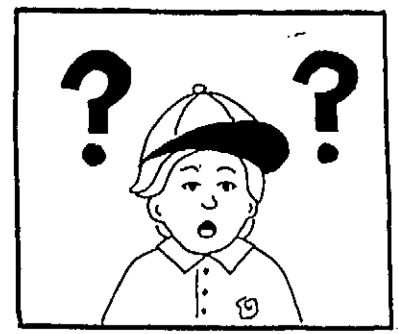
10. Do you have a cross walk attendant near your school?



1) yes

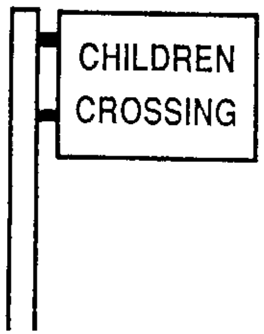
2) no

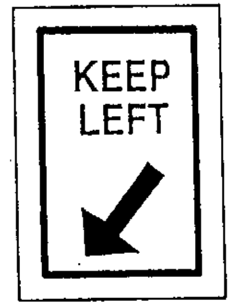
3) don't know

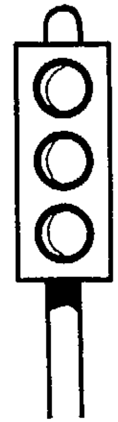


Circle ALL the correct answers

11. Which road signs show a crossing place for pedestrians?

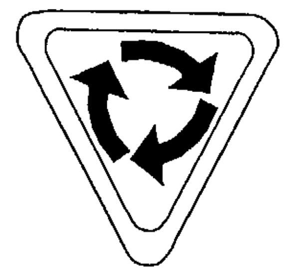
1) 

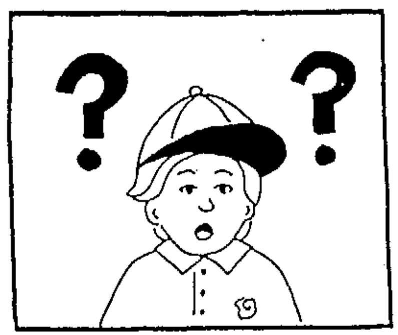
2) 

3) 

4) 

5) 

6) 

7) don't know 

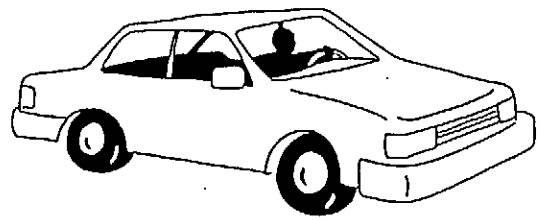
(74-80)

The next questions are about things that you do. Circle what you think is the right answer.

12. How do you get to school on <u>most</u> days?

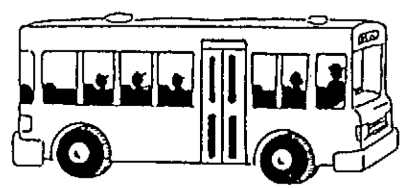
1) walk

2) by car



3) ride my bike

4) by bus



Circle what you think is the right answer

13. How often do you walk to or from school?

1) 4-5 days a week

4-5

2) 3-4 days a week

3-4

3) 1-2 days a week
times

1-2

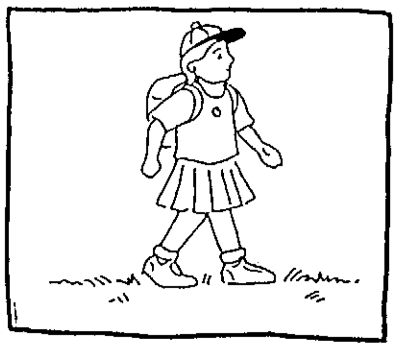
4) no days or only a few
a year

0

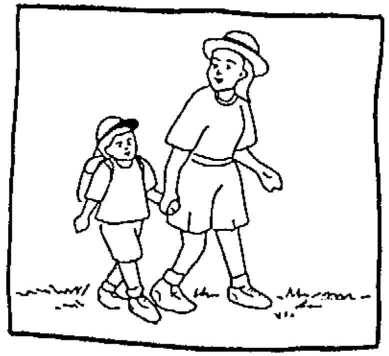
Circle what you think is the right answer

14. If you <u>ever</u> walk to school do you <u>mostly</u> walk:

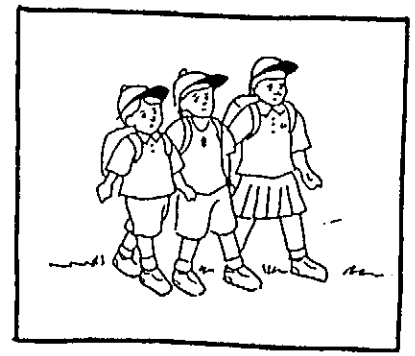
1) by yourself



2) with an adult



3) with other primary school children



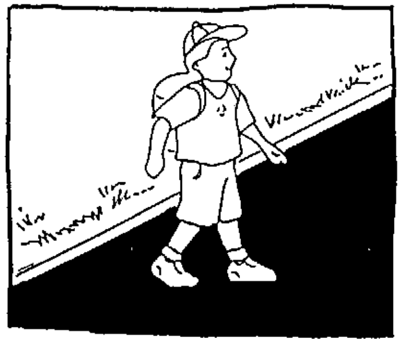
4) with teenagers (13 - 18 years)

5) I don't walk to school

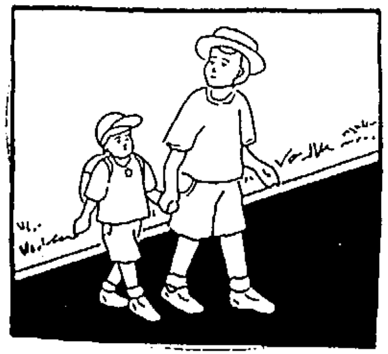
Circle what you think is the right answer

15. Who do you usually cross the road with?

1) on your own

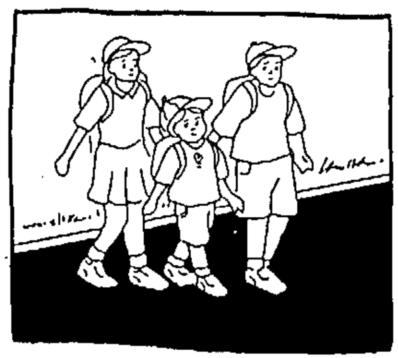


2) an adult



3) other primary school children

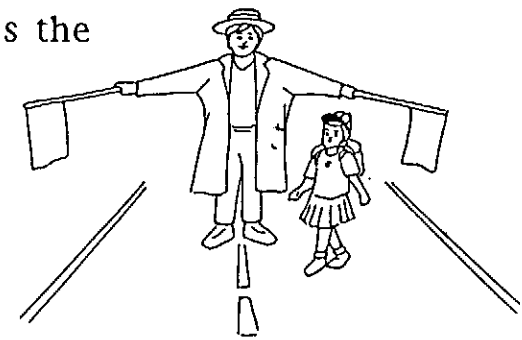
4) a teenager (13 - 18 years)



5) I almost never cross the road

Circle what you think is the right answer

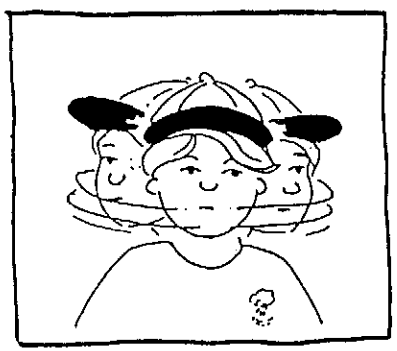
16. Have you ever used a cross walk attendant to help you cross the road?



1) Yes

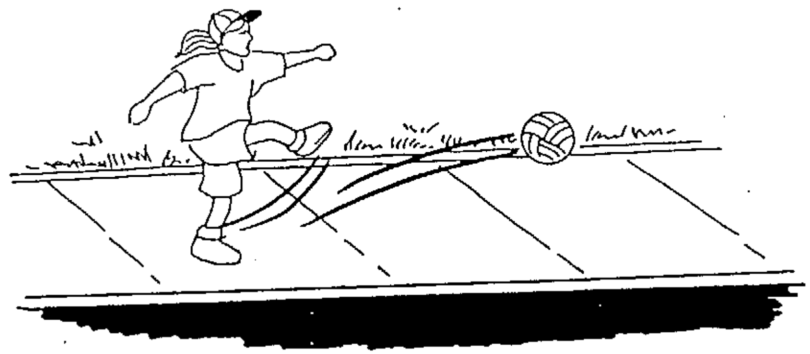
2) No

3) We don't have one near our school



Circle what you think is the right answer

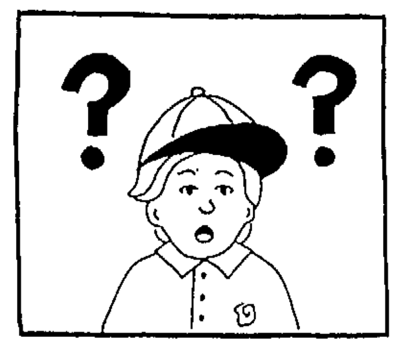
17. Do you ever play on the footpath?



1) Yes

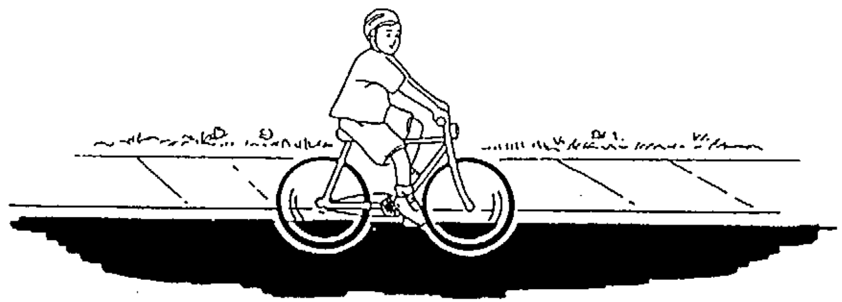
2) No

3) Don't know



Circle what you think is the right answer

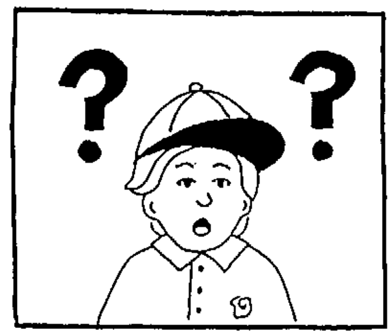
18. Do you ever play on the road?



1) Yes

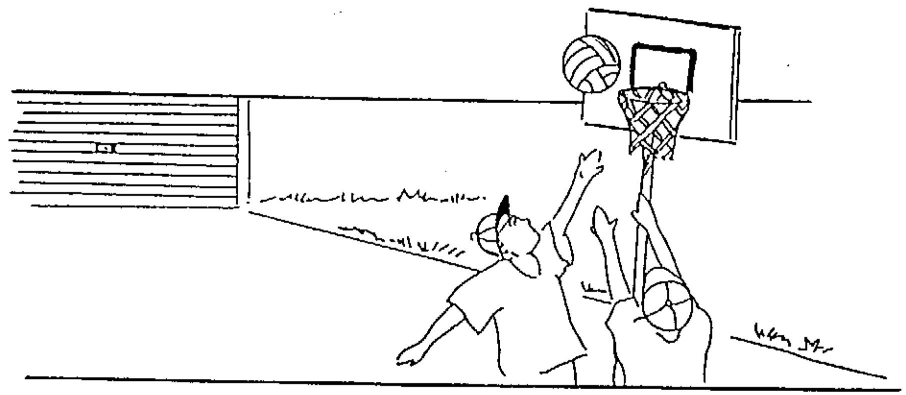
2) No

3) Don't know



Circle what you think is the right answer

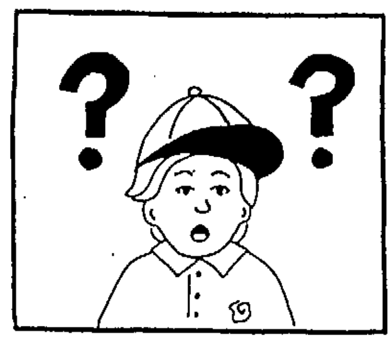
19. Do you ever play on the driveway?



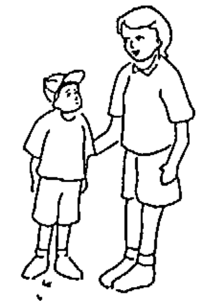
1) Yes

2) No

3) Don't Know

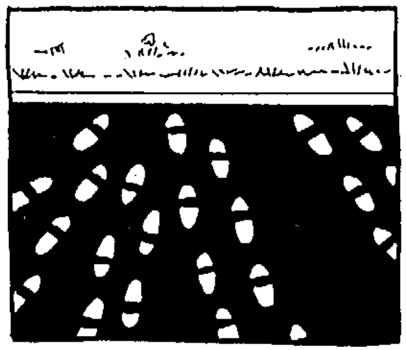


Circle what you think is the right answer

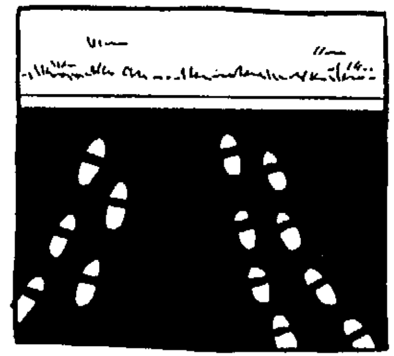


20. How often have your parents talked to you about how to cross the road safely?

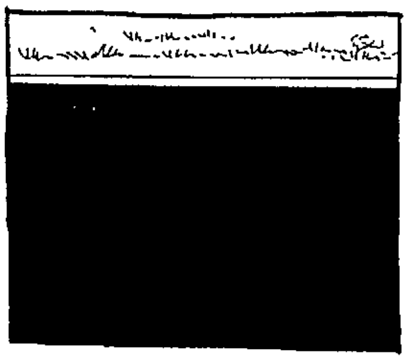
a) 3 or more times



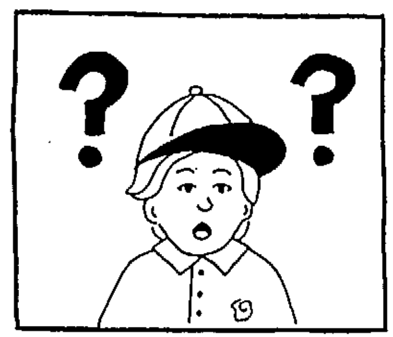
2) 1 or 2 times



3) never



4) don't know



Circle what you think is the right answer

21. How many times <u>a day</u> do you cross a road by yourself?

1) never

0

2) one or two times

1-2

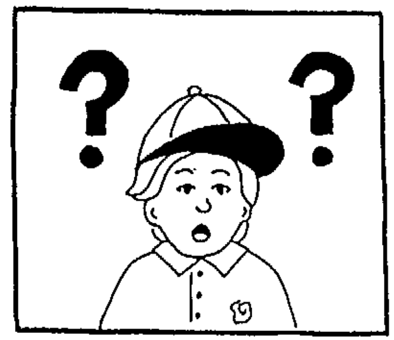
3) three or four times

3-4

4) more than four times

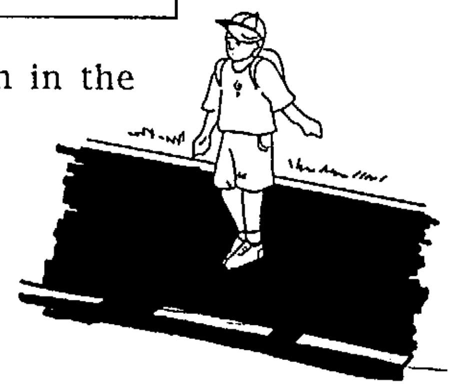
4+

5) don't know



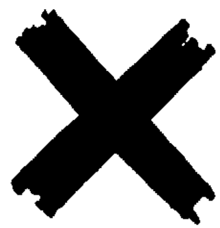
Circle what you think is the right answer

22. Would you be allowed to cross the road if you were the person in the picture?

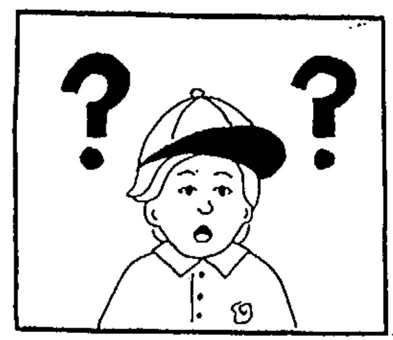


1) Yes

2) No



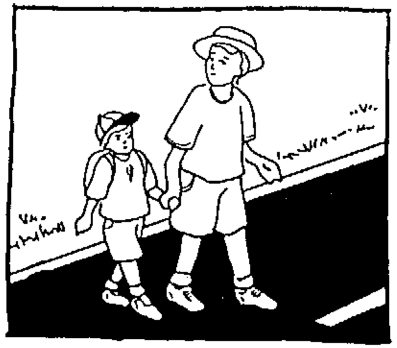
3) Don't know



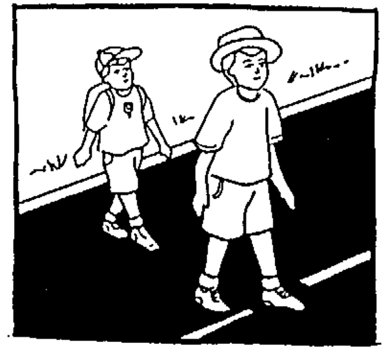
Circle what you think is the right answer

23. When you cross the road with an adult do you walk:

1) next to them



2) behind them



3) in front of them

4) I don't do any of these things

You have now finished, thank you for helping us.

Appendix 7

Post-test 1995 student self-administered questionnaire

Child Pedestrian Injury Prevention Project

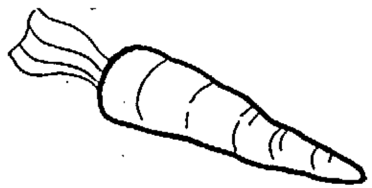
CURTIN
University of Technology
Perth Western Australia

Please answer the next questions as best you can, like in the example below. Circle what you think is the right answer.

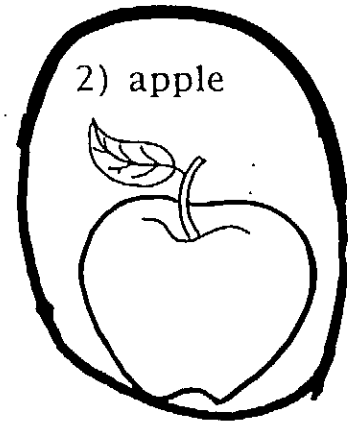
EXAMPLE

1. Which food is a fruit?

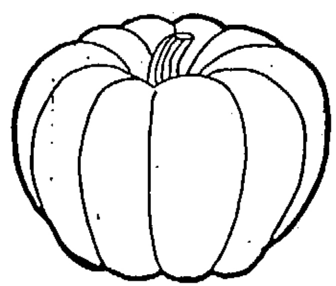
1) carrot



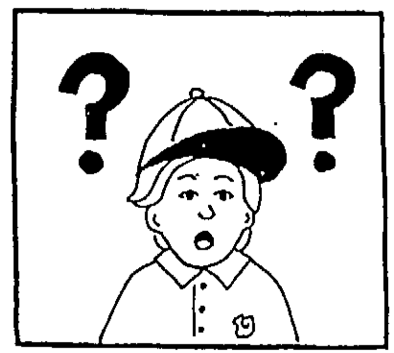
2) apple



3) pumpkin



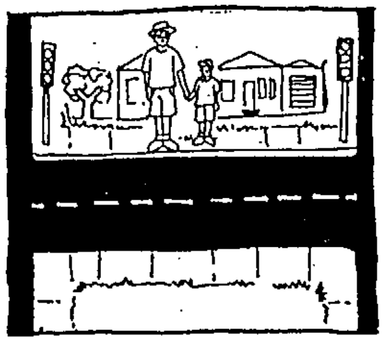
4) don't know



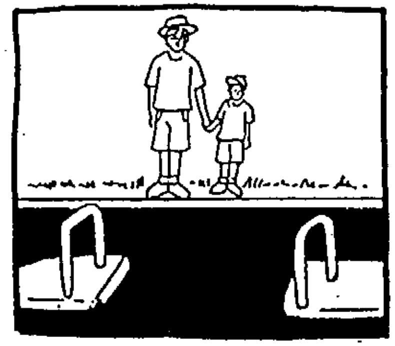
Circle what you think is the right answer

1. Where is the <u>safest</u> place for the boy to cross the road?

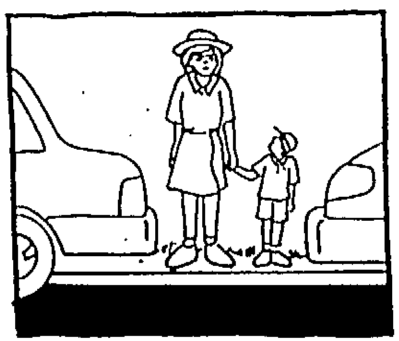
1) at the mid block
with an adult



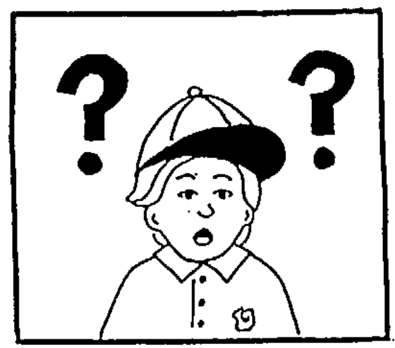
2) at the marked crossing
with an adult



3) near the parked cars
with an adult



4) don't know

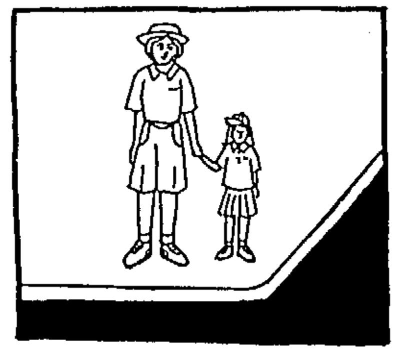


Circle what you think is the right answer

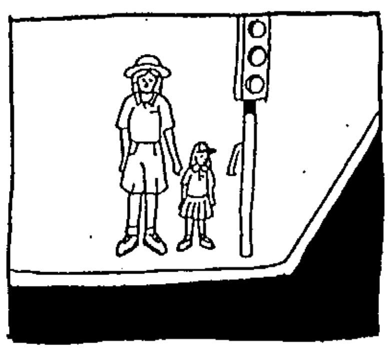
2. Where is the <u>safest</u> place for the girl to cross the road?

1) at the mid block
with an adult

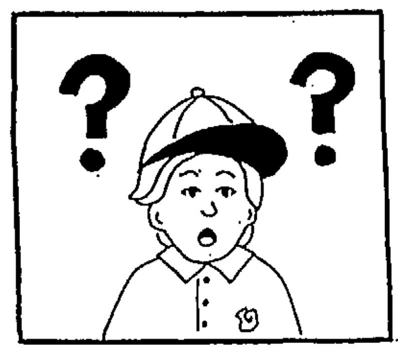
2) at the corner
with an adult



3) at the traffic lights
with an adult

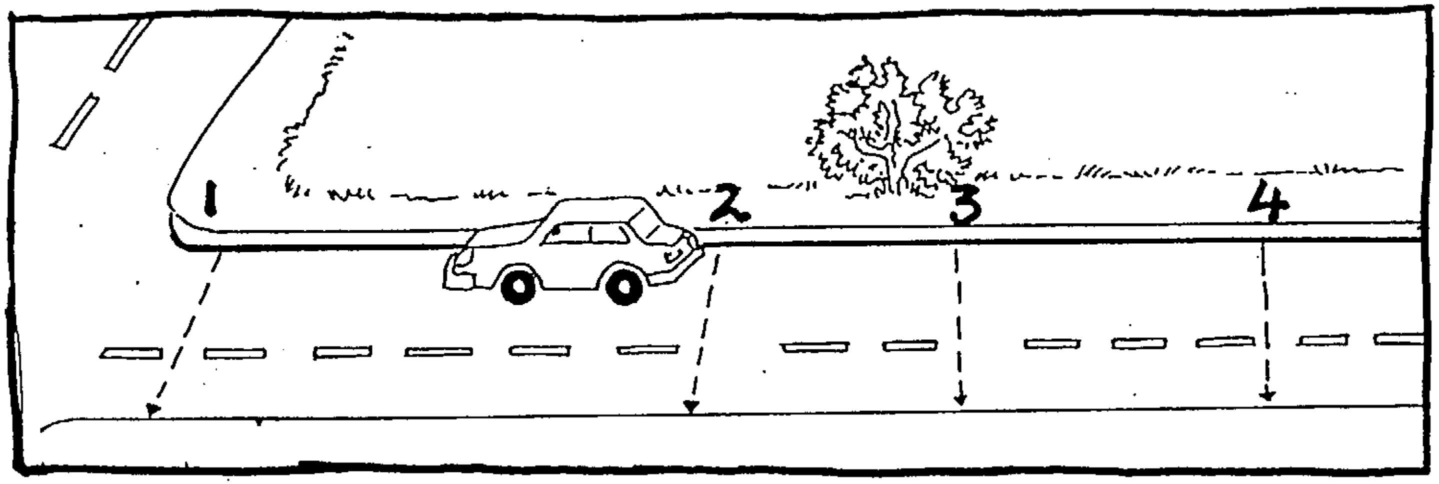


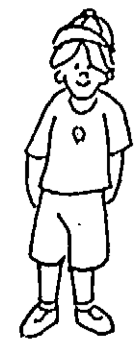
4) don't know



Circle what you think is the right answer

3. Where is the <u>safest</u> place for the boy to cross the road?





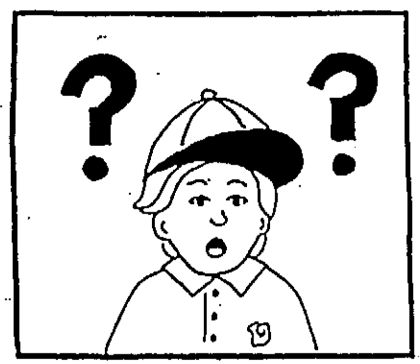
1) near the corner

2) near the parked car

3) near the big tree

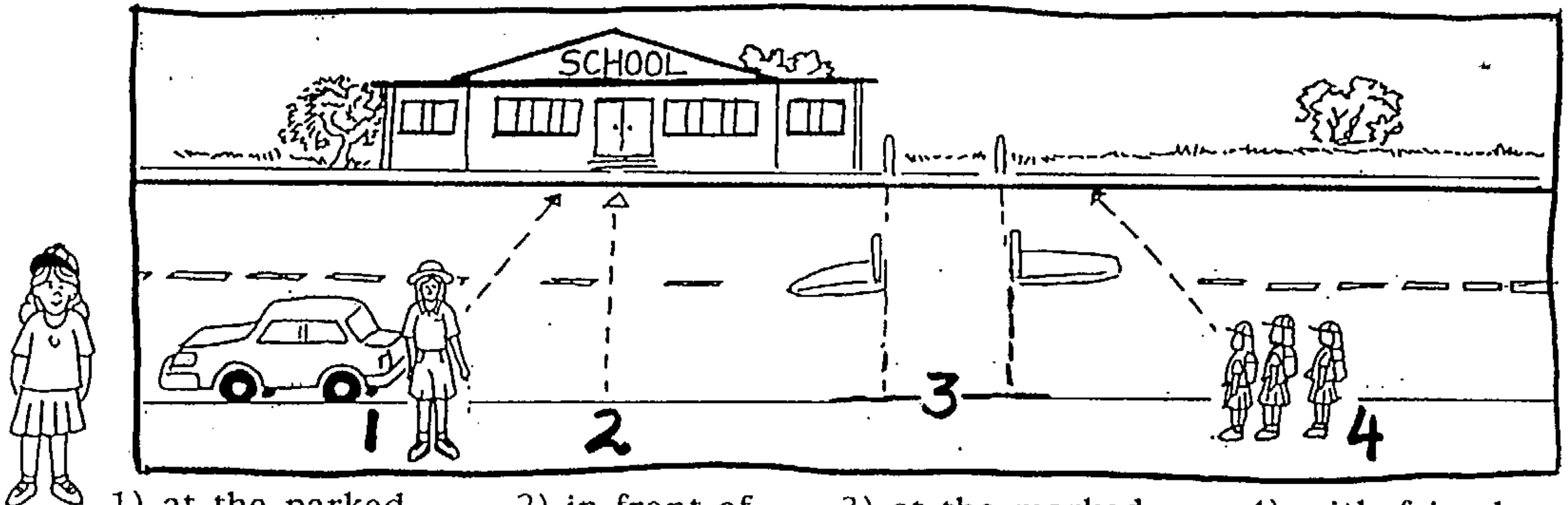
4) on the straight piece of road

5) don't know



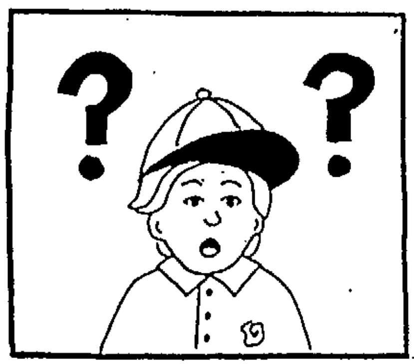
Circle what you think is the right answer

4. Where is the <u>safest</u> place for the girl to cross the road?



1) at the parked car with an adult
2) in front of the school
3) at the marked crossing
4) with friends

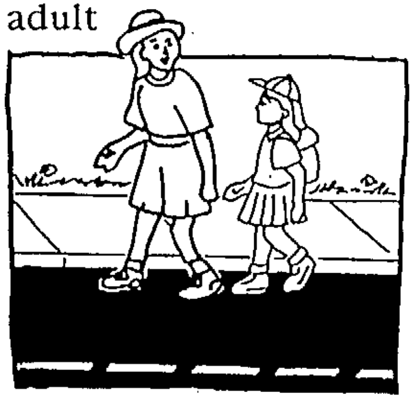
5) don't know



Circle what you think is the right answer

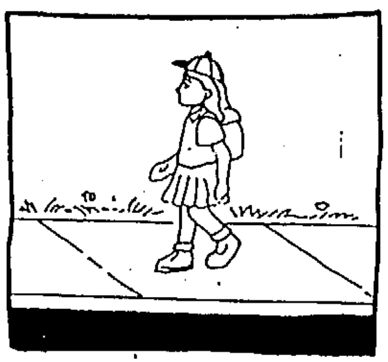
5. Where is the <u>safest</u> place for the girl to walk?

1) on the side of the road
with an adult

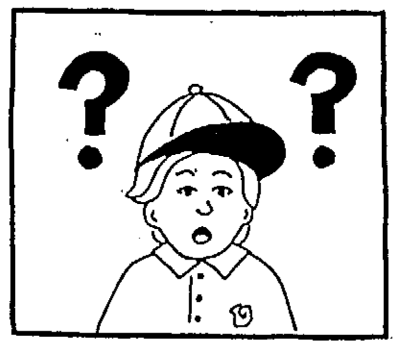


2) on the grass on the
side of the road

3) on the footpath



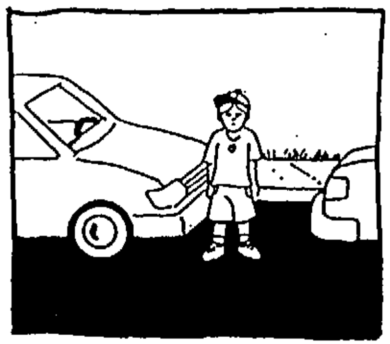
4) don't know



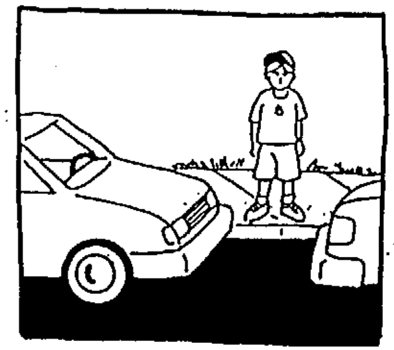
Circle what you think is the right answer

6. Where should the boy stop to look before crossing the road?

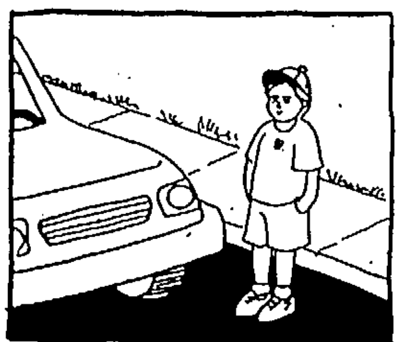
1) on the road at the edge of the car



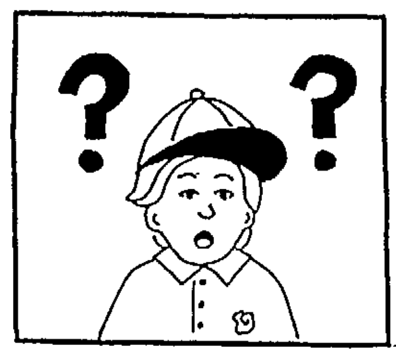
2) on the footpath



3) between the footpath and the car



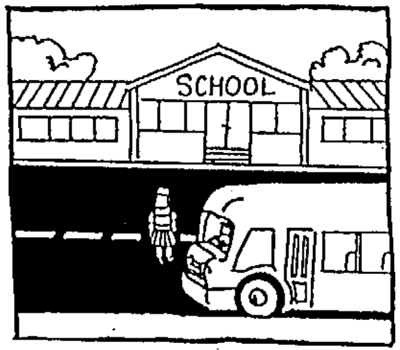
4) don't know



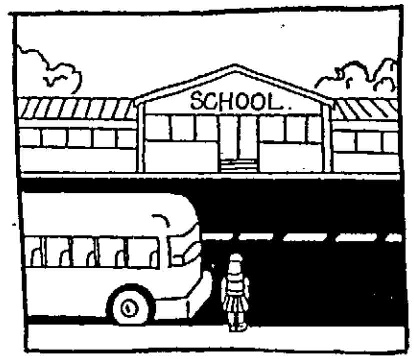
Circle what you think is the right answer

7. After getting off the bus the girl should:

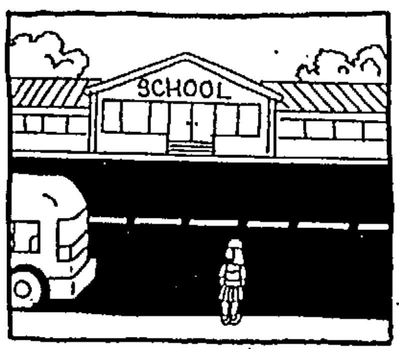
1) walk to the edge of the bus
and cross when the road is clear



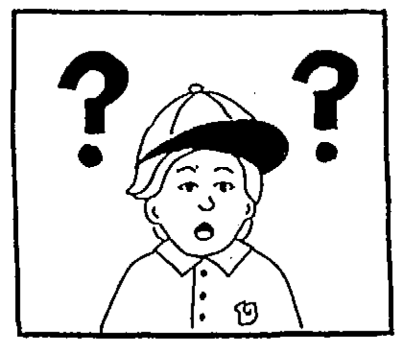
2) cross behind the bus
when the road is clear



3) wait until the bus has
pulled away and cross
when the road is clear



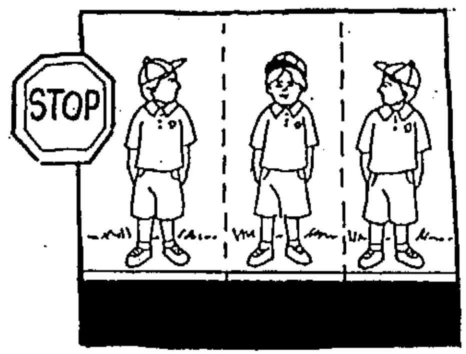
4) don't know



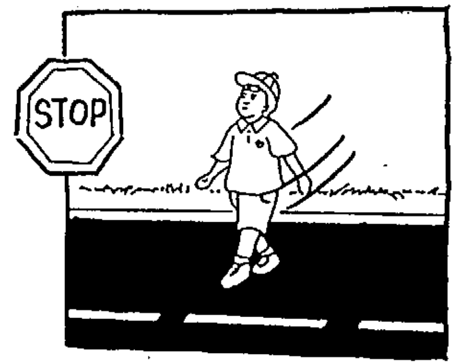
Circle what you think is the right answer

8. When the boy has found a safe place to cross the road he should:

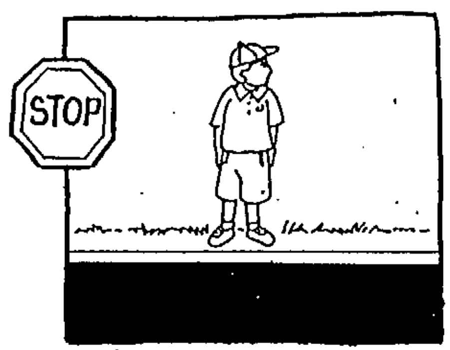
1) stop and look in all directions



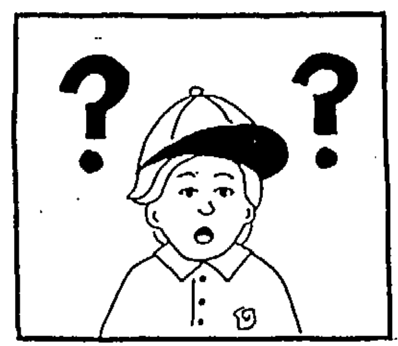
2) stop and look one way before walking across quickly



3) stop and look one way



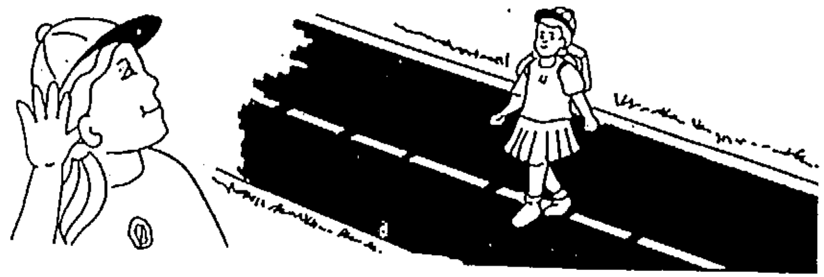
4) don't know



Circle what you think is the right answer

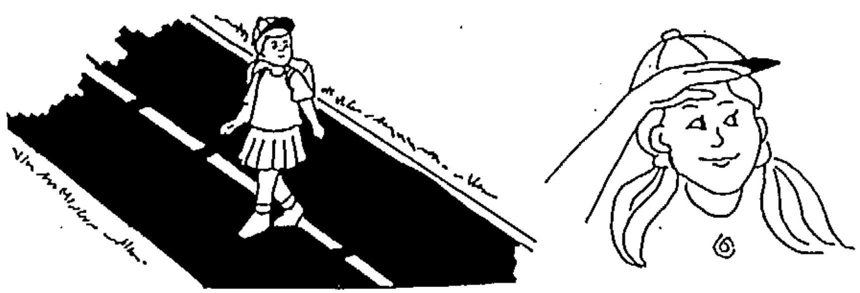
9. When the road is clear the girl should cross by:

1) listening for traffic and looking straight ahead

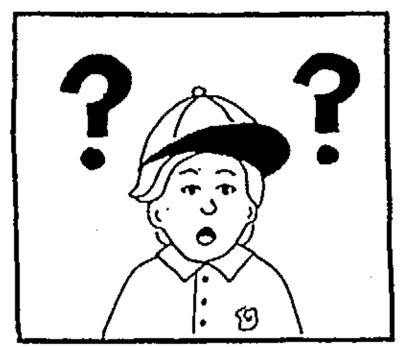


2) watching and listening for traffic

3) walking slowly looking only in one direction

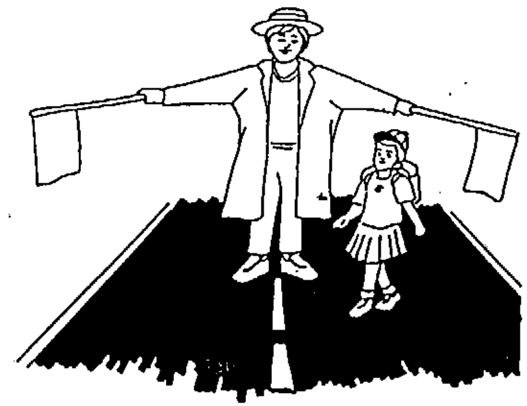


4) don't know



Circle what you think is the right answer

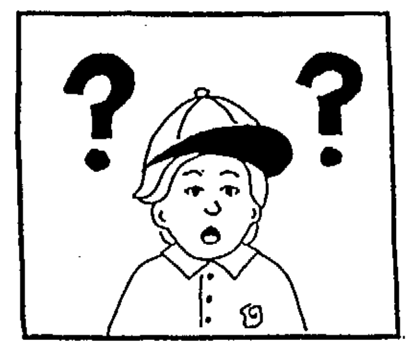
10. Do you have a cross walk attendant near your school?



1) yes

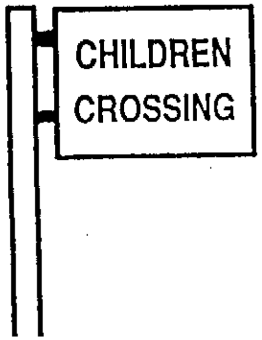
2) no

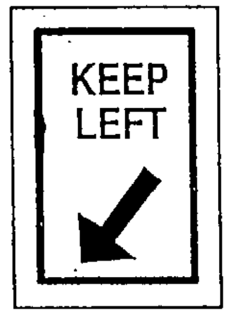
3) don't know

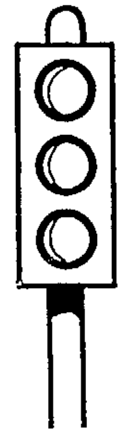


Circle ALL the correct answers

11. Which road signs show a crossing place for pedestrians?

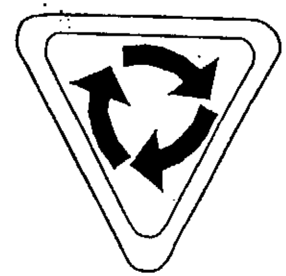
1) 

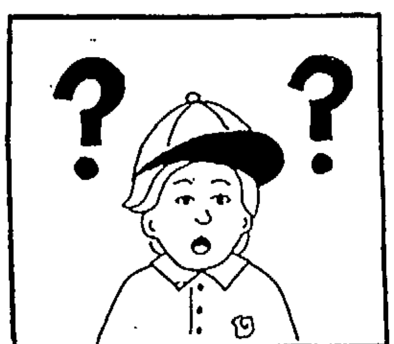
2) 

3) 

4) 

5) 

6) 

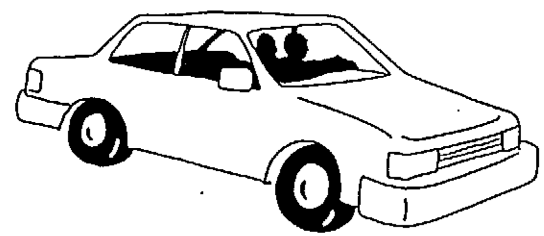
7) don't know 

The next questions are about things that you do. Circle what you think is the right answer.

12. How do you get to school on <u>most</u> days?

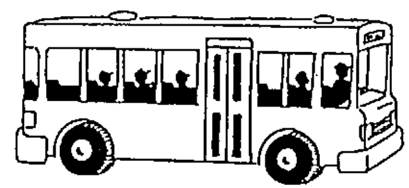
1) walk

2) by car



3) ride my bike

4) by bus



Circle what you think is the right answer

13. How often do you walk to or from school?

1) every day

every day

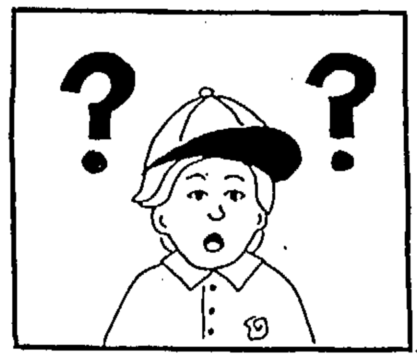
2) A few days

a few days

3) no days or only a few days a year

no days

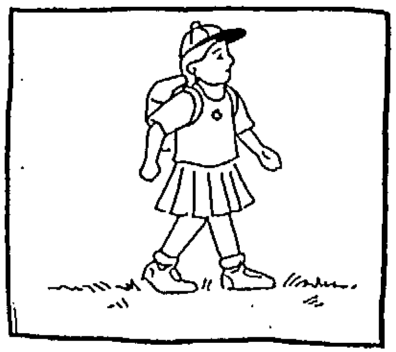
4) don't know



Circle what you think is the right answer

14. If you ever walk to school do you mostly walk:

1) by yourself



2) with an adult

3) with other primary school children

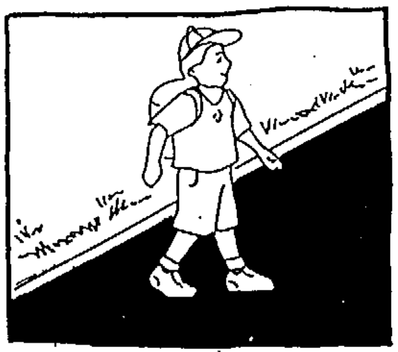
4) with teenagers (13 - 18 years)

5) I don't walk to school

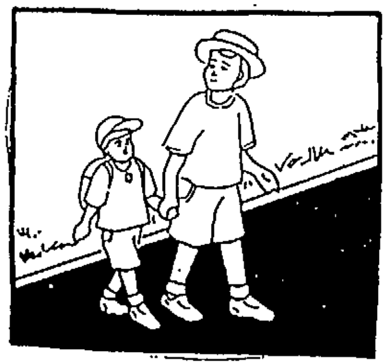
Circle what you think is the right answer

15. Who do you usually cross the road with?

1) on your own

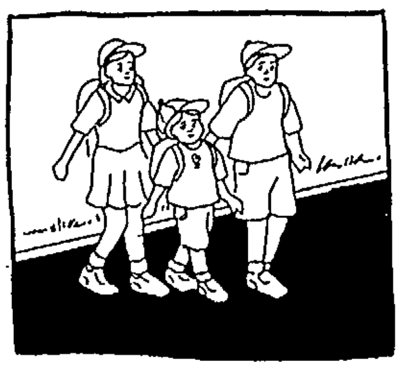


2) with an adult



3) with other primary school children

4) with teenagers (13 - 18 years)



5) I almost never cross the road

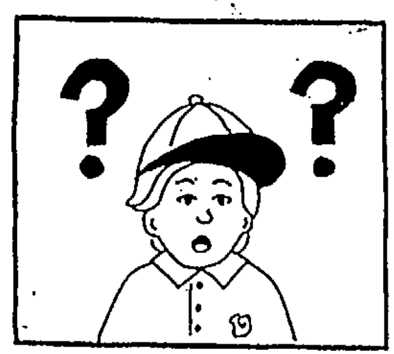
Circle what you think is the right answer

16. Did you practice crossing a real or pretend road with your teacher this year?

1) Yes

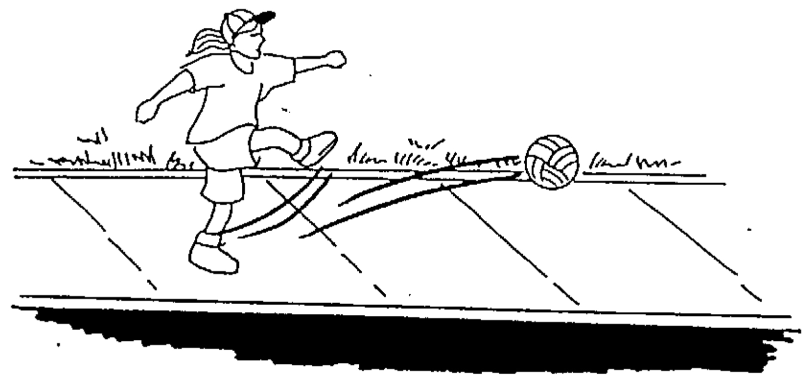
2) No

3) Can't remember



Circle what you think is the right answer

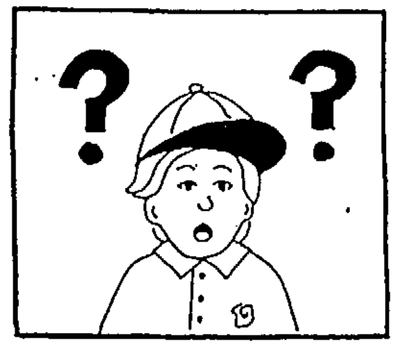
17. Do you ever play on the footpath?



1) Yes

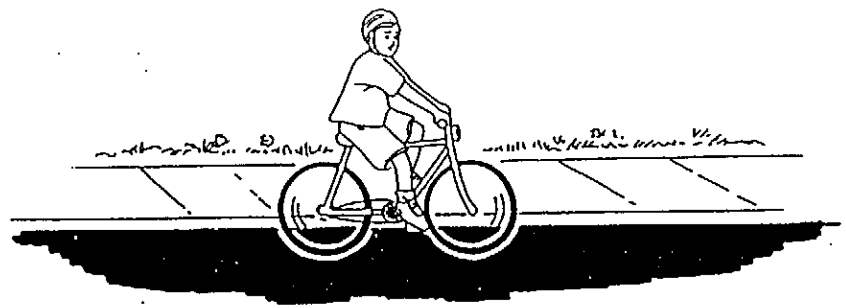
2) No

3) Don't know



Circle what you think is the right answer

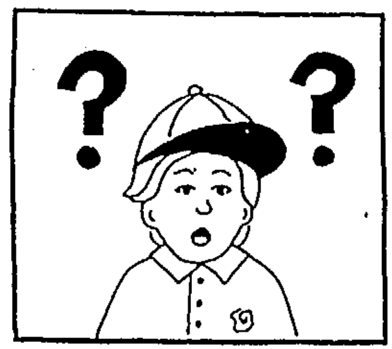
18. Do you ever play on the road?



1) Yes

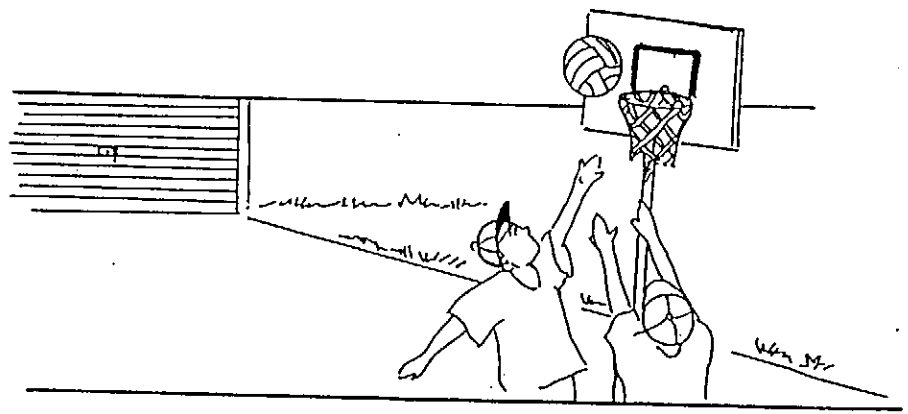
2) No

3) Don't know



Circle what you think is the right answer

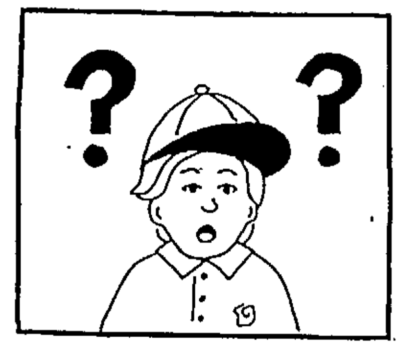
19. Do you ever play on the driveway?



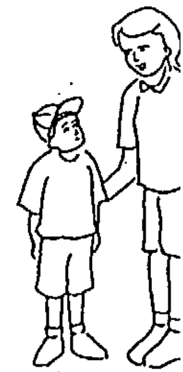
1) Yes

2) No

3) Don't Know



Circle what you think is the right answer



20. How often have your parents talked to you about how to cross the road safely?

1) 3 or more times

3 +

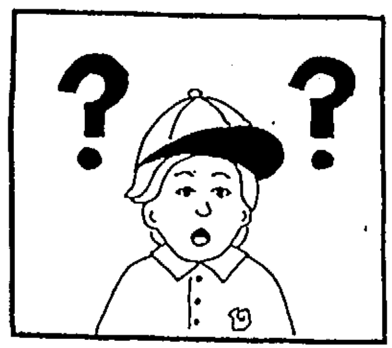
2) 1 or 2 times

1-2

3) never

0

4) don't know



Circle what you think is the right answer

21. How many times a day do you cross a road by yourself?

1) never

0

2) one or two times

1 - 2

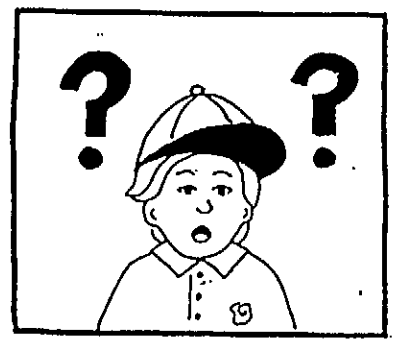
3) three or four times

3 - 4

4) more than four times

4 +

5) don't know

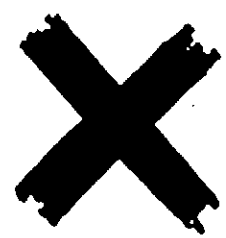


Circle what you think is the right answer

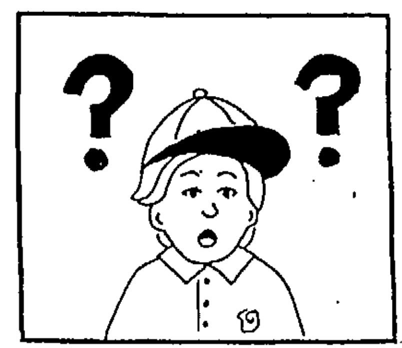
22. Would you be allowed to cross the road if you were the person in the picture?

1) Yes

2) No



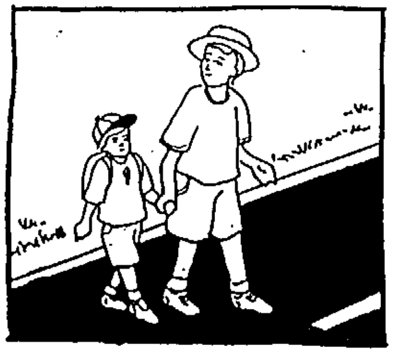
3) Don't know



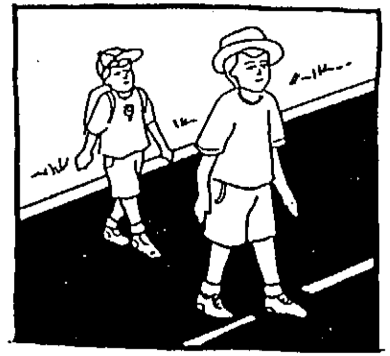
Circle what you think is the right answer

23. When you cross the road with an adult do you walk:

1) next to them



2) behind them

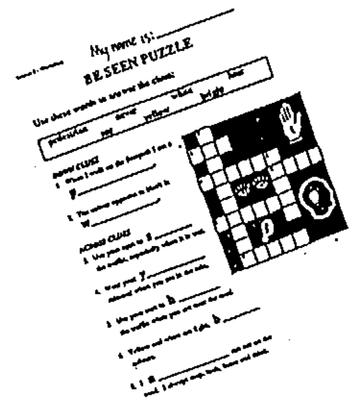


3) in front of them

4) I don't do any of these things

Circle what you think is the right answer

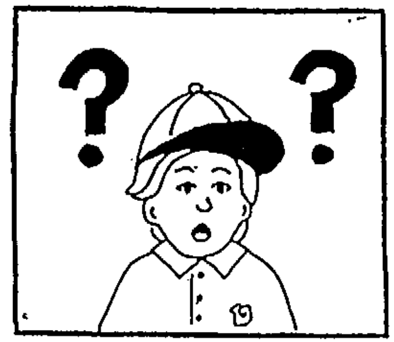
24. Did you like most of the lessons you did this year on crossing the road?



1) Yes

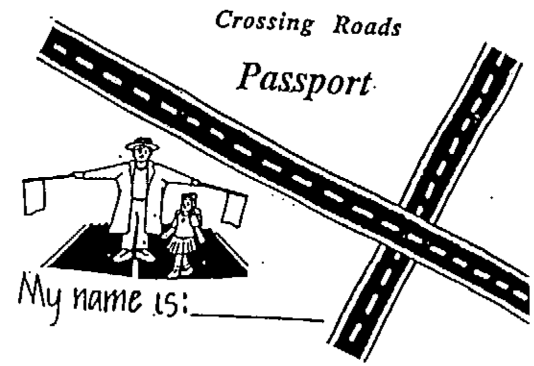
2) No

3) Not sure



Circle what you think is the right answer

25. Did you like getting your Crossing Roads passport stamped at school this year?

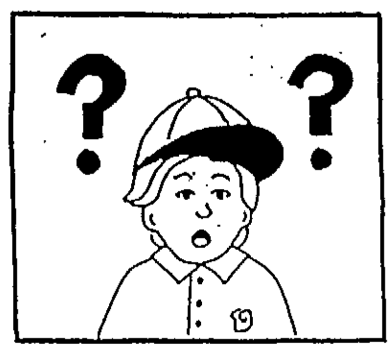


1) Yes

2) No

3) Didn't get it stamped

4) Not sure



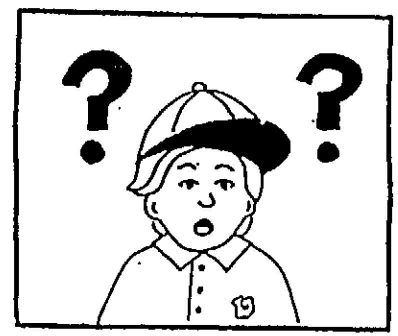
Circle what you think is the right answer

26. Have the lessons you did this year on crossing the road safely helped you to be safe near roads?

1) Yes

2) No

3) Not sure



27. Write what you liked most about the lessons you did this year on crossing roads.

____

____

____

____

You have now finished, thank you for helping us.

23183·10·85

Appendix 8

Post-test 1996 student self-administered questionnaire

Child Pedestrian Injury Prevention Project

Curtin University of Technology
Perth Western Australia

1996
Student Post-test Questionnaire
Intervention

Circle what you think is the right answer.

Did you attend this school in Term 4 last year (1995)?

1. Yes ✓

2. No ✗

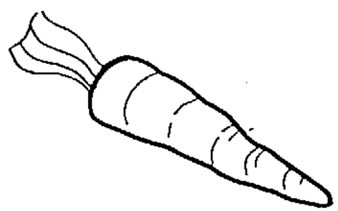
If No, which school did you attend?______________________ Primary School

Please answer the questions as best you can, like in the example below. Circle what you think is the right answer.

EXAMPLE

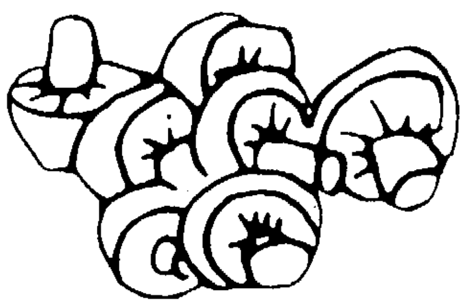
1. Which food is a fruit?

1) carrot

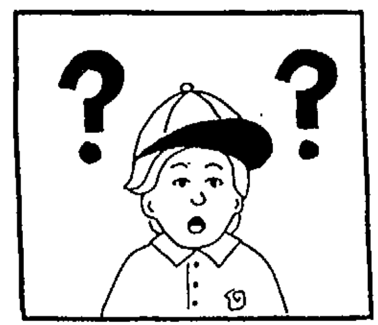


2) apple

3) mushrooms



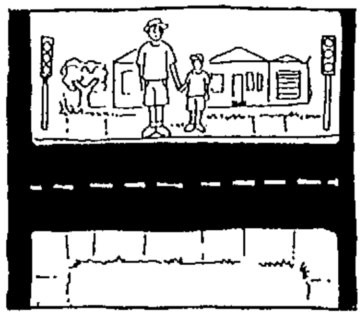
4) don't know



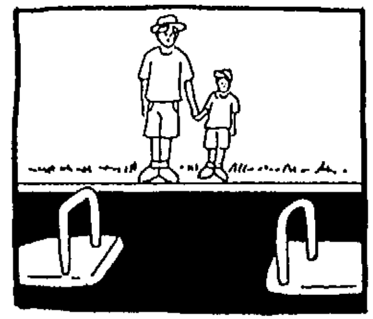
Circle what you think is the right answer

1. Where is the safest place for the boy to cross the road?

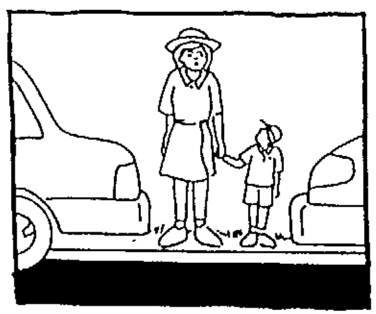
1) at the mid block
with an adult



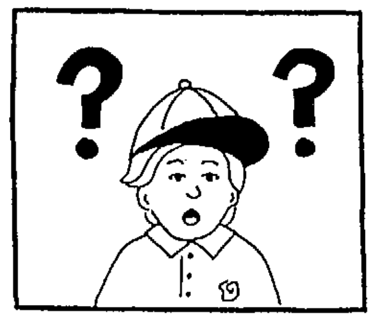
2) at the marked crossing
with an adult



3) near the parked cars
with an adult



4) don't know

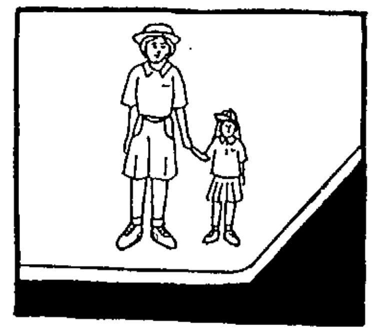


Circle what you think is the right answer

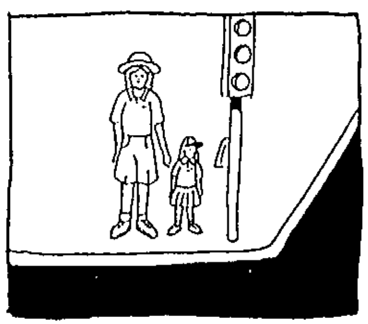
2. Where is the safest place for the girl to cross the road?

1) at the mid block
with an adult

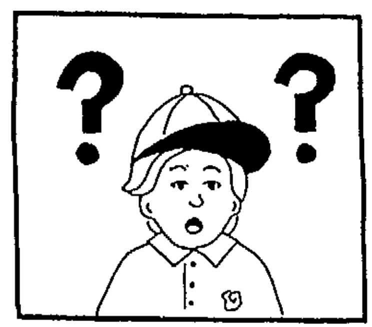
2) at the corner
with an adult



3) at the traffic lights
with an adult

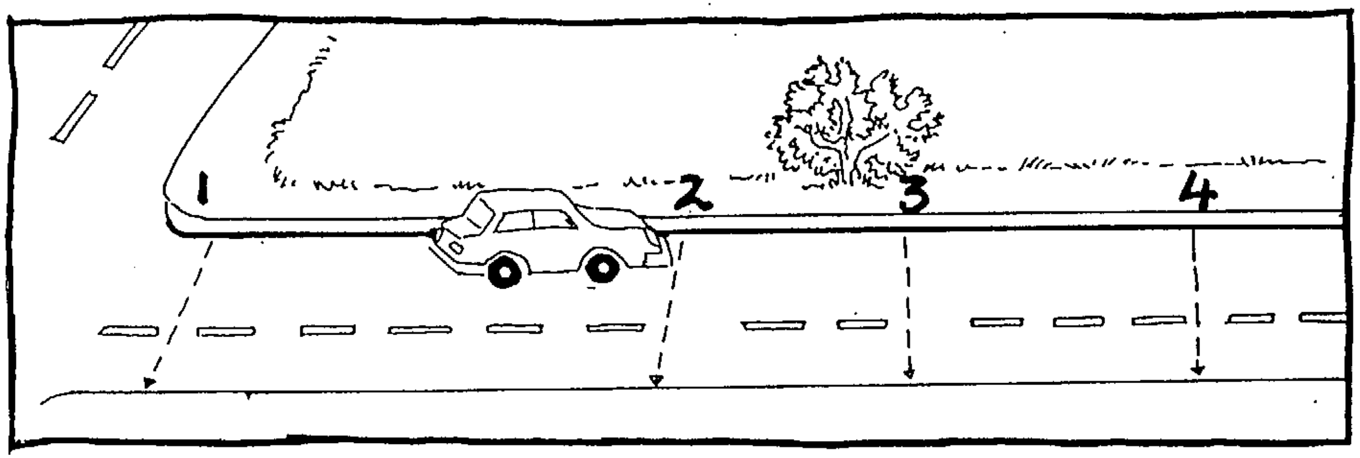


4) don't know



Circle what you think is the right answer

3. Where is the <u>safest</u> place for the boy to cross the road?



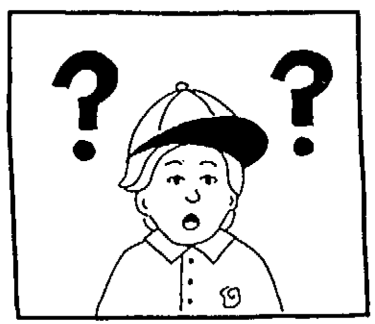
1) near the corner

2) near the parked car

3) near the big tree

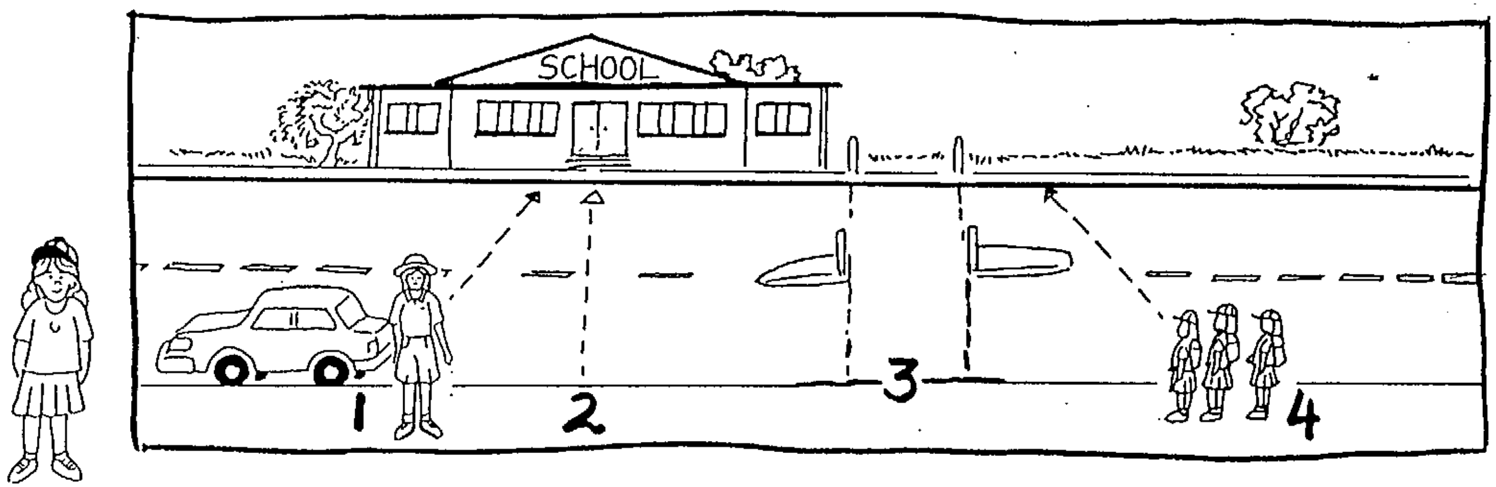
4) on the straight piece of road

5) don't know



Circle what you think is the right answer

4. Where is the <u>safest</u> place for the girl to cross the road?



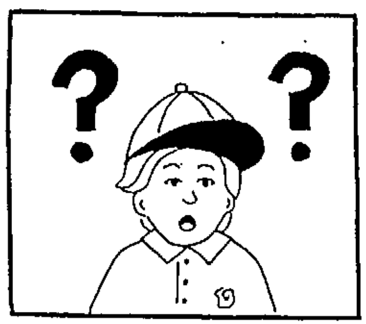
1) at the parked car with an adult

2) in front of the school

3) at the marked crossing

4) with friends

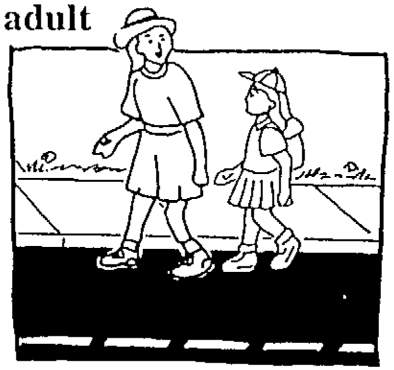
5) don't know



Circle what you think is the right answer

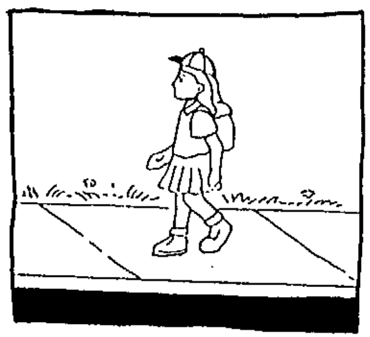
5. Where is the safest place for the girl to walk?

1) on the side of the road
with an adult

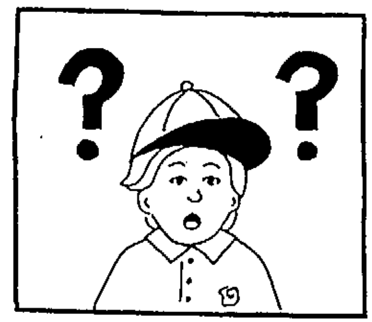


2) on the grass on the side of
the road

3) on the footpath



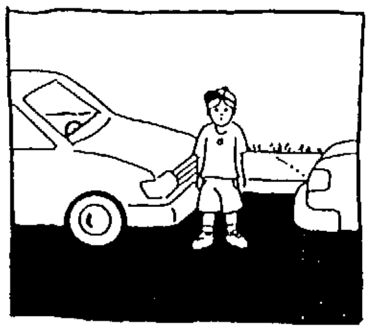
4) don't know



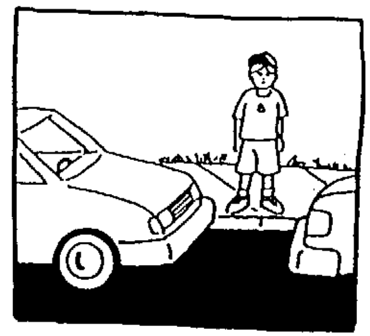
Circle what you think is the right answer

6. Where should the boy stop to look before crossing the road?

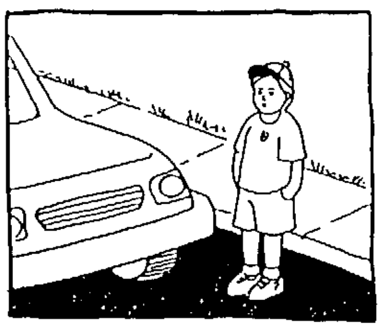
1) on the road at the edge of the car



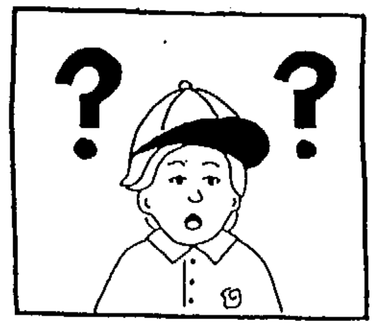
2) on the footpath



3) between the footpath and the car



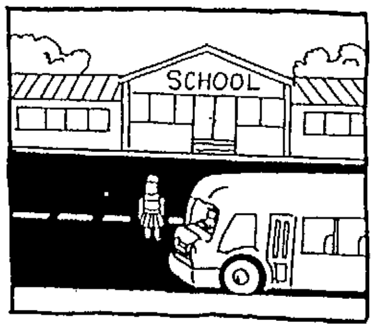
4) don't know



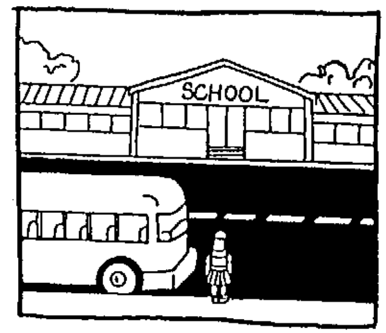
Circle what you think is the right answer

7. After getting off the bus the girl should:

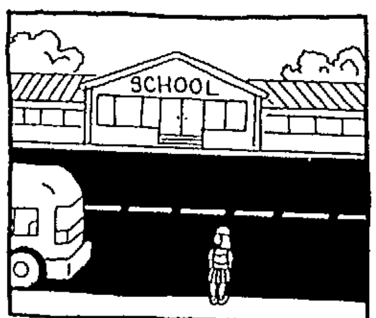
1) walk to the edge of the bus
and cross when the road is clear



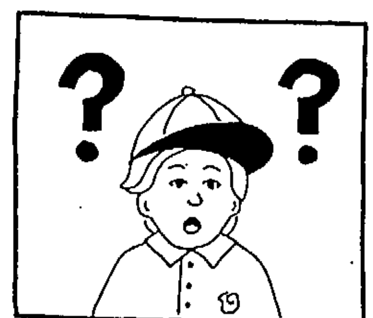
2) cross behind the bus
when the road is clear



3) wait until the bus has driven away
and cross when the road is clear



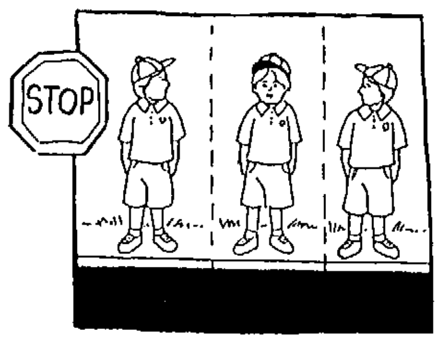
4) don't know



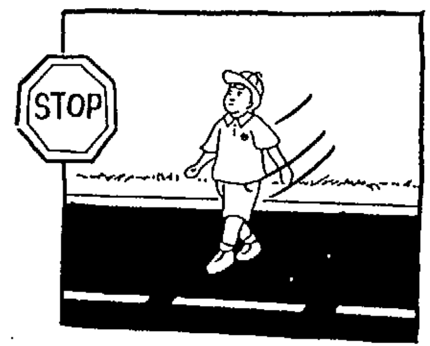
Circle what you think is the right answer

8. When the boy has found the safest place to cross the road he should:

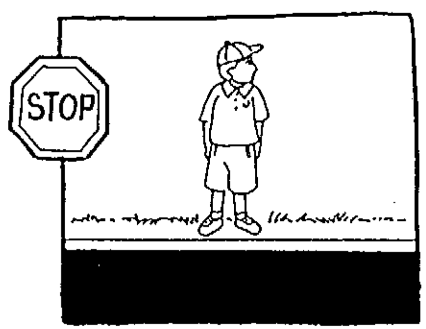
1) stop and look in all directions



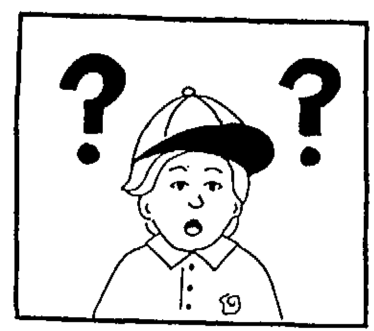
2) stop and look one way before walking across quickly



3) stop and look one way



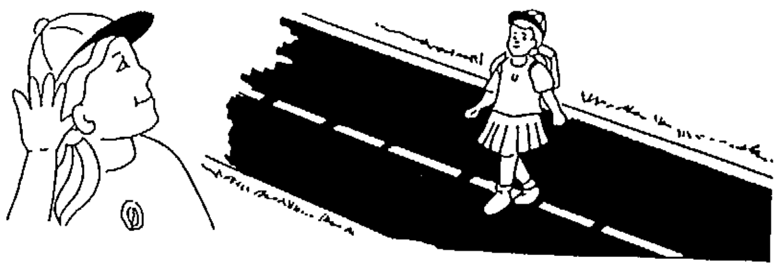
4) don't know



Circle what you think is the right answer

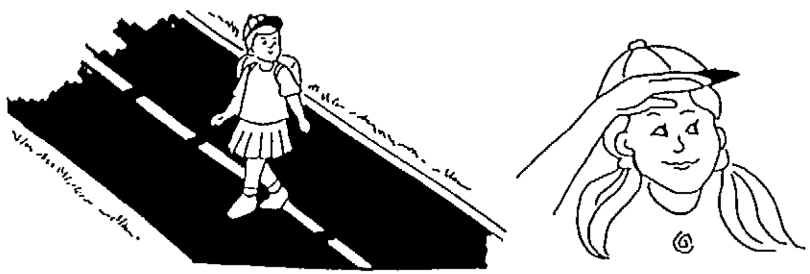
9. When the road is clear the girl should cross by:

1) listening for traffic and looking straight ahead

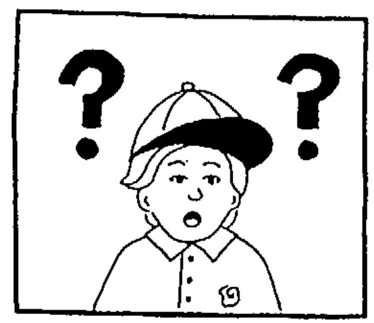


2) watching and listening for traffic

3) walking slowly looking only in one direction



4) don't know



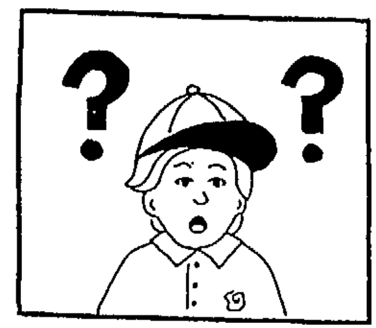
Circle what you think is the right answer

10. If you walked to school today or yesterday was it with an adult?

1) yes

2) no

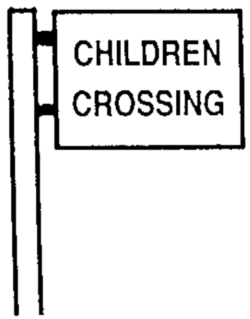
3) don't know

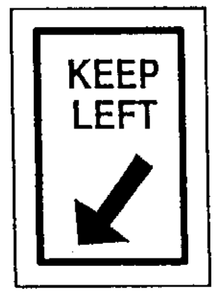


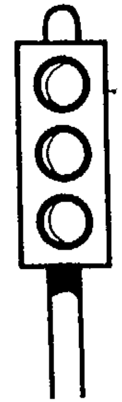
4) I didn't walk to school today or yesterday.

Circle <u>ALL</u> the correct answers

11. Which road signs show a crossing place for pedestrians?

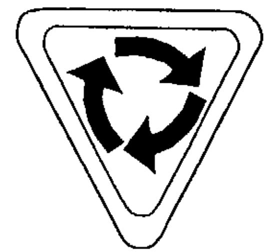
1) 

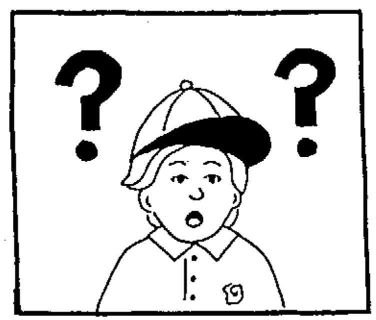
2) 

3) 

4) 

5) 

6) 

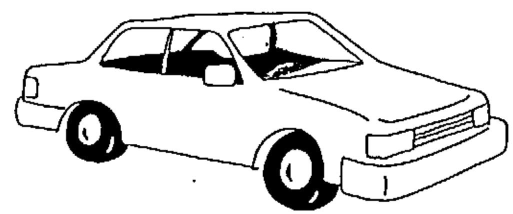
7) don't know 

The next questions are about things that you do. Circle what you think is the right answer.

12. How do you get <u>to</u> school on <u>most</u> days?

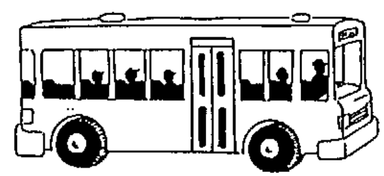
1) walk

2) by car



3) ride my bike

4) by bus



Circle what you think is the right answer

13. How often do you walk to or from school?

1) every day

every day

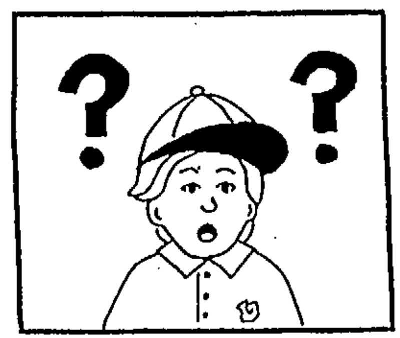
2) A few days a week

a few days

3) no days or only a few days a <u>year</u>

no days

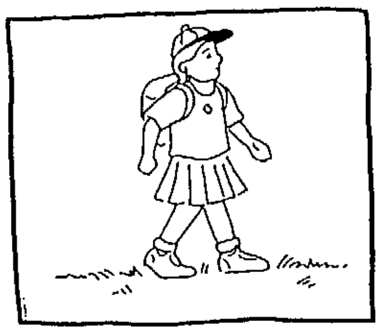
4) don't know



Circle what you think is the right answer

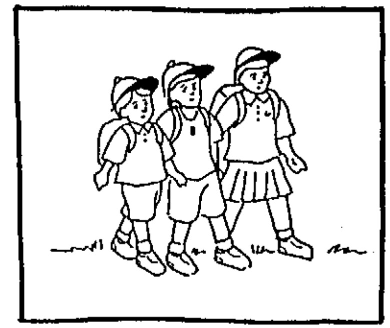
14. If you <u>ever</u> walk to school do you <u>mostly</u> walk:

1) by yourself



2) with an adult

3) with other primary school children



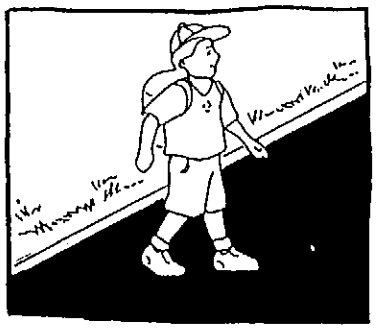
4) with teenagers (13 - 18 years)

5) I don't walk to school

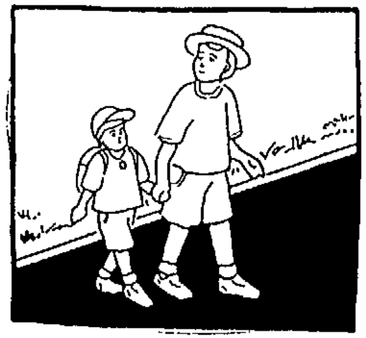
Circle what you think is the right answer

15. When walking in your neighbourhood, with whom do you <u>usually</u> cross the road?

1) on your own

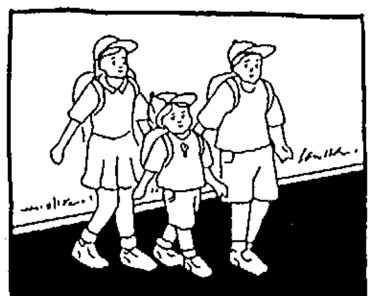


2) an adult



3) other primary school children

4) a teenager (13 - 18 years)



5) I almost never cross the road

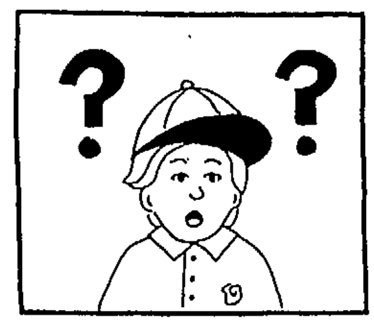
Circle what you think is the right answer

16. Did you practice crossing a road outside your school with your teacher this year?

1) Yes

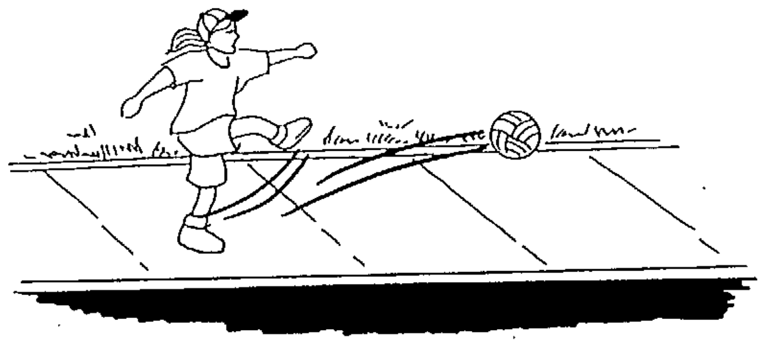
2) No

3) Can't remember



Circle what you think is the right answer

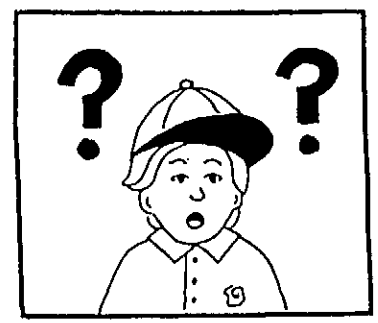
17. Do you ever play on the footpath?



1) Yes

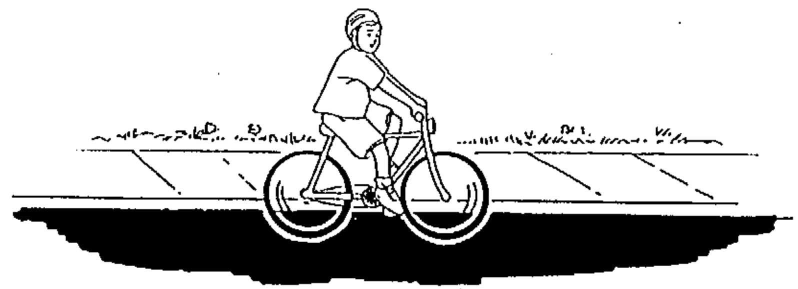
2) No

3) Don't know



Circle what you think is the right answer

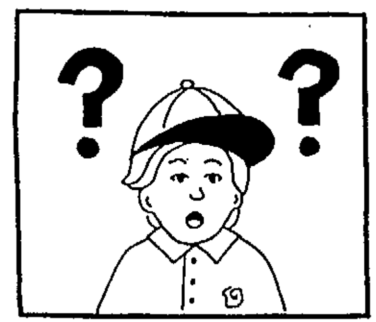
18. Do you ever play on the road?



1) Yes

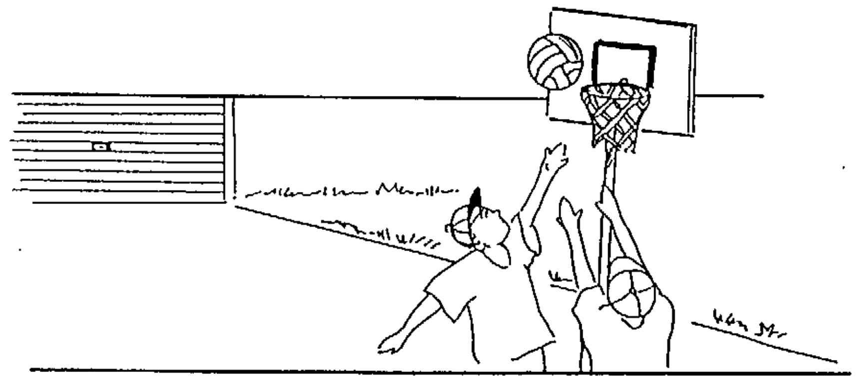
2) No

3) Don't know



Circle what you think is the right answer

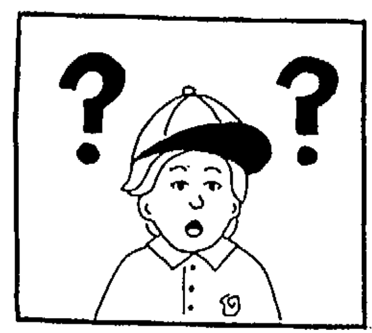
19. Do you ever play on the driveway?



1) Yes

2) No

3) Don't Know



Circle what you think is the right answer

20. How often have your parents talked to you about how to cross the road safely?

1) 3 or more times

3 +

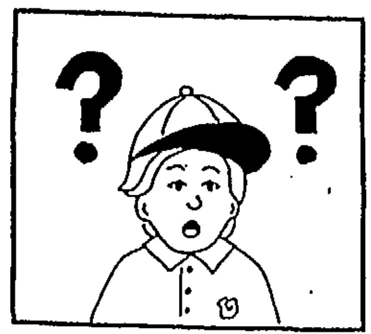
2) 1 or 2 times

1-2

3) never

0

4) don't know



Circle what you think is the right answer

21. How many times a day do you cross a road by yourself?

1) never

0

2) one or two times

1 - 2

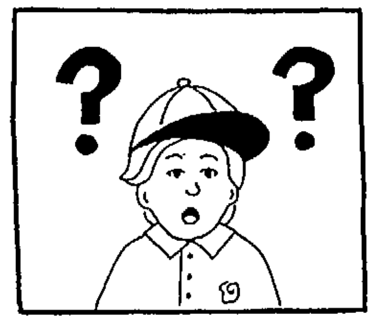
3) three or four times

3 - 4

4) more than four times

4 +

5) don't know



Circle what you think is the right answer

22. Would you be allowed to cross the road if you were the person in the picture?

1) Yes

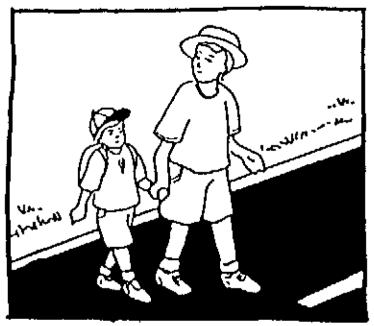
2) No

3) Don't know

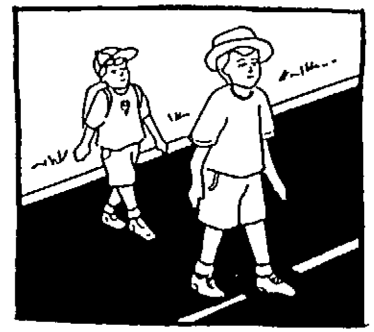
Circle what you think is the right answer

23. When you cross the road with an adult do you walk:

1) next to them



2) behind them



3) in front of them

4) I don't do any of these things

Circle what you think is the right answer

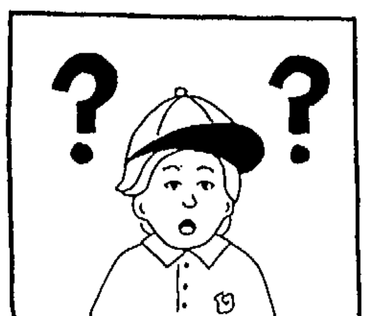
24. When you cross a road do you think you can:

1) Cross **more safely** than other children you know?

2) Cross **about the same** as other children you know?

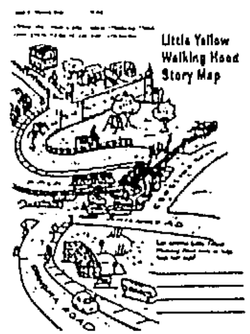
3) Cross **less safely** than other children you know?

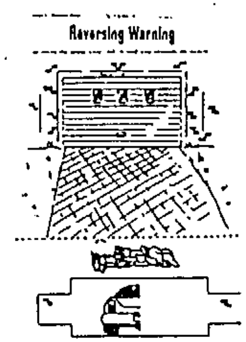
4) Not sure



Circle what you think is the right answer

25. Did you like most of the lessons you did this year on crossing the road?



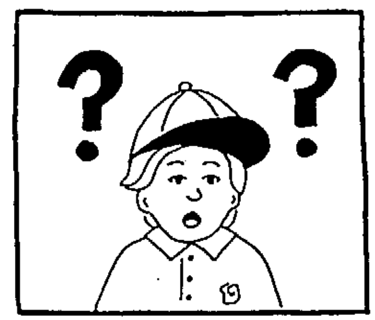


1) Yes ✓

2) No ✗

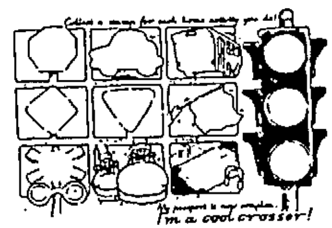
3) Didn't do any 0

4) Not sure



Circle what you think is the right answer

26. Did getting your Crossing Roads passport stamped make you want to do your home activities?

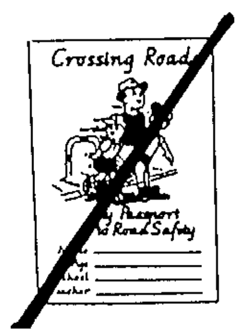


1) **Always**

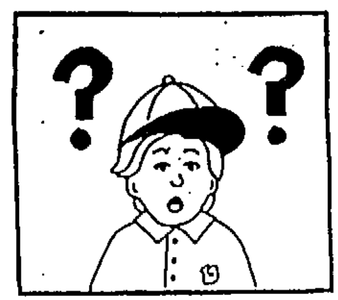
2) **Sometimes**

3) **Never**

4) Didn't get it stamped / Didn't get a passport



5) Not sure



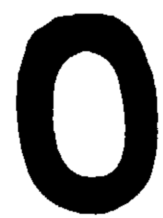
Circle what you think is the right answer

27. Have the lessons you did this year on crossing the road safely helped you to be safer near roads?

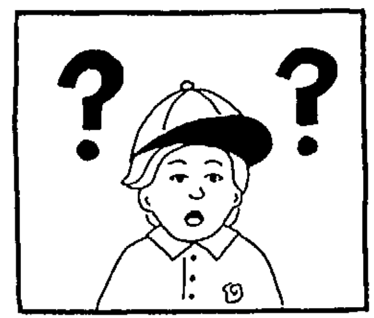
1) Yes

2) No

3) Didn't do any



4) Not sure



28. What is the safest way for you to cross a road?

You have now finished, thank you for helping us.

Appendix 9

Post-test 1997 student self-administered questionnaire

Child Pedestrian Injury Prevention Project

curtin
University of Technology
Western Australia

1997
Student Post-test Questionnaire
Intervention

Circle what you think is the right answer.

Did you attend this school in Term 4 last year (1996)?

1. Yes ✓

2. No ✗

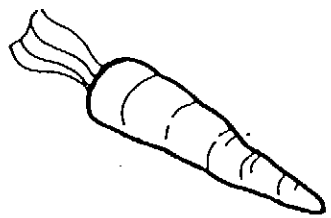
If No, which school did you attend? ______________________ Primary School

Please answer the next questions as best you can, like in the example below. Circle what you think is the right answer.

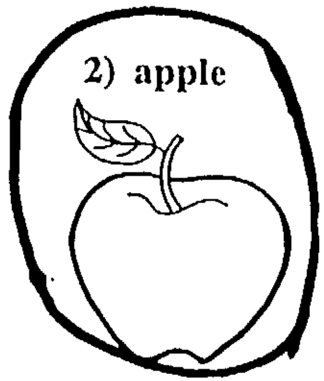
EXAMPLE

1. Which food is a fruit?

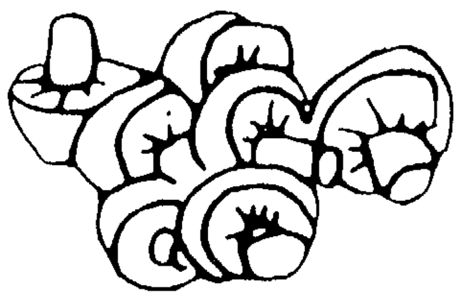
1) carrot



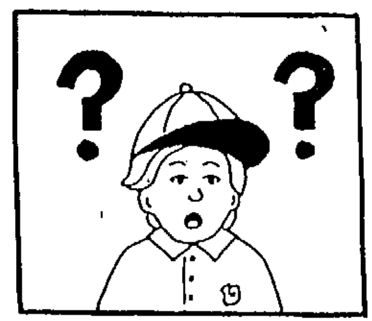
2) apple



3) mushrooms



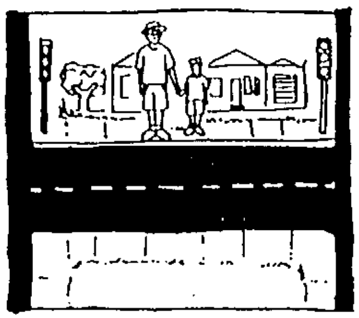
4) don't know



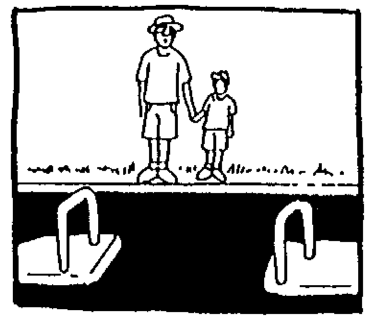
Circle what you think is the right answer

1. Where is the safest place for the people to cross the road?

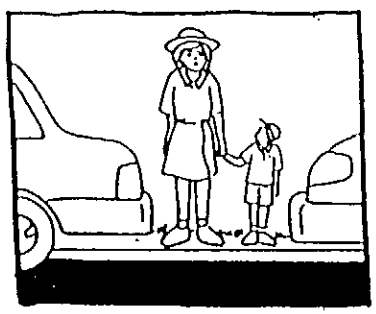
1) at the mid block



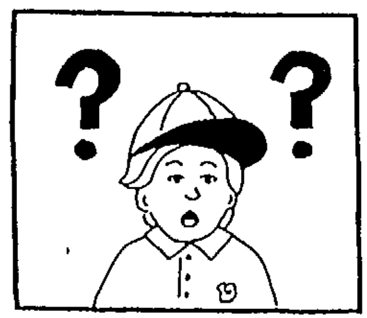
2) at the marked crossing



3) near the parked cars



4) don't know

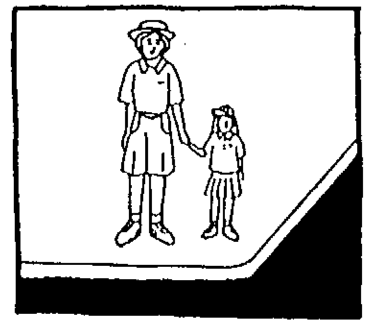


Circle what you think is the right answer

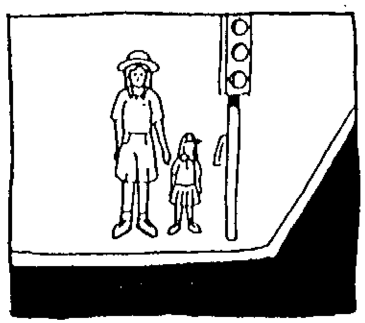
2. Where is the <u>safest</u> place for the people to cross the road?

1) at the mid block

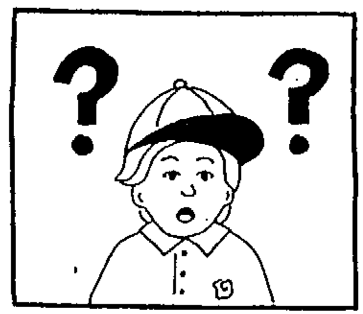
2) at the corner



3) at the traffic lights

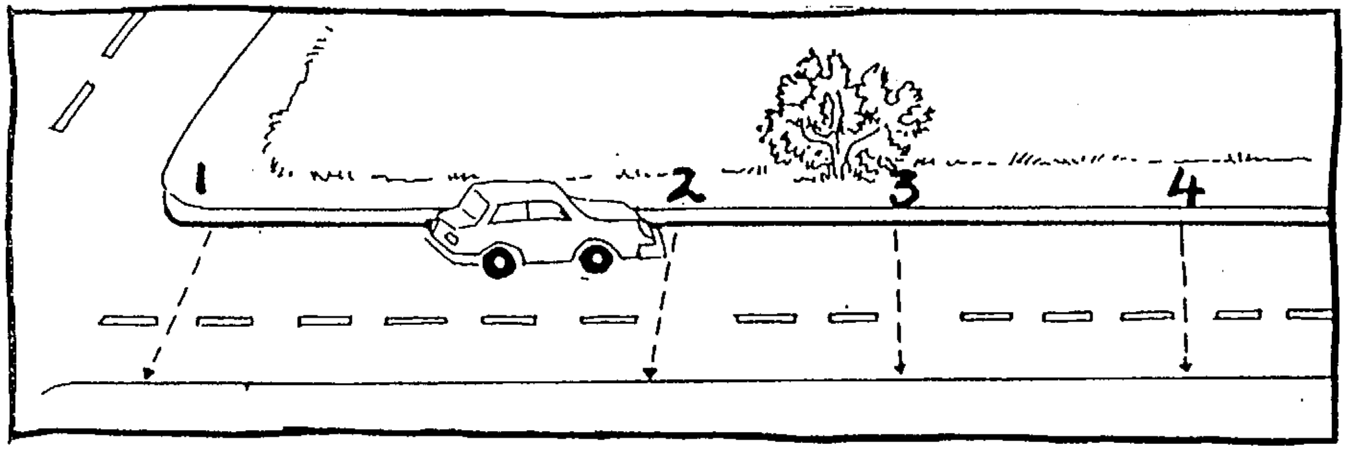


4) don't know



Circle what you think is the right answer

3. Where is the safest place for the person to cross the road?



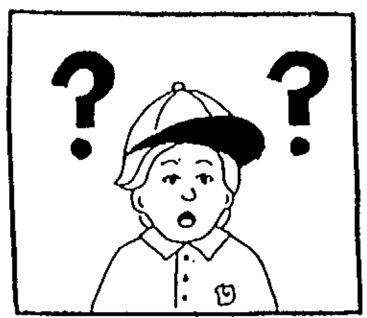
1) near the corner

2) near the parked car

3) near the big tree

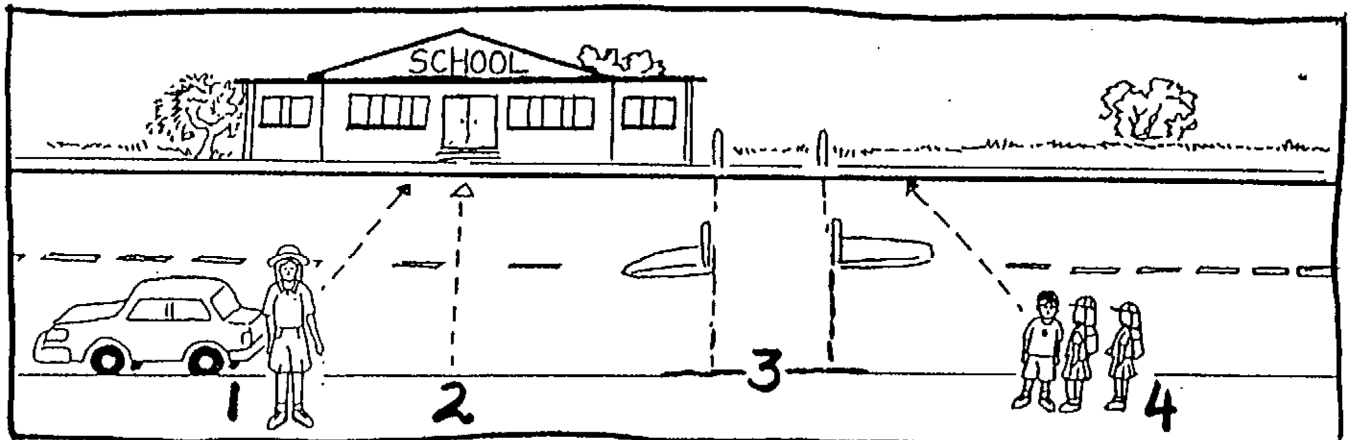
4) on the straight piece of road

5) don't know



Circle what you think is the right answer

4. Where is the <u>safest</u> place for the person to cross the road?



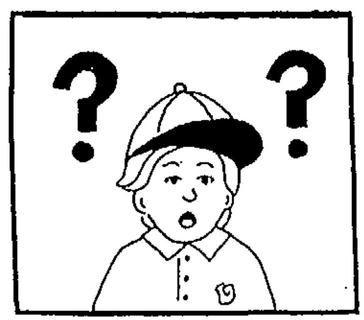
1) at the parked car with an adult

2) in front of the school

3) at the marked crossing

4) with friends

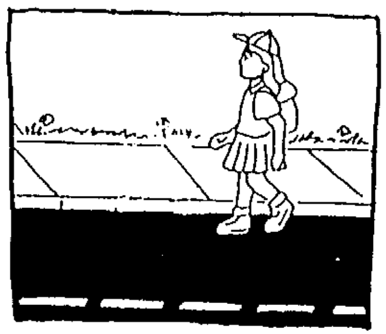
5) don't know



Circle what you think is the right answer

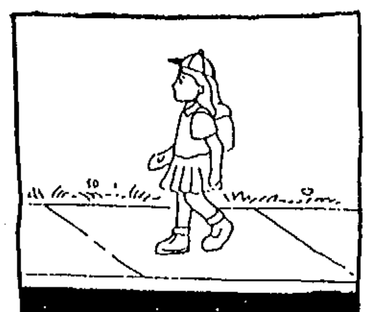
5. Where is the safest place for the person to walk?

1) on the side of the road

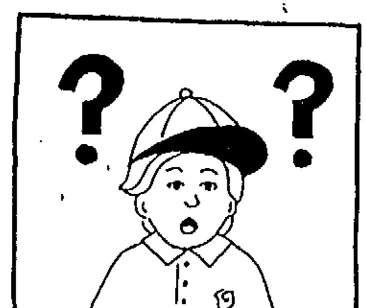


2) on the grass on the side of the road

3) on the footpath



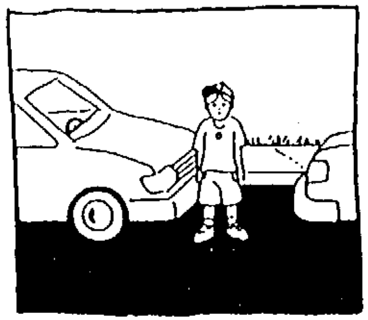
4) don't know



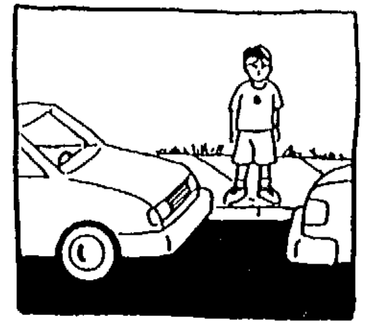
Circle what you think is the right answer

6. Where should the person stop to look before crossing the road?

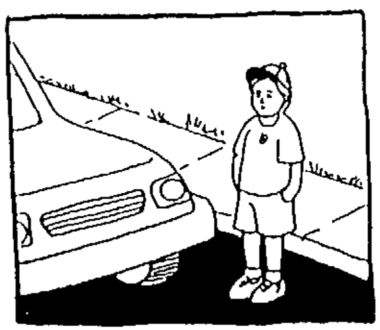
1) on the road at the edge of the car



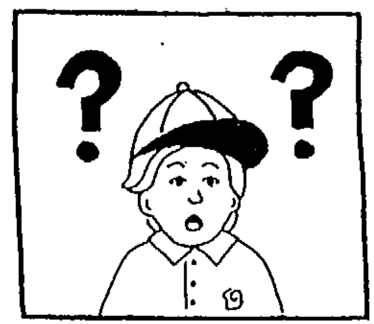
2) on the footpath



3) between the footpath and the car



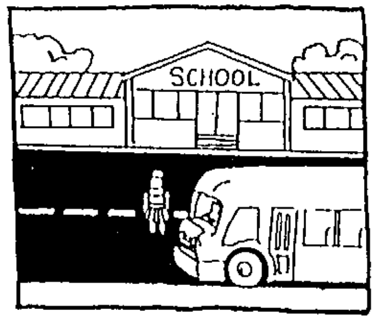
4) don't know



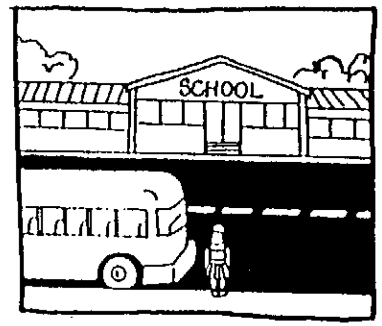
Circle what you think is the right answer

7. After getting off the bus the person should:

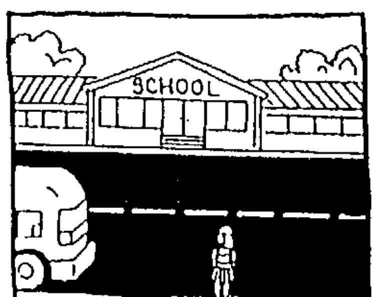
1) walk to the edge of the bus
and cross when the road is clear



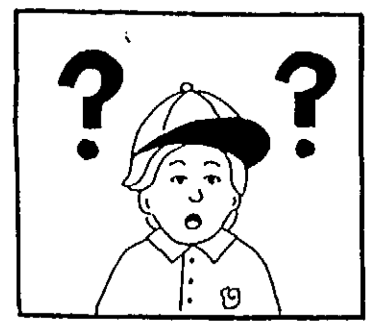
2) cross behind the bus
when the road is clear



3) wait until bus has driven away
and cross when the road is clear



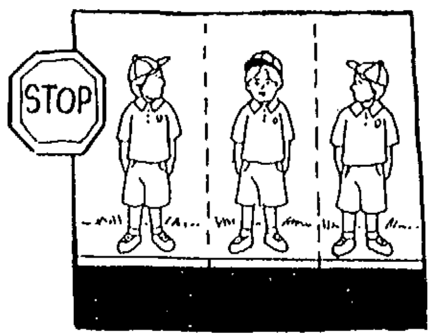
4) don't know



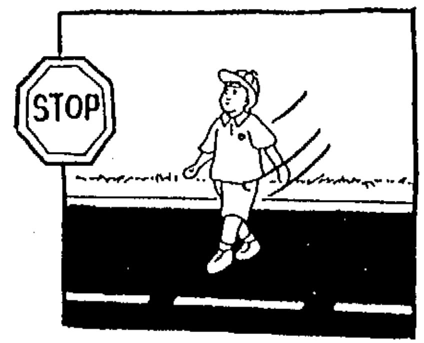
Circle what you think is the right answer

8. When a person has found the safest place to cross the road he/she should:

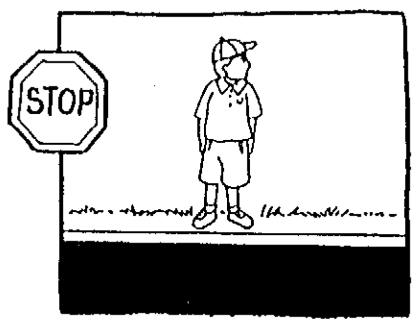
1) stop and look in all directions



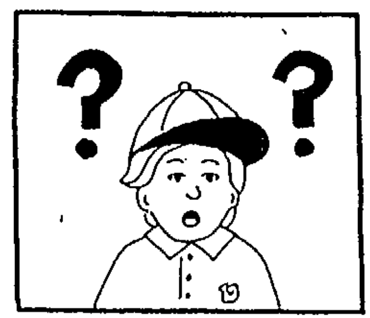
2) stop and look one way before walking across quickly



3) stop and look one way



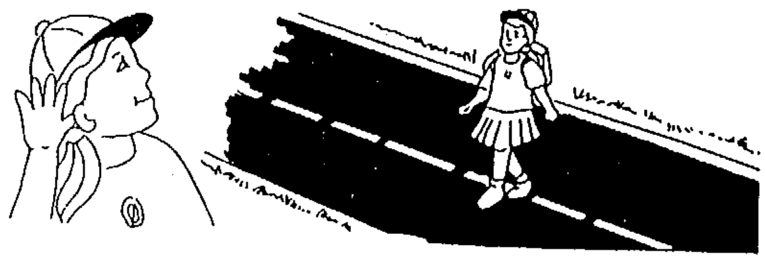
4) don't know



Circle what you think is the right answer

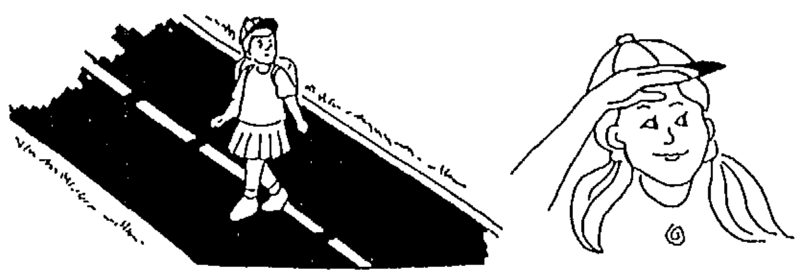
9. When the road is clear the person should cross by:

1) listening for traffic and looking straight ahead

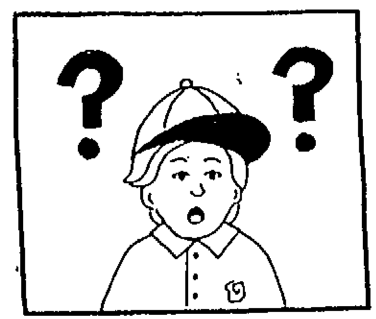


2) watching and listening for traffic

3) walking slowly looking only in one direction



4) don't know



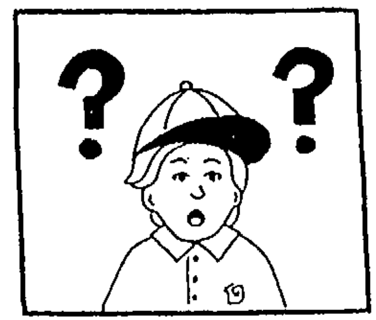
Circle what you think is the right answer

10. If you walked to school today was it with an adult?

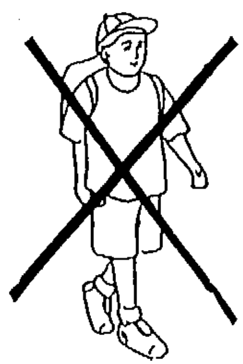
1) yes

2) no

3) don't know

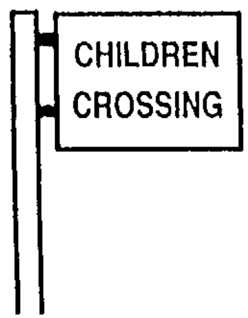


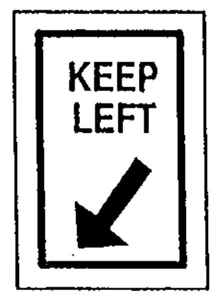
4) I didn't walk to school today

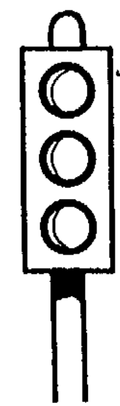


Circle ALL the correct answers

11. Which road signs show a crossing place for pedestrians?

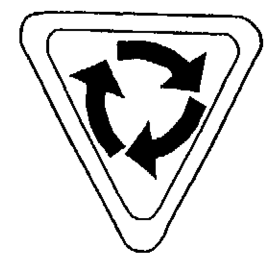
1) 

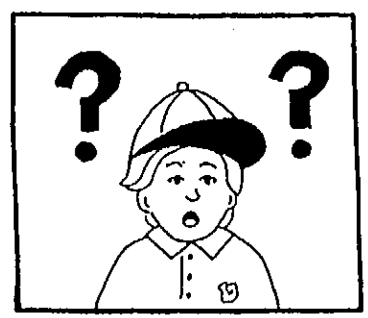
2) 

3) 

4) 

5) 

6) 

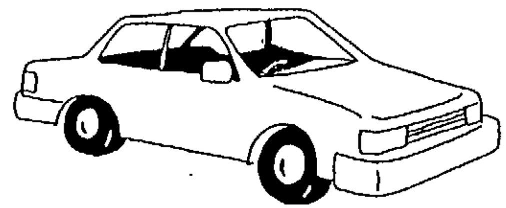
7) don't know 

The next questions are about things you do. Circle what you think is the right answer.

12. How do you get to school on most days?

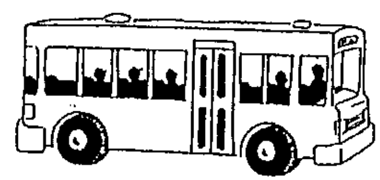
1) walk

2) by car



3) ride my bike

4) by bus



Circle what you think is the right answer

13. How often do you walk to or from school?

1) every day

every day

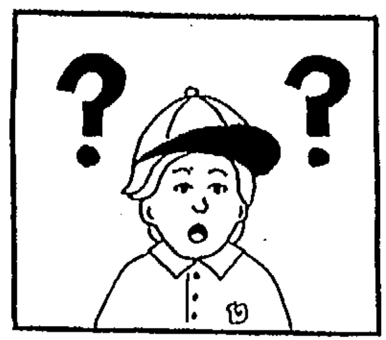
2) A few days a week

a few days

3) no days or only a few days a year

no days

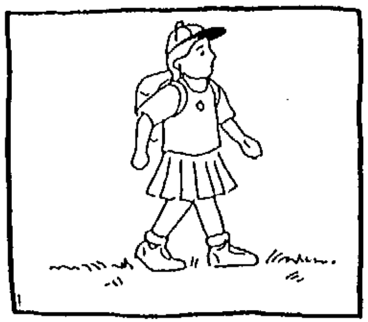
4) don't know



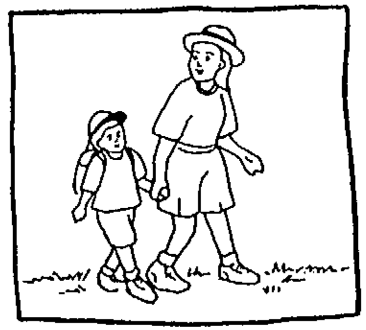
Circle what you think is the right answer

14. If you ever walk to school do you usually walk:

1) by yourself



2) with an adult



3) with other primary school children

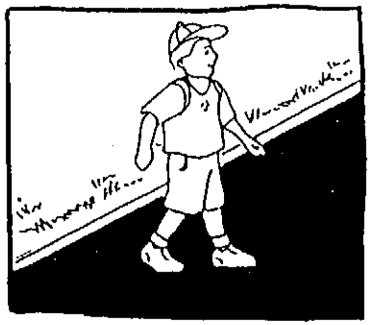
4) with teenagers (13 - 18 years)

5) I don't walk to school

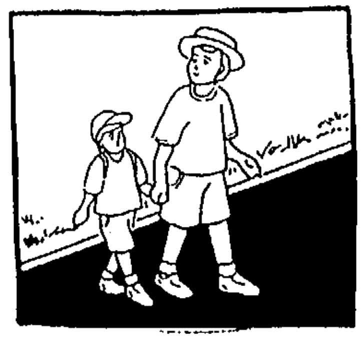
Circle what you think is the right answer

15. When walking in your neighbourhood, with whom do you usually cross the road?

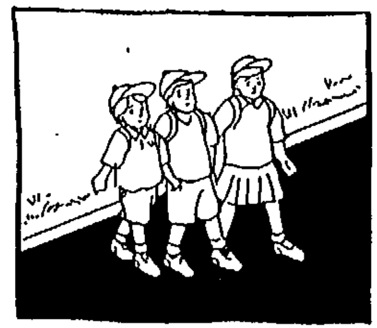
1) by myself



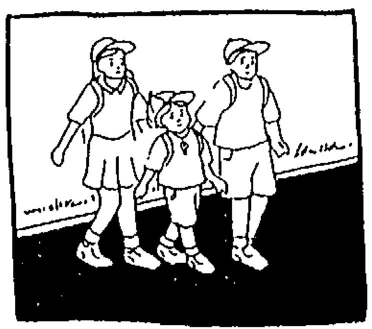
2) with an adult



3) with other primary school children



4) with teenagers (13 - 18 years)

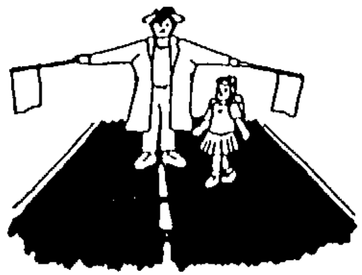


5) I almost never cross the road

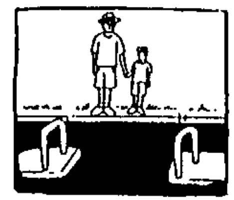
Circle what you think is the right answer

16. When walking to school, with whom do you usually cross the road?

1) I usually cross with a crossing attendant

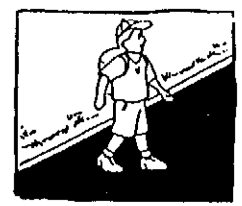


2) I usually cross with an adult

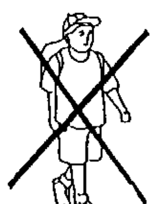


3) I usually cross with other children

4) I usually cross on my own



5) I don't cross a road

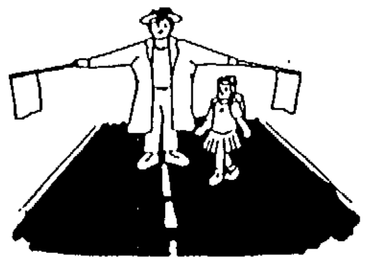


6) I don't walk to school

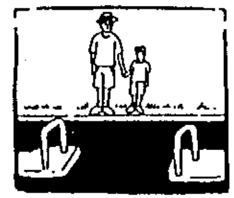
Circle what you think is the right answer

17. At the first road you crossed this morning, with whom did you cross?

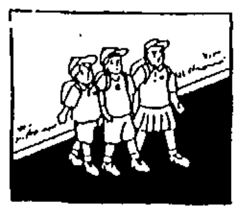
1) I crossed with a crossing attendant



2) I crossed with an adult



3) I crossed with other children



4) I crossed on my own

5) I didn't cross a road

6) I didn't walk to school

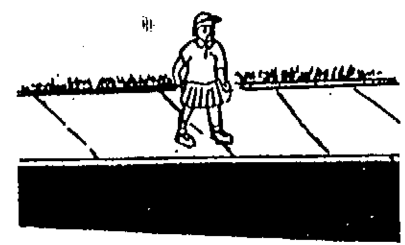
Circle what you think is the right answer

18. When you walked to school today did you cross at a stop sign stencil with footprints leading up to it?

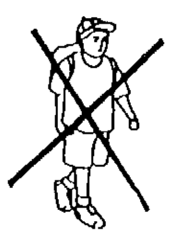
1) Yes

2) No, <u>I didn't use</u> the stop sign stencil with footprints

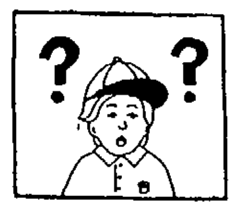
3) No, <u>there is no</u> stop stop sign stencil with footprints near my school



4) I didn't walk to school today



5) don't know



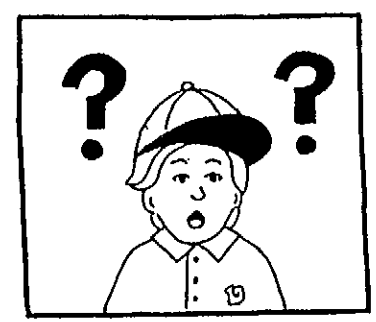
Circle what you think is the right answer

19. Did you practise crossing a road outside your school with your teacher this year?

1) Yes

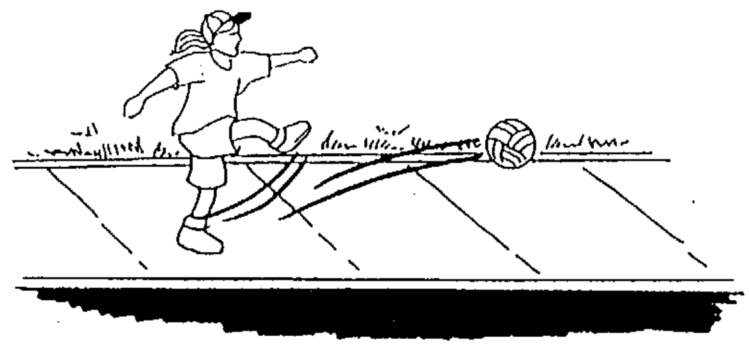
2) No

3) Can't remember



Circle what you think is the right answer

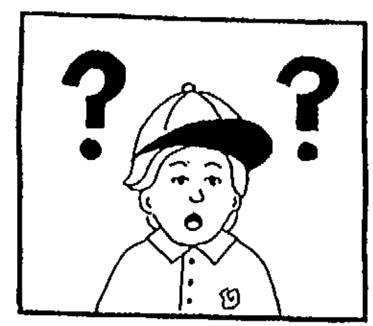
20. Did you play on the footpath this year?



1) Yes

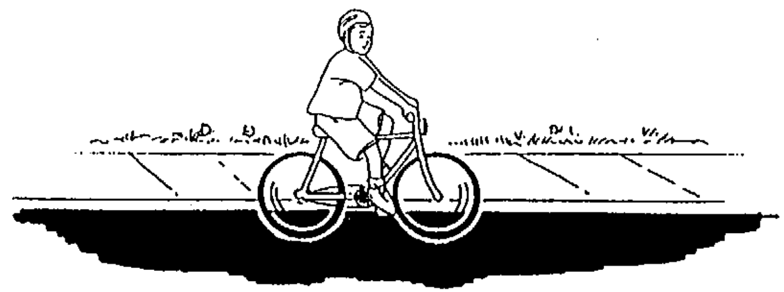
2) No

3) Don't know



Circle what you think is the right answer

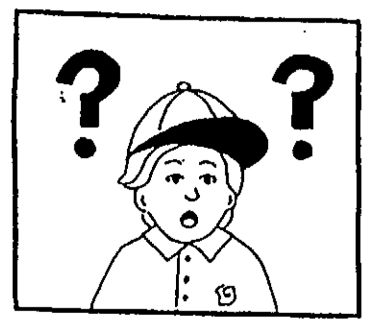
21. Did you play on the road this year?



1) Yes

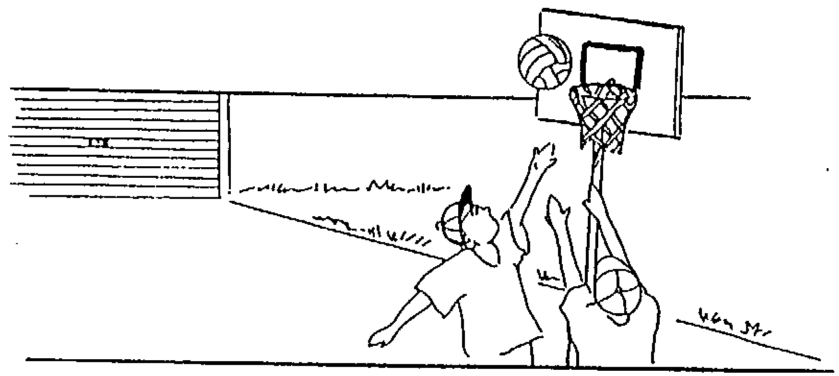
2) No

3) Don't know



Circle what you think is the right answer

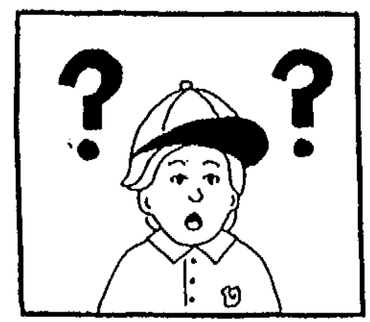
22. Did you play on the driveway this year?



1) Yes ✓

2) No ✗

3) Don't Know



Circle what you think is the right answer

23. How often this year have your parents talked to you about how to cross the road safely?

1) 3 or more times

3 +

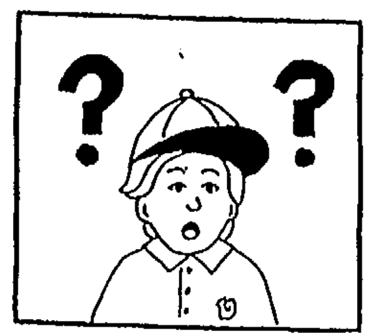
2) 1 or 2 times

1-2

3) never

0

4) don't know



Circle what you think is the right answer

24. How many times a day do you cross a road by yourself?

1) never

0

2) one or two times

1 - 2

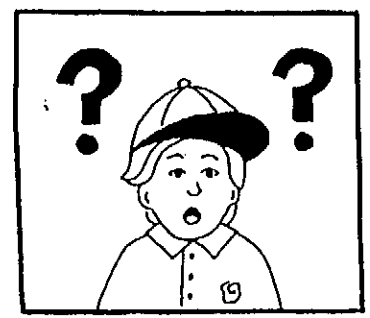
3) three or four times

3 - 4

4) more than four times

4 +

5) don't know



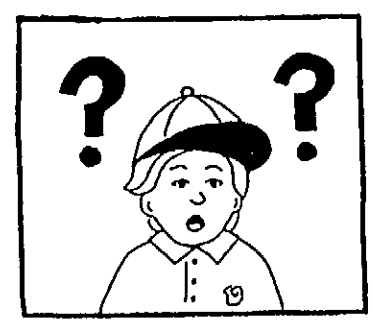
Circle what you think is the right answer

25. Do your parents let you cross the road on your own?

1) Yes

2) No

3) Don't know



Circle what you think is the best answer for you

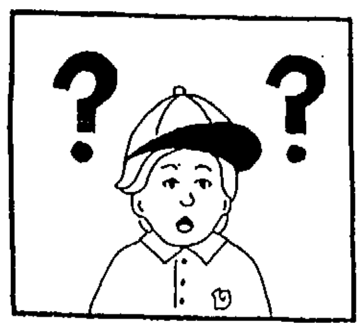
26. When you cross a road do you think you can:

1) Cross **more safely** than other children you know?

2) Cross **about the same** as other children you know?

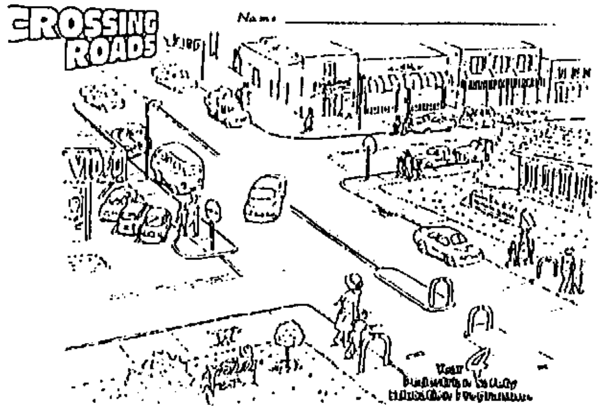
3) Cross **less safely** than other children you know?

4) Not sure

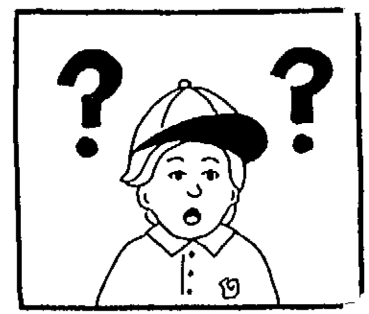


Circle what you think is the right answer

27. Did you like most of the lessons you did this year on crossing the road?



1) Yes 2) No 3) Didn't do any 4) Not sure



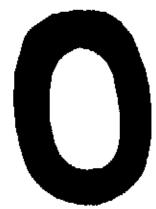
Circle what you think is the right answer

28. Have the crossing roads lessons you did this year helped you to be safer near roads?

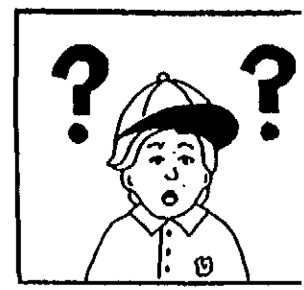
1) Yes

2) No

3) Didn't do any



4) Not sure



5) No, I already cross roads safely

29. What is the safest way for you to cross a road?

You have now finished, thank you for helping us.

Appendix 10

Pre-intervention teacher self-report questionnaire

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Child Pedestrian Injury Prevention Project

CONFIDENTIAL QUESTIONNAIRE

Dear Year 4 Health Education Teacher

Thank you for participating in this study. The Curtin University, Centre for Health Promotion Research is conducting this survey to gather information about Year 4 teachers' health education attitudes and practises. This information is needed to determine the most effective way to teach pedestrian safety education.

We have asked you to identify your name and school on this survey. This will allow Curtin University to match this information with your students' surveys for analysis. All identifying information will be strictly confidential.

The time required to complete this survey is approximately 15 minutes. Each question has a number of alternatives, please answer the questions honestly and to the best of your knowledge.

If you have any questions about the survey, please contact Margaret Hall on Ph: 351 2115.

Thank you very much for your help.

Margaret Hall (Research Associate)

Study Code Number: ☐☐☐☐☐☐☐☐☐☐☐☐☐

1 **Name** ____________________
(Please print in upper-case letters)

2 **School** ____________________
(Please print in upper-case letters)

3 **What is the Year level of your class in 1997?**
(Circle one number)

Year 3/4 1
Year 4 2
Year 4/5 3
Year 4 health class only .... 4 *(14)*

4 **How many students in your health class?**
(Write in the boxes provided)

☐☐ students *(15-16)*

5 **What is your teaching status in 1997?**
(Circle one number)

full time 1
tandem 2
part-time 3
health specialist .... 4 *(17)*

6 **Gender**
(Circle one number)

male 1
female .... 2 *(18)*

7 **Age group**
(Circle one number)

20 to 24 years................................1
25 to 29 years................................2
30 to 34 years................................3
35 to 39 years................................4
40 years & over...............................5 *(19)*

8 **What is your HIGHEST academic qualification?**
(Circle one number)

Diploma of Teaching 1
Bachelor Degree............................2
Postgraduate Diploma...................3
Please specify:

____

Other: please specify...........................4 *(20)*

____

9 **For how many years prior to this year have you been teaching?** *(21-22)*
(Write in the boxes provided)

☐☐ years

10 **For how many years in total have you taught Year 4 students (include 3/4 & 4/5 classes)?**
(Write in the boxes provided)

☐☐ years *(23-24)*

11 **Did you study health education in your tertiary training?**
(Circle one number)

Yes...1
No 2
Can't remember.............................3 *(25)*

12 **How many hours of health education training (in-services, workshops etc.) have you received in the last 5 years?**
(Circle one number)

0 hours..1
1-3 hours.......................................2
4-6 hours 3
> 6 hours ....4 *(26)*

13 **Have you attended any road safety in-service courses in the last 2 years?**
(Circle one number)

Yes.. 1
No.. 2 go to question 14
Can't remember .... 3 go to question 14 *(27)*

13.1 If yes, please state which aspect(s) of road safety was/were addressed - bike, pedestrian, seat belts, etc., and the organisation that ran the course.

____

14 **In 1997 how many minutes of class time PER WEEK do you allocate to health education?**
(Write in the boxes provided)

☐☐ minutes per week (28-29)

15 **In 1996 approximately how many lessons of pedestrian safety did you teach to your Year 4 students?**
(Circle one number)

Did not teach Year 4 students in 1996 1
Did not teach pedestrian safety 2
1 - 2 lessons of 40 minutes or greater duration 3
3 - 4 lessons of 40 minutes or greater duration 4
5 - 6 lessons of 40 minutes or greater duration 5
1 - 2 lessons of less than 40 minutes duration 6
3 - 4 lessons of less than 40 minutes duration 7
5 - 6 lessons of less than 40 minutes duration 8
Other: please specify 9 (30)

____

16 **Please circle the subjects in which you usually teach pedestrian safety.**
(Circle as many as apply)

health education 1 (31)
mathematics 1 (32)
social studies 1 (33)
science 1 (34)
language 1 (35)
Other: please specify 1 (36)

____

17 **If you have taught pedestrian safety to Year 4 students in PREVIOUS YEARS, where did you practise safe road crossing behaviour with your students?**
(Circle as many as apply)

In the classroom 1 (37)
Outside the classroom but within the school grounds 1 (38)
In the road environment 1 (39)
Did not go outside the classroom at all 1 (40)
Did not practise safe road crossing 1 (41)
Have not taught Year 4 students before 1 (42)
Other: please specify 1 (43)

____

18 **Have you ever invited a guest to speak to your class (any year level) about pedestrian safety?**
(Circle one number)

Yes 1
No 2 (44)

If yes, please specify from where or what agency/organisation.

____

19 **Using a scale from 1 to 4, rate the following HEALTH TOPICS in order of importance for your Year 4, students where 1 is assigned to the topic most important.**
(Write in the boxes provided)

Nutrition	☐	*(45)*
Fire Safety	☐	*(46)*
Pedestrian Safety	☐	*(47)*
Sexuality Education	☐	*(48)*

20 **Using a scale from 1 to 5, rate the following SUBJECTS in order of importance for your Year 4 students, where 1 is assigned to the subject most important.**
(Write in the boxes provided)

Health Education	☐	*(49)*
Physical Education	☐	*(50)*
Mathematics	☐	*(51)*
Science	☐	*(52)*
Language	☐	*(53)*

21 **If you have taught pedestrian safety to Year 4 students in PREVIOUS YEARS, for the following Road Safety curriculum materials indicate how much of each you have used.**
(Circle appropriate numbers)

Have not taught Year 4 students before.. 1 Go to question 22 *(54)*

	Most	Some	None	
WA K-10 Health Education Year 4 Teachers Guide Road Safety Lessons	1	2	3	*(55)*
Out and About	1	2	3	*(56)*
Main Roads WA materials	1	2	3	*(57)*
Police materials	1	2	3	*(58)*
Bike Ed (Police) materials	1	2	3	*(59)*
Designated Safe Routes	1	2	3	*(60)*
Constable Care materials	1	2	3	*(61)*
Kangaroo Creek Gang materials	1	2	3	*(62)*
Other : please specify	1	2	3	*(63)*

____

22 For each of the following statements indicate how true it is for you.

(Circle one number for each question)

		Strongly Disagree	Disagree	Agree	Strongly Agree	Unsure	
.1	I prefer to be one of the first in my year level/school to try new materials.	1	2	3	4	5	*(64)*
.2	I enjoy being the first teacher in my school to try something new.	1	2	3	4	5	*(65)*
.3	I like to try some things that I hear or read about.	1	2	3	4	5	*(66)*
.4	I'm always looking for something new for my class/es.	1	2	3	4	5	*(67)*
.5	If I don't know what to do, I ask someone to show me.	1	2	3	4	5	*(68)*
.6	Incentives such as stickers, pens, etc., would motivate me to consider teaching some new materials.	1	2	3	4	5	*(69)*
.7	I like to be the first to try a new program.	1	2	3	4	5	*(70)*
.8	It's important to me professionally to be first to try.	1	2	3	4	5	*(71)*
.9	I usually go along with some of my colleagues' recommendations about teaching materials.	1	2	3	4	5	*(72)*
.10	I prefer to try new materials after seeing other teachers successfully use them.	1	2	3	4	5	*(73)*
.11	I usually wait until some colleagues use a program to try it.	1	2	3	4	5	*(74)*
.12	I would wait until the Education Department required a program to be used before I would adopt it.	1	2	3	4	5	*(75)*
.13	I prefer to use traditional methods in my teaching.	1	2	3	4	5	*(76)*
.14	Pressure from others is the only reason I would use a new road safety program.	1	2	3	4	5	*(77)*
.15	I'm uncomfortable using materials I haven't used before.	1	2	3	4	5	*(78)*
.16	I prefer using materials I've used in the past.	1	2	3	4	5	*(79)*
.17	It's necessary for me to talk with someone who's already taught a program before I decide to teach it.	1	2	3	4	5	*(80)*
.18	I prefer to wait until an idea is thoroughly tested before adopting it.	1	2	3	4	5	*(81)*

For each of the following statements indicate how true it is for you.
(Circle one number for each question)

		Always	Sometimes	Never	
23	**I modify lessons from resources to suit my students.**	1	2	3	*(82)*
24	**I am required to teach too many new programs.**	1	2	3	*(83)*
25	**I send home activities for students to do with their parents.**	1	2	3	*(84)*
26	**I contact health agencies for resources and information for my health education lessons.**	1	2	3	*(85)*
27	**I am asked to chair/lead committees at my school.**	1	2	3	*(86)*

28 **Which of the following statements is MOST true for you about your use of a new teaching program, a new teaching strategy or a new teaching resource in any subject area in 1996?**

(Circle ONE number)

Didn't try anything new in this category.. 1

Didn't try until required.. 2

Was among the last in my school to voluntarily try it........................ 3

Tried it along with many others in my school, after 4
watching a few other teachers successfully use it

Tried it after another teacher found/introduced it............................. 5

Was one of the first in my school to try it.. 6

I have not been exposed to, nor found the need for, ... 7
any new programs, strategies or resources.

Did not teach in 1996.. 8

Can't remember.. 9 *(87)*

Questions 29-40 ask about your knowledge of road safety issues.

(Circle one number for each question)

		True	False	Don't Know	
29	The rate of pedestrian injury is greatest in Western Australian children aged 0-4 Years.	1	2	3	(88)
30	Most children have neither the cognitive nor perceptual ability to cross the road safely on their own until they are aged 9 years.	1	2	3	(89)
31	Pedestrian safety research has found boys generally cross the road more safely than girls.	1	2	3	(90)
32	The number of Western Australian children aged 5-9 years who have been killed or injured as a pedestrian has not changed in the last three years.	1	2	3	(91)
33	The most common place child pedestrians are hit by cars is between intersections, at the mid block location.	1	2	3	(92)
34	Most parents don't recognise that children aged 5-9 years are not able to judge a safe gap in traffic.	1	2	3	(93)
35	Children aged 5-9 only need limited practise crossing the road in real traffic situations because the road crossing knowledge they gain inside the classroom will transfer to behaviour outside the classroom.	1	2	3	(94)
36	A traffic drill like 'Stop, Look and Listen' that is rote learnt by children will ensure that a child can cross the road safely.	1	2	3	(95)
37	Most parents believe that when standing at the edge of a road, a child aged 5-9 and an adult both have the same field of vision.	1	2	3	(96)
38	When a child aged 5-9 hears a car approaching he/she can almost always determine the direction from which the car is coming.	1	2	3	(97)
39	When a child aged 5-9 sees a car in the distance he/she can always determine whether the car is travelling quickly or slowly.	1	2	3	(98)
40	Most children aged 5-9 assume cars can stop instantly.	1	2	3	(99)

41 Are you aware of any former student of your SCHOOL, or any of your previous SCHOOLS, who was killed as a result of being hit by a car?
(Circle one number)

Yes..1
No ....2 *(100)*

42 Are you aware of any former student of your CLASS, or any of your previous CLASSES, who was killed as a result of being hit by a car?
(Circle one number)

Yes..1
No ....2 *(101)*

43 Are you aware of any student of your SCHOOL, or any of your previous SCHOOLS, who was INJURED as a result of being hit by a car?
(Circle one number)

Yes..1
No ....2 *(102)*

44 Are you aware of any student of your CLASS, or any of your previous CLASSES, who was INJURED as a result of being hit by a car?
(Circle one number)

Yes..1
No ....2 *(103)*

Thank you for participating in this study.

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WESTERN AUSTRALIAN HEALTH PROMOTION FOUNDATION

Appendix 11

Post-intervention teacher self-report questionnaire

(Grade 2 teacher questionnaire and Grade 4 teacher questionnaire)

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Perth Western Australia

Child Pedestrian Injury Prevention Project

CONFIDENTIAL QUESTIONNAIRE

Dear Year 2 Health Education Teacher

Thank you for participating in this study. The Curtin University, Centre for Health Promotion Research is conducting this survey to gather information about Year 2 teachers' health education attitudes and practises. This information is needed to determine the most effective way to teach pedestrian safety education.

We have asked you to identify your name and school on this survey. This is to allow Curtin University to match this information with your students' surveys for analysis. All identifying information will be strictly confidential.

The time required to complete this survey is approximately 15 minutes. Each question has a number of alternatives, please answer the questions honestly and to the best of your knowledge.

After completing the questionnaire please return it in the reply-paid envelope provided. All teachers who return their questionnaire by **Friday, November 17 1995** will have a chance to win one of three $50 Myer gift vouchers.

If you have any questions about the survey, please contact Margaret Hall on Ph: 351 3807.

Thank you very much for your help.

Margaret Hall
(Research Fellow)

1 4 4 9 5

1 **Name** ______________________________
(Please print in upper-case letters)

2 **School** ______________________________
(Please print in upper-case letters)

3 **What is the Year level of your class in 1995?**
(Circle one number)

Year 1/2 1
Year 2 2
Year 2/3 3
Year 2 Health class only .... 4 *(14)*

4 **In 1995 how many minutes of class time PER WEEK did you allocate to health education?**
(Write in the boxes provided)

☐☐ minutes per week *(15-16)*

5 **In 1995 approximately how many lessons of pedestrian safety did you teach to your Year 2 students?**
(Circle one number)

Did not teach Year 2 students in 1995 1
Did not teach pedestrian safety .... 2 go to question 5a
1 - 2 lessons of 40 minutes or greater duration 3
3 - 4 lessons of 40 minutes or greater duration 4
5 - 6 lessons of 40 minutes or greater duration 5
7 - 8 lessons of 40 minutes or greater duration 6
9 -10 lessons of 40 minutes or greater duration 7
> 10 lessons of 40 minutes or greater duration 8
1 - 2 lessons of less than 40 minutes duration 9
3 - 4 lessons of less than 40 minutes duration 10
5 - 6 lessons of less than 40 minutes duration 11
7 - 8 lessons of less than 40 minutes duration 12
9 -10 lessons of less than 40 minutes duration 13
> 10 lessons of less than 40 minutes duration 14
Other: please specify .... 15 *(17)*

____

5a **Please circle the reason(s) you did not teach pedestrian safety.**
(Circle as many as apply)

It is not an important issue .... 1 *(18)*
It is the parents' responsibility .... 1 *(19)*
No time for pedestrian safety .... 1 *(20)*
Unaware of resources available .... 1 *(21)*
Don't like available resources .... 1 *(22)*
Don't have a good knowledge of this topic .... 1 *(23)*
Other: please specify .... 1 *(24)*

____

6 **If you have taught pedestrian safety to Year 2 students in 1995, where did you practise safe road crossing behaviour with these students?**
(Circle as many as apply)

In the classroom .... 1 *(25)*
Outside the classroom but within the school grounds .... 1 Go to question 6a *(26)*
In/near the road environment .... 1 Go to question 6b *(27)*
Did not go outside the classroom at all .... 1 *(28)*
Did not practise safe road crossing .... 1 *(29)*
Did not teach pedestrian safety .... 1 *(30)*
Other: please specify .... 1 *(31)*

____

6a **How many times did you go outside the classroom but within the school grounds to practise safe road crossing behaviours with your Year 2 students?**
(Circle one number)

Every lesson 1
Most lessons 2
A few lessons 3
One lesson .... 4 *(32)*

6b How many times did you go to the road environment to practise safe road crossing behaviours with your Year 2 students?
(Circle one number)

Every lesson 1
Most lessons 2
A few lessons...x.................3
One lesson...........................4 (33)

7 For the following Road Safety Education materials indicate how much of each you have used in 1995.
(Circle appropriate numbers)

	Most	Some	None	
WA K-10 Health Education Year 2 Teachers Guide Road Safety Lessons	1	2	3	(34)
Out and About	1	2	3	(35)
Main Roads WA materials	1	2	3	(36)
Police materials	1	2	3	(37)
Bike Ed (Police) materials	1	2	3	(38)
Crossing Roads	1	2	3	(39)
Designated Safe Routes	1	2	3	(40)
Roads are Safe	1	2	3	(41)
Constable Care materials	1	2	3	(42)
Kangaroo Creek Gang materials	1	2	3	(43)
Other : please specify	1	2	3	(44)

____

HEALTH KNOWLEDGE QUESTIONS

(Circle one number for each question)

		True	False	Don't Know	
8	**The rate of pedestrian injury is greatest in Western Australian children aged 0-4 Years.**	1	2	3	(45)
9	**Most children have neither the cognitive nor perceptual ability to cross the road safely on their own until they are aged 9 years.**	1	2	3	(46)
10	**Pedestrian safety research has found boys generally cross the road more safely than girls.**	1	2	3	(47)
11	**The number of Western Australian children aged 5-9 years who have been killed or injured as a pedestrian has not changed in the last three years.**	1	2	3	(48)

		True	False	Don't Know	
		(Circle one number for each question)			
12	The most common place child pedestrians are hit by cars is between intersections, at the mid block location.	1	2	3	(49)
13	Most parents don't recognise that children aged 5-9 years are not able to judge a safe gap in traffic.	1	2	3	(50)
14	Children aged 5-9 only need limited practice crossing the road in real traffic situations because the road crossing knowledge they gain inside the classroom will transfer to behaviour outside the classroom.	1	2	3	(51)
15	A traffic drill like 'Stop, Look and Listen' that is rote learnt by many children will ensure he/she can cross the road safely.	1	2	3	(52)
16	Most parents believe that when standing at the edge of a road, both a child aged 5-9 and an adult have the same field of vision.	1	2	3	(53)
17	When a child aged 5-9 hears a car approaching he/she can almost always determine the direction from which the car is coming.	1	2	3	(54)
18	When a child aged 5-9 sees a car in the distance they can always determine whether the car is travelling quickly or slowly.	1	2	3	(55)
19	Most children aged 5-9 assume cars can stop instantly.	1	2	3	(56)

The following questions are about the Crossing Roads lessons.

20 On AVERAGE, approximately how many minutes did you spend teaching EACH Crossing Roads LESSON as described in the manual?
(Circle one number)

Did not teach any 1
10 minutes per lesson 2
20 minutes per lesson 3
30 minutes per lesson 4
40 minutes per lesson 5
50 minutes per lesson 6
60 minutes per lesson 7
70 minutes per lesson 8
80 minutes per lesson 9
> 80 minutes per lesson 10 (57)

21 **Did you teach your Year 2 students any pedestrian safety lessons other than the Crossing Roads lessons?**
(Circle one number)

Taught some/all of the Crossing Roads lessons only 1

Did not teach any pedestrian safety lessons........ 2

Taught pedestrian safety lessons using only materials other than Crossing Roads materials ... 3
(Please specify materials used)

____

Taught pedestrian safety lessons using BOTH Crossing Roads materials and other materials... 4
(Please specify materials used)

______________________________ *(58)*

22 **Did you attend the Crossing Roads teacher training in May 1995?**
(Circle one number)

Yes .... 1 go to question 22a
No... 2 go to question 23 *(59)*

22a If YES please rate its usefulness in teaching the Crossing Roads program.
(Circle one number)

Excellent...................................... 1
Very good 2
Good.. 3
Fair.. 4
Poor... 5 *(60)*

23 **Did you find the support offered to teachers after the teacher training by CPIPP staff helpful?**
(Circle one number)

Yes 1
No 2
Not sure .... 3 *(61)*

24 **Did you find the administration at your school supportive in implementing the Crossing Roads program?**
(Circle one number)

Yes 1
No 2
Not sure .... 3 *(62)*

25 **Please list/describe any other factors that you feel facilitated or hindered the implementation of the Crossing Roads program.**

____

Blank *(63-64)*

26 **Overall, how well do you feel you taught the Crossing Roads lessons to your students?**
(Circle one number)

Very adequately 1
Moderately adequately.................. 2
Adequately.................................... 3
Inadequately 4
Not sure .... 5 *(65)*

27 **Did your students enjoy the Crossing Roads lessons?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach them 4 (66)

28 **Did your students learn a lot about pedestrian safety from the Crossing Roads lessons?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach them 4 (67)

29 **In your opinion, did the Crossing Roads lessons require too much class time?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach them 4 (68)

30 **Would you use the Crossing Roads lessons again?**
(Circle one number)

Yes in their existing form............... 1
Yes in a slightly modified form 2
No... 3
Not sure 4
I did not teach them 5 (69)

The following questions ask about the Crossing Roads education materials. Your feedback is appreciated to judge the effectiveness and to improve this new program.

31 **Is the information in the teaching manual logically organised?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach the program 4 (70)

32 **Did you find the Introduction useful?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach the program 4 (71)

33 **Did you find the Teachers Notes helpful?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach the program 4 (72)

34 **Did you find the Background Notes helpful?**
(Circle one number)

Yes 1
No... 2
Not sure 3
I did not teach the program 4 (73)

35 Did you find the Resource List useful?
(Circle one number)
Yes 1
No 2
Not sure 3
I did not teach the program .... 4 *(74)*

36 Did the lessons provide students with the opportunity to develop their pedestrian safety skills?
(Circle one number)
Yes 1
No 2
Not sure 3
I did not teach the program .... 4 *(75)*

37 Did the home activities reinforce pedestrian safety messages given to students at school?
(Circle one number)
Yes 1
No 2
Not sure 3
I did not teach the program .... 4 *(76)*

38 Were the activities appropriate to the developmental level of your students?
(Circle one number)
Yes 1
No 2
Not sure 3
I did not teach the program .... 4 *(77)*

39 In general were the activities easy to teach?
(Circle one number)
Yes 1
No 2
Not sure 3
I did not teach the program .... 4 *(78)*

Thank you for participating in this study.

Please place this questionnaire in the reply-paid envelope provided and return it by Friday, November 17 to qualify for the chance to win one of three $50 Myer gift vouchers.

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University of Technology
Perth Western Australia
School of Public Health

Healthway
Project funded by
WESTERN AUSTRALIAN
HEALTH PROMOTION FOUNDATION

University of Technology
Perth Western Australia

Child Pedestrian Injury Prevention Project

Healthway

CONFIDENTIAL QUESTIONNAIRE

Dear Year 4 Health Education Teacher

Thank you for participating in this study. The Curtin University, Centre for Health Promotion Research is conducting this survey to gather information about Year 4 teachers' health education attitudes and practises. This information is needed to determine the most effective way to teach pedestrian safety education.

We have asked you to identify your name and school on this survey. This is to allow Curtin University to match this information with your students' surveys for analysis. All identifying information will be strictly confidential.

The time required to complete this survey is approximately 15 minutes. Each question has a number of alternatives, please answer the questions honestly and to the best of your knowledge.

After completing the questionnaire please return it in the reply-paid envelope provided. All teachers who return their questionnaire by **Wednesday, September 3, 1997** will have a chance to win one of three $50 Myer gift vouchers.

If you have any questions about the survey, please contact Margaret Hall on Ph: 9266 2752.

Thank you very much for your help.

Margaret Hall
(Research Associate)

9 7

1 **Name** ______________________
(Please print in upper-case letters)

2 **School** ______________________
(Please print in upper-case letters)

3 **What is the Year level of your 1997 class?**

(Circle one number)

Year 3/4 1
Year 4 2
Year 4/5 3
Year 4 health class only 4

(14)

4 **In 1997, how many minutes of class time PER WEEK did you allocate to health education?**

(Write in the boxes provided)

☐☐

minutes per week

(15-16)

5 **In 1997, approximately how many lessons of pedestrian safety did you teach to your Year 4 students?**

(Circle one number)

Did not teach Year 4 students in 1997	1	Do not continue this questionnaire. Please pass it on to the Year 4 Health Education teacher.
Did not teach pedestrian safety	2	Go to question 5a
1 - 2 lessons of 40 minutes or greater duration	3	
3 - 4 lessons of 40 minutes or greater duration	4	
5 - 6 lessons of 40 minutes or greater duration	5	
7 - 8 lessons of 40 minutes or greater duration	6	
9 -10 lessons of 40 minutes or greater duration	7	
> 10 lessons of 40 minutes or greater duration	8	
1 - 2 lessons of less than 40 minutes duration	9	
3 - 4 lessons of less than 40 minutes duration	10	
5 - 6 lessons of less than 40 minutes duration	11	
7 - 8 lessons of less than 40 minutes duration	12	
9 -10 lessons of less than 40 minutes duration	13	
> 10 lessons of less than 40 minutes duration	14	
Other: please specify	15	(17-18)

____

5a *Respond to this question only if you circled '2' at question 5.*

Please circle the reason(s) you did not teach pedestrian safety.

(Circle as many as apply)

It is not an important issue	1	Go to question 8	(19)
It is the parents' responsibility	1	Go to question 8	(20)
No time for pedestrian safety	1	Go to question 8	(21)
Unaware of resources available	1	Go to question 8	(22)
Don't like available resources	1	Go to question 8	(23)
Don't have a good knowledge of this topic	1	Go to question 8	(24)
Other: please specify	1	Go to question 8	(25)

____

6 **When teaching pedestrian safety to your Year 4 class in 1997, where did you practise safer road crossing behaviour with these students?**

(Circle as many as apply)

In the classroom	1		(26)
Outside the classroom but within the school grounds	1	Go to question 6a	(27)
On a road outside the school	1	Go to question 6b	(28)
Did not go outside the classroom at all	1		(29)
Did not practise safe road crossing	1		(30)
Did not teach pedestrian safety	1		(31)
Other: please specify	1		(32)

____

6a *Respond to this question only if instructed at question 6.*

How many times did you go OUTSIDE THE CLASSROOM BUT WITHIN THE SCHOOL GROUNDS to practise safer road crossing behaviours with your Year 4 students?

(Circle one number)

Every lesson	1	
Most lessons	2	
A few lessons	3	
One lesson	4	(33)

6b ***Respond to this question only if instructed at question 6.***

How many times did you go to A ROAD OUTSIDE SCHOOL to practise safer road crossing behaviours with your Year 4 students?

(Circle one number)

Every lesson 1
Most lessons 2
A few lessons 3
One lesson 4

(34)

7 If you have used any of the following Road Safety Education materials indicate how much of each you have used in 1997?

(Circle appropriate numbers)

7a WA Health Education K-10 Year 4 Teachers Guide Road Safety Lessons	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(35)*
7b Out and About	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(36)*
7c Main Roads WA materials	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(37)*
7d Police service materials	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(38)*
7e Bike Ed (Police) materials	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(39)*
7f Crossing Roads	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(40)*
7g Designated Safe Routes	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(41)*
7h Roads are Safe	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(42)*
7i Constable Care materials	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(43)*
7j Kangaroo Creek Gang materials	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(44)*
7k Other: please specify	Most of the materials .... 1 Some of the materials.............. 2 Didn't use the materials........... 3	*(45)*

Questions 8-19 ask about your knowledge of road safety issues. (Circle one number for each question)

		True	False	Don't Know	
8	The rate of pedestrian injury is greatest in Western Australian children aged 0-4 years.	1	2	3	*(46)*
9	Most children have neither the cognitive nor perceptual ability to cross the road safely on their own until they are aged 10 years.	1	2	3	*(47)*
10	Pedestrian safety research has found boys generally cross the road more safely than girls.	1	2	3	*(48)*
11	The number of Western Australian children aged 5-9 years who have been killed or injured as a pedestrian has not changed in the last three years.	1	2	3	*(49)*
12	The most common place child pedestrians are hit by cars is between intersections, at the mid block location.	1	2	3	*(50)*
13	Most parents don't recognise that children aged 5-9 years are not able to judge a safe gap in traffic.	1	2	3	*(51)*
14	Children aged 5-9 only need limited practise crossing the road in real traffic situations because the road crossing knowledge they gain inside the classroom will transfer to behaviour outside the classroom.	1	2	3	*(52)*
15	A traffic drill like 'Stop, Look and Listen' that is rote learnt by many children will ensure they can cross the road safely.	1	2	3	*(53)*
16	Most parents believe that when standing at the edge of a road, both a child aged 5-9 and an adult have the same field of vision.	1	2	3	*(54)*
17	When a child aged 5-9 hears a car approaching he/she can almost always determine the direction from which the car is coming.	1	2	3	*(55)*
18	When a child aged 5-9 sees a car in the distance he/she can always determine whether the car is travelling quickly or slowly.	1	2	3	*(56)*
19	Most children aged 5-9 assume cars can stop instantly.	1	2	3	*(57)*

The following questions are about the Crossing Roads program.

20 **Did you attend the Crossing Roads teacher training in February 1997?**

(Circle one number)

Yes .... 1 Go to question 20a
No .... 2 Go to question 21 (58)

> **20a** *Respond to this question only if instructed at question 25.*
>
> **If YES, please rate its usefulness in helping you to teach the Crossing Roads program.**
>
> (Circle one number)
>
> Very good 1
> Good 2
> Fair 3
> Poor 4
> Did not teach any 5 (59)

21 **Did you find the support offered to teachers after the teacher training by Curtin University CPIPP staff helpful?**

(Circle one number)

Yes 1
No 2
Not sure 3
Didn't receive any 4 (60)

22 **Did you find the administrative staff at your school supportive in implementing the Crossing Roads program?**

(Circle one number)

Yes 1
No 2
Not sure 3 (61)

23 **Please list/describe any other factors you feel helped or hindered your implementation of the Crossing Roads program.**

____ (62-63)

24 **Overall, how well do you feel you taught the Crossing Roads lessons to your students?**

(Circle one number)

Very adequately 1
Moderately adequately 2
Adequately 3
Inadequately 4
Not sure 5
Did not teach any .... 6 - Go to the end of the questionnaire. Do not answer any more questions.

(64)

25 **For each of the Crossing Roads lessons indicate how much of each you taught to your Year 4 students this year. (Your Crossing Roads Teachers Guide may help you with this question.)**

(Circle one number for each question)

25a Lesson One
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (65)

25b Lesson Two
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (66)

25c Lesson Three
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (67)

25d Lesson Four
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (68)

25e Lesson Five
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (69)

25f Lesson Six
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (70)

25g Lesson Seven
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (71)

25h Lesson Eight
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (72)

25i Lesson Nine
Most of it................................ 1
Some of it............................... 2
None of it............................... 3 (73)

26 **Did you teach your Year 4 students any pedestrian safety lessons other than the Crossing Roads lessons?**

(Circle one number)

Yes .... 1 Go to question 26a & 26b
No 2
Not sure 3 (74)

Respond to this question only if instructed at question 26.

26a **How many lessons?**________________________________

26b **What materials did you use for these other pedestrian safety lessons?**

____

____

(75-76)

27 **Did your students enjoy the Crossing Roads lessons?**

(Circle one number)

All/Most of the lessons 1
Some of the lessons...................... 2
None of the lessons....................... 3
Not sure 4 (77)

28 **How much NEW information and skills did your students learn about pedestrian safety from the Crossing Roads lessons?**

(Circle one number)

A lot 1
Some 2
Nothing 3
They already knew it all 4
Not sure .... 5 *(78)*

29 **Were the Crossing Roads lesson activities appropriate to the developmental level of your students?**

(Circle one number)

Yes 1
No 2
Not sure .... 3 *(79)*

30 **In your opinion, did the Crossing Roads lessons require too much class time?**

(Circle one number)

Yes .... 1 Go to question 30a
No 2
Not sure .... 3 *(80)*

30a *Respond to this question only if instructed at question 30.*

Which parts, if any, do you think could be omitted from the program?

____

____

(81)

31 **Would you use the Crossing Roads lessons again?**

(Circle one number)

Yes, in their existing form 1
Yes, in a slightly modified form .... 2 Go to question 31a
No 3
Not sure .... 4 *(82)*

31a *Respond to this question only if instructed at question 31.*

Briefly describe how you would modify the program.

____

____

(83)

You have reached the end of the questionnaire.

Thank you for participating in this study.

Please place this questionnaire in the reply-paid envelope provided and return it by Wednesday, September 3 to qualify for the chance to win a $50 Myer gift vouchers.

Appendix 12

Letter of thanks to teachers

Child Pedestrian Injury Prevention Project

A project funded by Healthway

Curtin

28 July, 1997

Dear

The response to the Crossing Roads lessons so far has been outstanding. Both teachers and students are enjoying their lessons and are already showing some good road crossing behaviours.

In September we plan to visit your class and ask your students (and their parents) to complete similar questionnaires to those completed for the project in September last year. If it is convenient for you and your school, your class has been scheduled for the administration of these questionnaires at the following time.

> A CPIPP research assistant will attend your class to administer student post-test questionnaires on:
>
> **Date -** MONDAY 1ST SEPT 1997
>
> **Time -**

If this arrangement does not suit you please contact Jill Officer as soon as possible with an alternative time on Ph: 9266 2115 or Fax: 9266 2958.

As we discussed at the teacher training we need your help to do the following in third term.

Before the post-test questionnaire:

- Please teach all nine Crossing Roads lessons by the post-test date shown above.
- Fax/post your Term 3 Program Checklist located at the back of your Crossing Roads teachers guide.

During the post-test questionnaire administration:

A CPIPP research assistant will visit your class to:

- Administer a questionnaire to your year 4 students.
- Give your students parent questionnaires to take home.
- Collect your disposable camera for film processing
- Collect five students' Crossing Roads scrapbooks and passports.

Centre for Health Promotion Research School of Public Health Curtin University of Technology GPO Box U1987 Perth Western Australia 6845 Phone: (08) 9266 2115 Fax: (08) 9266 2958

We will give you the names of the five students from your class whose work we would like to see. The names will be randomly selected by a computer, please do not be disturbed if a student is chosen who has little work completed. We will return these work samples before the end of third term.

In June of this year I wrote to the secretary/administrator at your school and obtained a copy of your Year 4 class list. I have since used the information provided to update our student database.
Attached is this updated list. Three are three things that I would appreciate your assistance with:

1. Please make any changes (new additions and/or students who have left). The reason we need this information is to enable the administration of the student questionnaire in September to run as smoothly as possible.
2. If you have a split Year 3/4 or 4/5 class, could you please indicate, at the bottom of the list how many students for each of these year groups you have. When administering the questionnaire all students in your class will receive a copy to avoid disruption.
3. **Please fax the updated class list back to me on 9266 2958 by Friday 1 August, 1997.**

Thank you for your contribution to the Child Pedestrian Injury Prevention Project. Your efforts are very important to this research project and greatly appreciated.

Yours sincerely

Jill Officer
Project Director

Appendix 13

Student work sample evaluation form - 1995

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Child Pedestrian Injury Prevention Project

CPIPP School Intervention Process Evaluation

Student Work Sample Evaluation Form

School: ______________________ Teacher: ______________________

Work Samples Assessed by: ______________________ Date: ____________

											9	5

Lesson Number	Activity	Possible Evidence	Evidence Present ✓ = yes; ✖ = no; M = modified evidence present						
		Student ID -						Any	Check L.
1	Footpaths Ped Safety Song Imaginary Footpath **Walking Excursion** Processing Home Activity	- - - - - Worksheet or Passport Stamp							
2	Dangerous & Safer Pl. Dangerous & Safer So **Crossing Steps** Processing Home Activity	Mural - - - Worksheet or Passport Stamp							
3	Listening Skills Stopping Safer Time to Cross **Road Crossing Rules** Processing Home Activity	- - Worksheet - - Worksheet or Passport Stamp							

		Student ID -						Any	Check L.
4	Street Hassles	Worksheet							
	Crossing Roads Story	Story map							
	Cross Safer	Worksheet							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
5	Match Sign to Story	Worksheet							
	Story Prediction	Rewrite story							
	Crossing Practise	-							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
6	One Step Back	-							
	Colour Hide & See	-							
	Visible Pedest.	Paper dolls							
	Being a Safer Pedest	Origami							
	Safer Crossing Prac.	-							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
7	Road Cross. Helpers	Worksheet							
	Traffic Lights Mime	-							
	Crossing with Lights	-							
	Crossing at Lights	-							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
8	Out of Sight	-							
	Going Backwards	-							
	Drivers Seeing Ped	Worksheet							
	Helping Pedestrians	-							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
9	Stop at the kerb	-							
	Finger Puppets	-							
	Dilemma Situations	-							
	Assertive Role Play	Sentences							
	Video Crossing	-							
	Processing	Drawing							
	Home Activity	Worksheet or Passport Stamp							

Total Possible - A $\boxed{22}$ Total Evident - B $\boxed{}$

Appendix 14

Student work sample evaluation form - 1996

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University of Technology
Perth Western Australia

Child Pedestrian Injury Prevention Project

CPIPP School-Based Intervention Process Evaluation

The Child Pedestrian Injury Prevention Project is a research project conducted by the Centre for Health Promotion Research, Curtin University, GPO Box U1987 Perth 6001 Western Australia. Phone: 09 - 351 3807 Fax: 09 351 2958.
The CPIPP is funded by Healthway, Main Roads WA & WA Traffic Board.

Student Work Sample Evaluation Form

School: ____________________Primary School Teacher: ____________________

Work Samples Assessed by: ____________________ Date: ____________________

96

Lesson Number	Activity	Possible Evidence	Evidence Present √ = yes; × = no; **M** =modified evidence present						
		Student ID						Any	Check L.
1	Safe Routes Story **Crossing at Lights** Three Dimensional Inters. Processing Home Activity	Re write story Worksheet - - Worksheet or Passport Stamp							
2	Home Activity Follow-up **Island Crossing** Crossing Dilemma Processing Home Activity	- Paragraph/pic.? Worksheet - Worksheet or Passport Stamp							
3	Home Activity Follow-up **Rail Crossing Senses** Practical Traffic Senses Processing Home Activity	- Worksheet Worksheet Sentences Worksheet or Passport Stamp							

4	Home Activity Follow-up **Pedestrian Safety Skittles** Dilemma Situations Processing Home Activity	- Paragraph - - Worksheet or Passport Stamp							
5	Home Activity Follow-up **Little Yellow Walk. Hood** Risky Business Processing Home Activity	- Story map Worksheet - Worksheet or Passport Stamp							
6	Home Activity Follow-up **Using the Safety Door** Passenger to Pedestrian Processing Home Activity	- Paragraph - - Worksheet or Passport Stamp							
7	Home Activity Follow-up **Reversing Cars** Obeying the Straw Processing Home Activity	- Worksheet - - Worksheet or Passport Stamp							
8	Home Activity Follow-up **Reaction Times** From the Driver's View Safety Sentence Conjunc. Processing Home Activity	- Worksheet,par,pic - Sentences - Worksheet or Passport Stamp							
9	Home Activity Follow-up **Assertive Role Play** Dilemma Situations Processing Home Activity	- - - Drawing Worksheet or Passport Stamp							

Total Possible - **A** ☐ Total Evident - **B** ☐

Appendix 15

Student work sample evaluation form - 1997

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University of Technology
Perth Western Australia

Child Pedestrian Injury Prevention Project

CPIPP School-Based Intervention Process Evaluation

The Child Pedestrian Injury Prevention Project is a research project conducted by the Centre for Health Promotion Research, Curtin University, GPO Box U1987 Perth 6001 Western Australia. Phone: 09 -266 2115 Fax: 09 266 2958.
The CPIPP is funded by Healthway, Main Roads WA & WA Traffic Board.

Student Work Sample Evaluation Form

School: ____________________Primary School Teacher: ____________________

Work Samples Assessed by: ____________________ Date: ____________________

											9	7

Lesson Number	Activity	Possible Evidence	Evidence Present √ = yes; × = no; M =modified evidence present						
		Student ID						Any	Check L.
1	Introduction								
	Walking Excursion	Worksheet							
	Crossword Puzzle	Worksheet							
	Processing	-							
	Home Activity	Worksheet Passport Stamp							
2	Home Activity Follow-up	-							
	Safety Spot	Worksheet							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
3	Home Activity Follow-up	-							
	Safer Routes	Talking heads; map							
	Walk the Safest Route	Song sheet							
	Processing	-							

4	Introduction	-							
	Ralf	Who, wh; St Map, Comp							
	Story Writing	Story							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
5	Home Activity Follow-up	-							
	Crossing Stations	Worksheet							
	Stephen, Tran & Jenny	Worksheet							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
6	Home Activity Follow-up	-							
	Lucky Dip	Paragraph							
	Processing	-							
7	Introduction	Picture							
	Safety Slogan	Worksheet							
	Crossing Book	Book							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
8	Home Activity Follow-up	-							
	Road Safety Camp	WS-keyhole; surv							
	Campaign Results	Graph of results							
	Processing	-							
	Home Activity	Worksheet or Passport Stamp							
9	Home Activity Follow-up	-							
	Speak Up for Road Safety	Letter							
	Processing	-							

Total Possible - A ☐ Total Evident - B ☐

Appendix 16

Collection of student work samples form

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Perth Western Australia

Child Pedestrian Injury Prevention Project

Student Work Samples

School: ________________ Prim School Teacher: ____________________

Date of Collection: __/__/__ Collected by: ____________________

Date of Return: __/__/__ Returned by: ____________________

Teachers

Please place in this envelope **Crossing Roads Scrap Books** and **Passports** of the first 5 students listed below. Student work will be returned in two weeks.

Thank you for your assistance.

CPIPP Administrators

The following is a list of randomly selected Year 3 students (plus two spares) from whom to collect Crossing Roads Scrap Books and Passports.
Collect 5 work samples only. The sixth and seventh names should only be used if any of the first five students have left the school. Please indicate beside each student name if the work sample is collected, or, if it is not collected indicate why (for example - student has left the school, student is a long term absentee, not required - 5 samples collected).

Thank you for your assistance.

NAME	ID	Collected/Reason not collected

Appendix 17

Teacher facsimile encouraging lesson log return

Child Pedestrian Injury Prevention Project

CENTRE for HEALTH PROMOTION RESEARCH

curtin
University of Technology
Perth Western Australia

School of Public Health, Curtin University, GPO Bos U1987, Perth WA 6001.
Ph: 351 2115, Fax 351 2958.

To:

From: Marg Hall, CPIPP

Date: **25 March 1996** **No. of pages (including this one):** 1

Dear

I hope the *Crossing Roads* lessons for term one have gone well with your class/es. If you have faxed through your term one program checklist - thank you. If you haven't, please note is located at the back of your *Crossing Roads Teachers Guide* to be faxed to: Marg Hall Fax # 351 2958. If you have any questions or concerns about the program you would like to discuss, please feel free to phone me on 351 2115.

Please don't forget I would like to observe your students participating in at least one of your Crossing Roads lessons in terms two or three. I will phone you one week prior to confirm the observation date and time.

Thank you for your contribution to the Child Pedestrian Injury Prevention Project. Your efforts are very important to this research project and greatly appreciated. I hope your Easter break is enjoyable and look forward to seeing you when I visit your school.

Yours sincerely

Margaret Hall
Research Associate
Child Pedestrian Injury Prevention Project

Appendix 18

Teachers' lesson logs - 1995

CROSSING ROADS - PROGRAM CHECKLIST

School: ______________________ Teacher: ______________________ Class: __________

Please indicate those parts of the education materials that you actually used with your class.

LESSON NUMBER **TERM 2**	TITLE	ACTIVITY	COMPLETED? ✔ =yes ✘ =no M =modified activity	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other: please specify	COMMENTS For example: What did you like/dislike about the activity? If you modified the activity, what did you do?
1	Roads	Footpaths	☐	☐	....
	and	Pedestrian Safety Song	☐	☐	....
	Footpaths	**Imaginary Footpath**	☐	☐	....
		Walking Excursion	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....
2	Safe	Dangerous and Safer Places	☐	☐	....
	and	Dangerous and Safer Sounds	☐	☐	....
	Dangerous	**Crossing Steps**	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....
3	Crossing	Listening Skills	☐	☐	....
	Skills	Stopping	☐	☐	....
		Safer Time to Cross	☐	☐	....
		Road Crossing Rules	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....

HOME Activity: If you gave the home activity to students to take home, then you have completed the activity.

At the end of Term 2 please complete this checklist and mail it to: CPIPP, Marg Hall, School of Public Health, Curtin University, GPO Box U1987, PERTH, 6001, WA. OR Fax to Fax no: 351 2958, attention Marg Hall.

CROSSING ROADS - PROGRAM CHECKLIST

School: ______________ Teacher: ______________ Class: ________

Please indicate those parts of the education materials that you actually used with your class.

LESSON NUMBER TERM 3	TITLE	ACTIVITY	COMPLETED? ✔ =yes ✗ =no M =modified activity	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other: please specify	COMMENTS For example: What did you like/dislike about the activity? If you modified the activity, what did you do?
4	Road Safety Encounters of a Close Kind?	Street Hassles	☐	☐	....
		Crossing Roads Story	☐	☐	....
		Cross Safer	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....
5	Follow the Signs	Match the Sign to the Story	☐	☐	....
		Story Prediction	☐	☐	....
		Crossing Practise	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....
6	See and Be Seen	One Step Back	☐	☐	....
		Colour Hide and See	☐	☐	....
		Visible Pedestrians	☐	☐	....
		Being a Safer Pedestrian	☐	☐	....
		Safer Crossing Practise	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....

HOME Activity: If you gave the home activity to students to take home, then you have completed the activity.

At the end of Term 3 please complete this checklist and mail it to: CPIPP, Marg Hall, School of Public Health, Curtin University, GPO Box U1987, PERTH, 6001, WA. OR Fax to Fax no: 351 2958, attention Marg Hall

CROSSING ROADS - PROGRAM CHECKLIST

School: ______________ Teacher: ______________ Class: ________

LESSON NUMBER **TERM 4**	TITLE	ACTIVITY	COMPLETED? ✔ =yes ✘ =no M =modified activity	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other: please specify	COMMENTS For example: What did you like/dislike about the activity? If you modified the activity, what did you do?
7	Crossing the Road with Help at Intersections	Road Crossing Helpers	☐	☐	....
		Traffic Lights Mime	☐	☐	....
		Crossing with Traffic Lights	☐	☐	....
		Crossing at Lights	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....
8	On the Road	Out of Sight	☐	☐	....
		Going Backwards	☐	☐	....
		Drivers Seeing Pedestrians	☐	☐	....
		Helping Pedestrians	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....
9	Special Crossing Problems	Stop at the Kerb	☐	☐	....
		Finger Puppets	☐	☐	....
		Dilemma Situations	☐	☐	....
		Assertive Role Play	☐	☐	....
		Video Crossing	☐	☐	....
		Processing	☐	☐	....
		Home Activity	☐	☐	....

At the end of Term 4 please complete this checklist and mail it to: CPIPP, Marg Hall, School of Public Health, Curtin University, GPO Box U1987, PERTH, 6001, WA. OR Fax to Fax no: 351 2958, attention Marg Hall.

Appendix 19

Teachers' lesson logs - 1996

CROSSING ROADS - PROGRAM CHECKLIST 1996

School: ______________ Teacher: ______________ Class: ______

Please indicate those parts of the education materials you used with your class.

(1-13)

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED? √ = Yes, x = No, M = Modified	WHY NOT? 0 = resources not available, 1 = time consuming, 2 = difficult to organise, 3 = dislike teaching outdoors, 4 = instructions confusing, 5 = other (please specify)	COMMENTS (For example: What did you like/dislike about the activity? If you modified the activity, what did you do?)
TERM 1						
1	__/__/96	Crossing	Safe Routes Story	☐ 17	☐	....
		at	Crossing at Lights	☐ 18	☐	....
	___ mins.	Controlled	Three Dimensional Inter.	☐ 19	☐	....
	(14-16)	Crossings	Processing	☐ 20	☐	....
			Home Activity	☐ 21-22	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 23

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED?	WHY NOT?	COMMENTS
2	__/__/96	Safe	Introduction	☐ 27	☐	....
		Crossing	Island Crossing	☐ 28	☐	....
	___ mins.		Crossing Dilemma	☐ 29	☐	....
	(24-26)		Processing	☐ 30	☐	....
			Home Activity	☐ 31-32	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 33

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED?	WHY NOT?	COMMENTS
3	__/__/96	Crossing	Introduction	☐ 37	☐	....
		Senses	Rail Crossing Senses	☐ 38	☐	....
	___ mins.		Practical Traffic Senses	☐ 39	☐	....
	(34-36)		Processing	☐ 40	☐	....
			Home Activity	☐ 41-42	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 43

After completing lessons 1 - 3 please complete this checklist and mail it to:

CPIPP, Marg Hall, Curtin University, School of Public Health, GPO Box U1987, PERTH WA, 6001. OR Fax it to 351 2958.

CROSSING ROADS - PROGRAM CHECKLIST 1996

School: ______________________ Teacher: ______________________ Class: ______

Please indicate those parts of the education materials you used with your class.

(1-13)

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED? √ = Yes x = No M = Modified	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other (please specify)	COMMENTS (For example: What did you like/dislike about the activity? If you modified the activity, what did you do?)
TERM 2						
4	___/___/ 96	Playing	Introduction	☐ 47	☐	....
		off the	Pedestrian Safety Skittles	☐ 48	☐	....
	____ mins.	Road	Dilemma Situations	☐ 49	☐	....
	(44-46)		Processing	☐ 50	☐	....
			Home Activity	☐ 51-52	☐	....
	Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 53					
5	___/___/ 96	Safe	Introduction	☐ 57	☐	....
		and	Little Yellow Walk. Hood	☐ 58	☐	....
	____ mins.	Dangerous	Risky Business	☐ 59	☐	....
	(54-56)		Processing	☐ 60	☐	....
			Home Activity	☐ 61-62	☐	....
	Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 63					
6	___/___/ 96	Passenger	Introduction	☐ 67	☐	....
		to	Using the Safety Door	☐ 68	☐	....
	____ mins.	Pedestrian	Passenger to Pedestrian	☐ 69	☐	....
	(64-66)		Processing	☐ 70	☐	....
			Home Activity	☐ 71-72	☐	....
	Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 73					

After completing lessons 4 - 6 please complete this checklist and mail it to:

CPIPP, Marg Hall, Curtin University, School of Public Health, GPO Box U1987, PERTH WA, 6001. OR Fax it to 351 2958.

CROSSING ROADS - PROGRAM CHECKLIST 1996

School: ______________ Teacher: ______________ Class: ______

Please indicate those parts of the education materials you used with your class.

(1-13)

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED? √ = Yes x = No M = Modified	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other (please specify)	COMMENTS (For example: What did you like/dislike about the activity? If you modified the activity, what did you do?)
TERM 3						
7	___/___/96	Traffic Dangers	Introduction	☐ 77	☐	....
	____ mins. (74-76)		Reversing Cars	☐ 78	☐	....
			Footpath Tag	☐ 79	☐	....
			Processing	☐ 80	☐	....
			Home Activity	☐ 81-82	☐	....
	Where did you practise road crossing with your class? *(e.g. real road, car park, basketball court, classroom, etc)* .... ☐ 83					
8	___/___/96	On the Road Again	Introduction	☐ 87	☐	....
	____ mins. (84-86)		Reaction Times	☐ 88	☐	....
			From the Driver's View	☐ 89	☐	....
			Safety Sentence Conjunc.	☐ 90	☐	....
			Processing	☐ 91	☐	....
			Home Activity	☐ 92-93	☐	....
	Where did you practise road crossing with your class? *(e.g. real road, car park, basketball court, classroom, etc)* .... ☐ 94					
9	___/___/96	Pedestrian Dilemmas	Introduction	☐ 98	☐	....
	____ mins. (95-97)		Assertive Role Play	☐ 99	☐	....
			Dilemma Situations	☐ 100	☐	....
			Processing	☐ 101	☐	....
			Home Activity	☐ 102-103	☐	....
	Where did you practise road crossing with your class? *(e.g. real road, car park, basketball court, classroom, etc)* .... ☐ 104					

After completing lessons 7 - 9 please complete this checklist and mail it to:

CPIPP, Marg Hall, Curtin University, School of Public Health, GPO Box U1987, PERTH WA, 6001. OR Fax it to 351 2958.

Appendix 20

Teachers' lesson logs - 1997

CROSSING ROADS - PROGRAM CHECKLIST 1997

School: ______________________ Teacher: ______________________ Class: ____________

Please indicate those parts of the education materials you used with your class.

(1-13)

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED? √ = Yes x = No M = Modified	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = Instructions confusing 5 = other (please specify)	COMMENTS (For example: What did you like/dislike about the activity? If you modified the activity, what did you do?)
TERM 1						
1	___/___/97	Safe Crossings	Safer Crossing Proc.	☐ 17	☐	....
			Walking Excursion	☐ 18	☐	....
	_____ mins.		Crossword	☐ 19	☐	....
	(14-16)		Processing	☐ 20	☐	....
			Home Activity	☐ 21-22	☐	....
	Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 23					
2	___/___/97	Traffic Search	Introduction	☐ 27	☐	....
	_____ mins.		Searching for Safety	☐ 28	☐	....
	(24-26)		Processing	☐ 29	☐	....
			Home Activity	☐ 30-31	☐	....
	Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 32					
3	___/___/97	Road Dilemmas	Introduction	☐ 36	☐	....
	_____ mins.		Safer Routes	☐ 37	☐	....
	(33-35)		Walk the Safest Route	☐ 38	☐	....
			Processing	☐ 39-40	☐	....
	Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 41					

After completing lessons 1 - 3 please complete this checklist and mail/fax it to:

CPIPP, Marg Hall, Curtin University, School of Public Health, GPO Box U1987, PERTH WA, 6001. OR Fax it to 351 2958.

CROSSING ROADS - PROGRAM CHECKLIST 1997

School: ______________ Teacher: ______________ Class: ______________

Please indicate those parts of the education materials you used with your class.

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED? √ = Yes × = No M = Modified	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other (please specify)	COMMENTS (For example: What did you like/dislike about the activity? If you modified the activity, what did you do?)
TERM 2						
4	___/___/97	Helping Others	Safer Crossings	☐ 45	☐	....
	______ mins.		Ralf	☐ 46	☐	....
	(42-44)		Story Writing	☐ 47	☐	....
			Processing	☐ 48	☐	....
			Home Activity	☐ 49-50	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 51

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED?	WHY NOT?	COMMENTS
5	___/___/97	Safer Places To Cross	Introduction	☐ 55	☐	....
	______ mins.		Crossing Course	☐ 56	☐	....
	(52-54)		Stephen, Tran & Jenny	☐ 57	☐	....
			Processing	☐ 58	☐	....
			Home Activity	☐ 59-60	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 61

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED?	WHY NOT?	COMMENTS
6	___/___/97	Helping Yourself	Introduction	☐ 65	☐	....
	______ mins.		Lucky Dip	☐ 66	☐	....
	(62-64)		Processing	☐ 67-68	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 69

After completing lessons 4 - 6 please complete this checklist and mail it to:

CPIPP, Marg Hall, Curtin University, School of Public Health, GPO Box U1987, PERTH WA, 6001. OR Fax it to 351 2958.

CROSSING ROADS - PROGRAM CHECKLIST 1997

School: ______________ Teacher: ______________ Class: ______________

Please indicate those parts of the education materials you used with your class.

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED? √ = Yes x = No M = Modified	WHY NOT? 0 = resources not available 1 = time consuming 2 = difficult to organise 3 = dislike teaching outdoors 4 = instructions confusing 5 = other (please specify)	COMMENTS (For example: What did you like/dislike about the activity? If you modified the activity, what did you do?)
TERM 3						
7	___/___/ 97	Safe Message to Others	Road Safety Picture	☐ 73	☐	....
	______ mins. (70-72)		Safety Slogan	☐ 74	☐	....
			Crossing Book	☐ 75	☐	....
			Processing	☐ 76	☐	....
			Home Activity	☐ 77-78	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 79

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED?	WHY NOT?	COMMENTS
8	___/___/ 97	Being a Road Safety	Introduction	☐ 83	☐	....
	______ mins. (80-82)		Road Safety Campaign	☐ 84	☐	....
			Campaign Results	☐ 85	☐	....
			Processing	☐ 86	☐	....
			Home Activity	☐ 87-88	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 89

LESSON NUMBER	DATE; DURATION of LESSON	TITLE	ACTIVITY	COMPLETED?	WHY NOT?	COMMENTS
9	___/___/ 97	Crossing Roads Finale	Introduction	☐ 93	☐	....
	______ mins. (90-92)		Speak Up for Road Saf.	☐ 94	☐	....
			Processing	☐ 95-96	☐	....

Where did you practise road crossing with your class? (e.g. real road, car park, basketball court, classroom, etc) .... ☐ 97

After completing lessons 7 - 9 please complete this checklist and mail/fax it to:

CPIPP, Marg Hall, Curtin University, School of Public Health, GPO Box U1987, PERTH WA, 6001. OR Fax it to 351 2958.

Appendix 21

Classroom observation evaluation form

Curtin University of Technology
Perth Western Australia

Child Pedestrian Injury Prevention Project

CPIPP School-Based Intervention Process Evaluation

Lesson Observation Evaluation Form

School: ____________________ Teacher: ____________________

Observer Name: ____________________ Date: ______________

Overall Level of Implementation:

High	Med/High	Medium	Med/Low	Low	No
3	2.5	2	1.5	1	0

Number of Students: __ __ ; __ __ ; __ __ ; __ __ ; __ __
Year 1 Year 2 Year 3 Year 4 Year 5

Start Time: __ __ : __ __ Finish Time: __ __ : __ __ = ______ minute lesson

Crossing Roads Lesson: 1 2 3 4 5 6 7 8 9 Year: 199_

Incentives delivered:
Pen
Stickers

Principal visited

Lesson Log

Comments: ____

The Child Pedestrian Injury Prevention Project is a research project conducted by the Centre for Health Promotion Research, Curtin University, GPO Box U1987 Perth 6001 Western Australia. Phone: 08-9266 2115 Fax: 08-9266 2958.
The CPIPP is funded be Healthway, Main Roads WA & WA Office of Road Safety.

School: ____________________ Teacher: ____________________ Date: __________

☐☐☐☐☐☐☐☐☐☐☐☐☐ (1-13)

Lesson number ____________ (14)

Lesson length ____________ (15-16)

Level of implementation	High	Medium	Low	No	
Fidelity to program objectives					
1 The lesson was taught as described in the Crossing Roads manual or modified positively.	3	2	1	0	(17)
2 The teacher accurately described and modelled the road crossing behaviour as described in the Crossing Roads manual.	3	2	1	0	(18)
3 When describing appropriate road crossing the teacher used sentences to describe the behaviour rather than a jingle or single words.	3	2	1	0	(19)
4 Road crossing practise was carried out on a:	3	2	1	0	(20)
	Real road	Simulated road outdoors	Simulated road indoors	Activity not attempted	
Teacher behaviour					
5 Students maintained interest in the lesson (e.g. pay attention, stay on task).	3	2	1	0	(21)
6 Teacher enthusiastic about the lesson.	3	2	1	0	(22)
7 Students given clear instructions.	3	2	1	0	(23)
8 Lesson was well organised.	3	2	1	0	(24)
9 Teacher encouraged questions and discussion.	3	2	1	0	(25)
10 Students received positive feedback for their participation in activities.	3	2	1	0	(26)
11 Teacher moved around the classroom to monitor student work.	3	2	1	0	(27)
12 Students actively participated in the lesson.	3	2	1	0	(28)

Appendix 22

Facsimile to confirm classroom observation

curtin
University of Technology
Perth Western Australia

Child Pedestrian Injury Prevention Project

FACSIMILE

TO:		Fax:	
SCHOOL:			
FROM:	Margaret Hall	(Fax:	351 2958)
DATE:	1995		
SUBJECT:	Crossing Roads Lesson Observation		
No. PAGES:	One (including this one)		

Dear

Just a note to confirm our phone conversation.

I will be at: ______________________________ Primary School

on ___________________________

to carry out an observation of your students in the following class/es.

Teacher *Time*

____

____

____

Please phone me on 351 3807 if any of this information is incorrect.
I look forward to seeing you when I visit your school.

Yours sincerelv

/

Margaret Hall
Research Fellow
Child Pedestrian Injury Prevention Project

Centre for Health Promotion Research, Curtin University.
GPO Box U1987 Perth 6001 WA Phone: 09-351 3807/Fax: 09-351 2958

Appendix 23

Implementation rates for core, home, processing and optional activities separately & correlation coefficients for core and home activities

Completeness implementation rates by activity type - mean percentage of activities completed

Instrument	1995		1996		1997		TOTAL	
	a	b	a	b	a	b	a	b
Student work samples	n=65	n=68	n=65	n=67	n=62	n=73	n=192	n=208
	%	%	%	%	%	%	%	%
Core activities	72	69	69	67	69	59	70	65
Home activities	80	77	82	79	67	57	76	71
Teacher lesson log	n=67	n=68	n=62	n=67	n=50	n=73	n=179	n=208
	%	%	%	%	%	%	%	%
Core activities	91	89	84	78	65	44	81	70
Home activities	93	92	87	80	64	44	83	71
Processing	80	79	71	66	53	36	69	60
Optional activities	65	64	59	55	53	36	60	51

[a] Non-respondents excluded
[b] Non-respondents re-coded as zero

Spearman's rank correlation coefficients between similar student work sample activities and teacher lesson log activities variables (** $p<0.01$)

	Teacher lesson log CORE ACTIVITY	Teacher lesson log HOME ACTIVITY
Student work sample CORE ACTIVITY	0.32**	-
Student work sample HOME ACTIVITY	-	0.51**

Appendix 24

Test-retest student self-administered questionnaire

Child Pedestrian Injury Prevention Project

Curtin University of Technology Perth Western Australia

OFFICE USE ONLY

Student	______	(1-4)
School	______	(5-8)
Instrument	____	(9-10)
Version	___	(11-12)
Int/Control	___	(13)
Year	___	(14-15)

What is your first name? ______________________________ (16-26)

What is your last name? ______________________________ (27-37)

What is your school year? ______________________________ (38)

What is your teacher's name? ______________________________ (39-49)

What is your Health teacher's name? ____________________ (50-60)

How old are you? ____________ years (61-62)

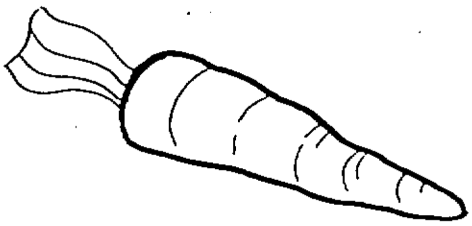
Which are you? _________ Boy _________ Girl (63)

Please answer the next questions as best you can, like in the example below. Circle what you think is the right answer.

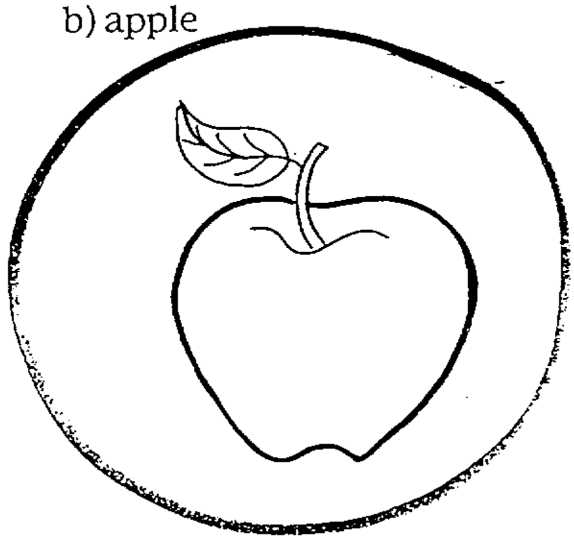
EXAMPLE

1. Which food is a fruit?

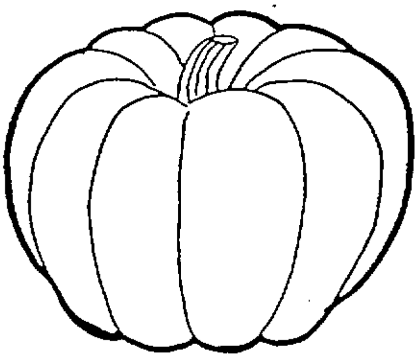
a) carrot



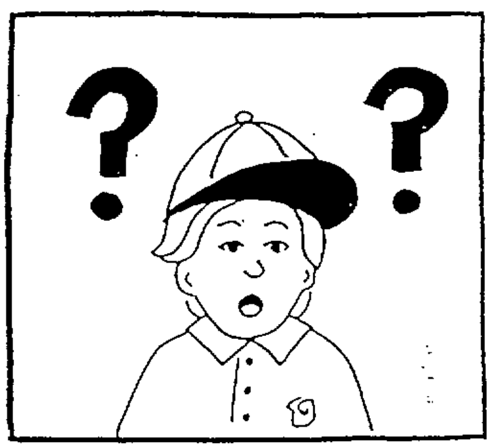
b) apple



c) pumpkin



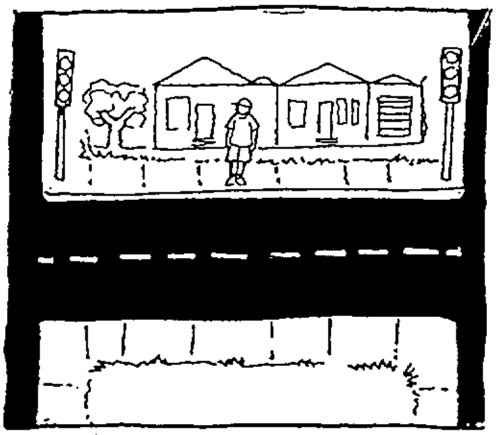
d) don't know



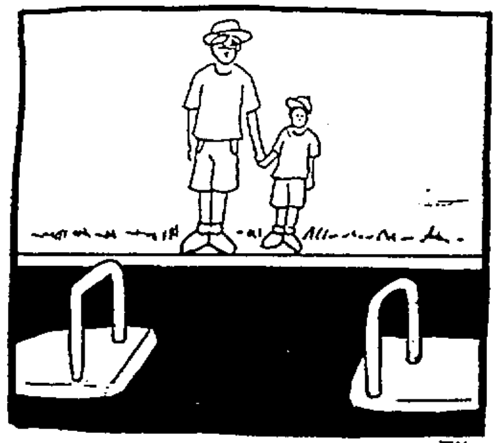
Circle what you think is the right answer

1 Where is the safest place for the boy to cross the road?

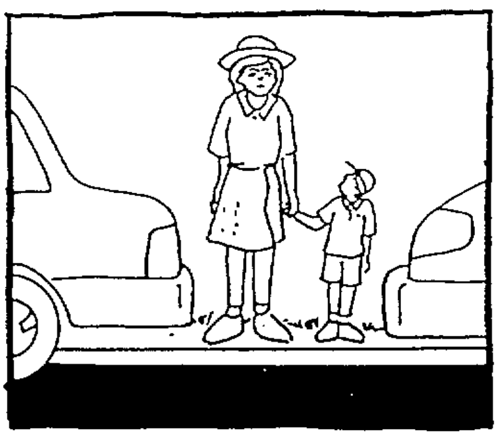
a) at mid block



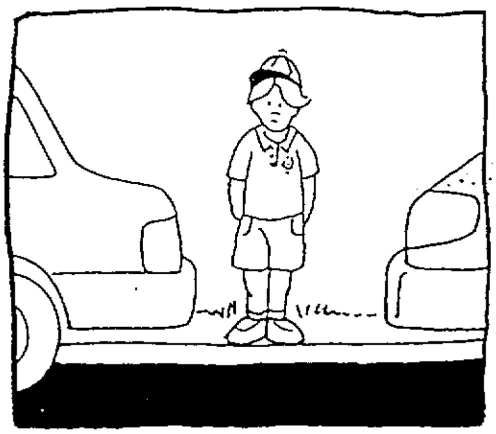
b) at marked crossing with adult



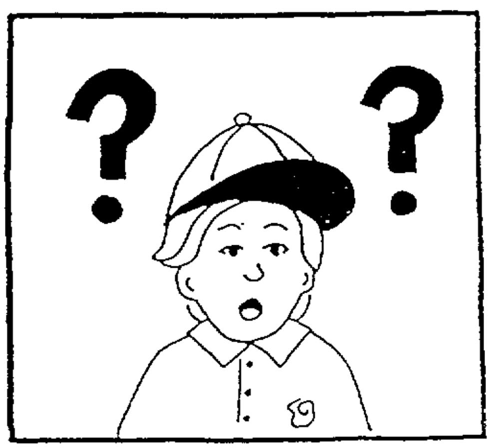
c) near parked cars with adult



d) near parked cars



g) don't know

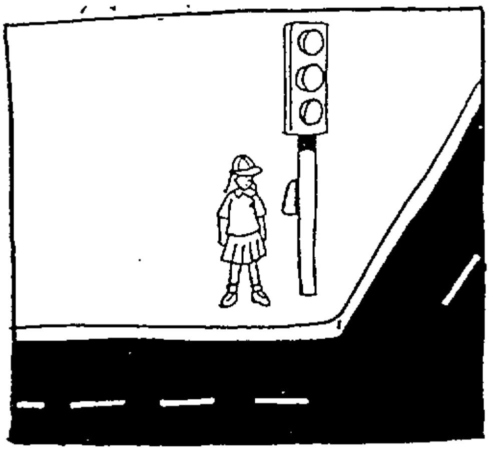


(64)

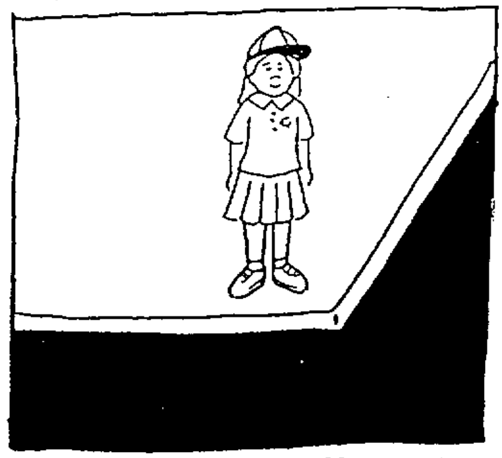
Circle what you think is the right answer

2 Where is the safest place for the girl to cross the road?

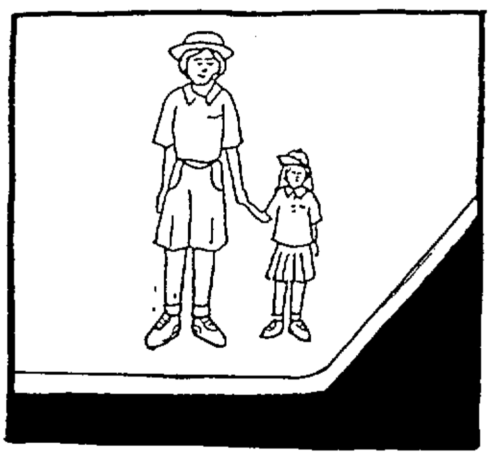
a) at the traffic lights



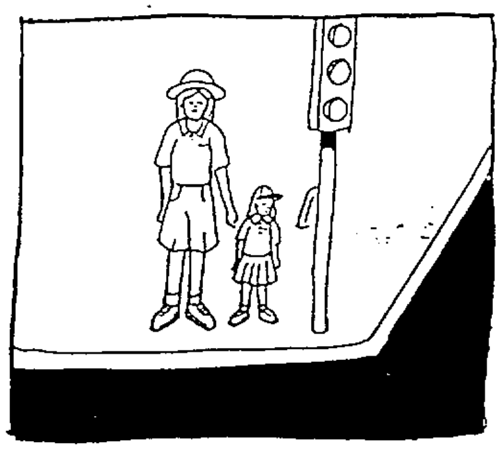
b) at the corner (alone)



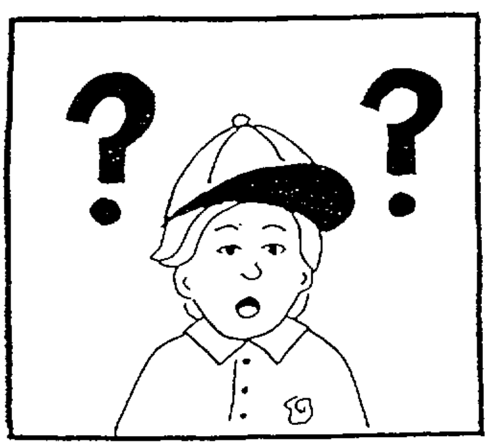
c) at the corner
an adult



d) at the traffic with
lights with
an adult



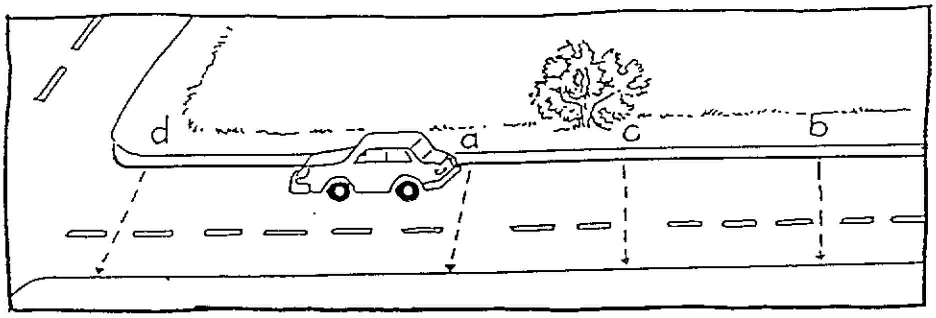
g) don't know



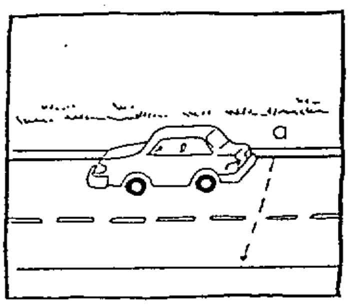
(65)

Circle what you think is the right answer

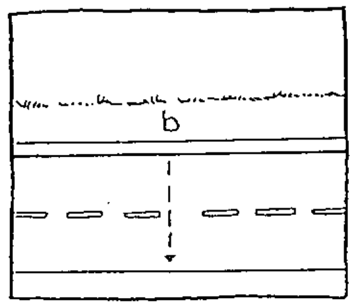
3 Where is the safest place for the boy to cross the road?



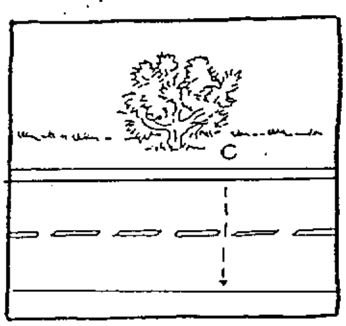
a) near the parked car



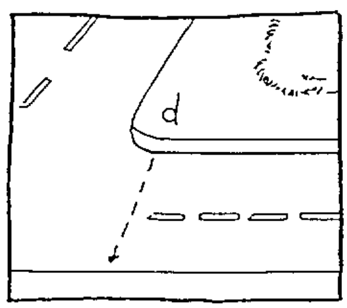
b) on the straight piece of road



c) near the big tree



d) near the corner

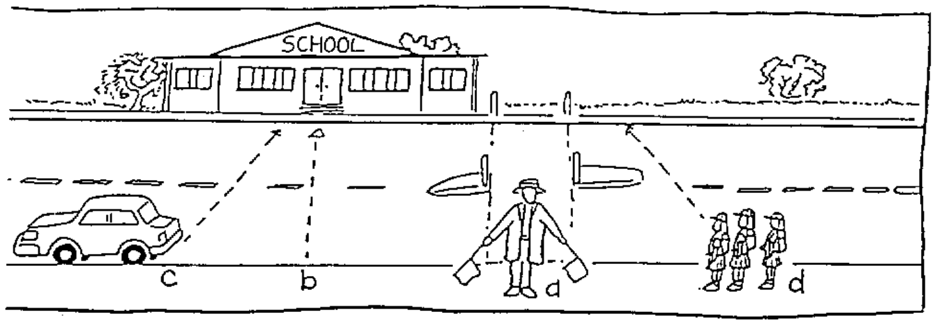


e) don't know

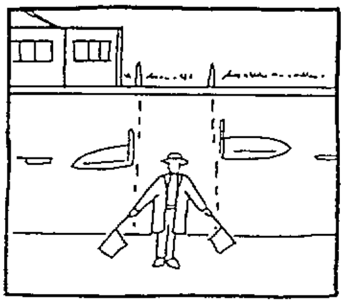
(66)

Circle what you think is the right answer

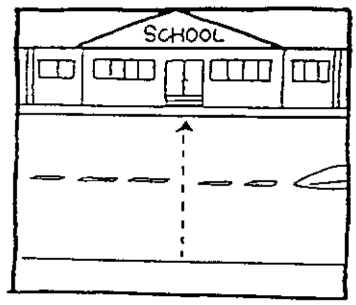
4. Where is the <u>safest</u> place for the girl to cross the road?



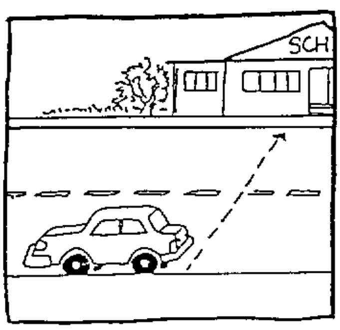
a) at the crossing attendant



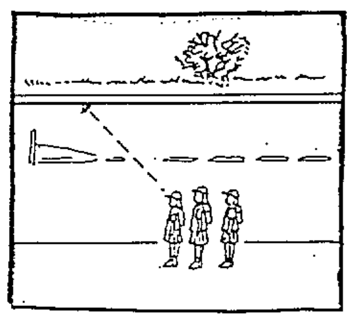
b) in front of school



c) near the parked car



d) with friends



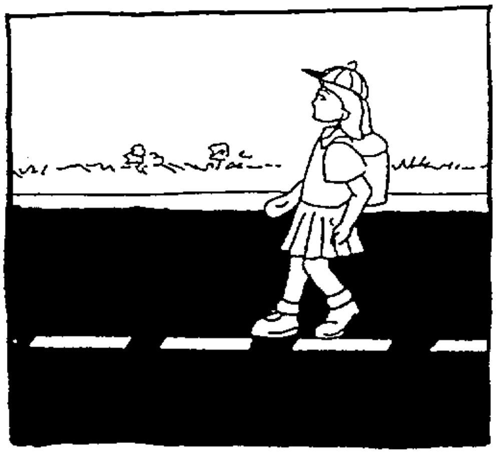
e) don't know

(67)

Circle what you think is the right answer

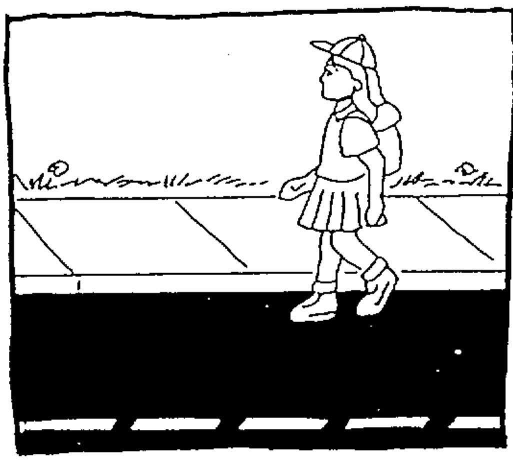
5. Where is the safest place for the girl to walk?

a) on middle of road

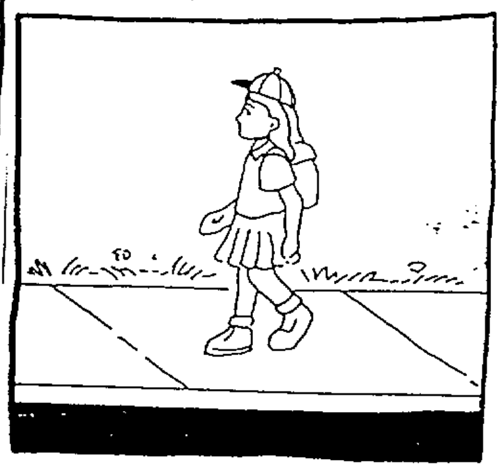


b) on grass on side of road

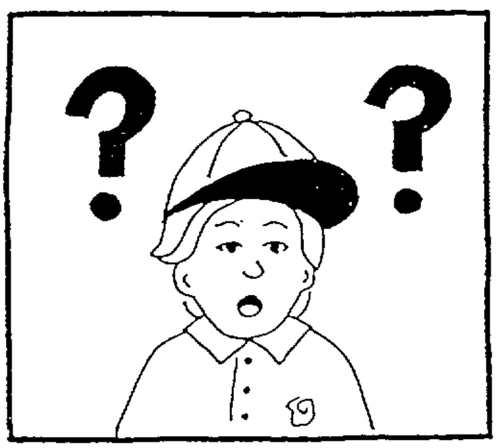
c) on road



d) on footpath



e) don't know

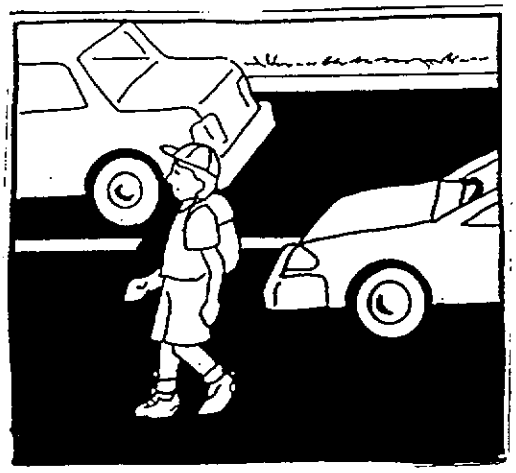


(68)

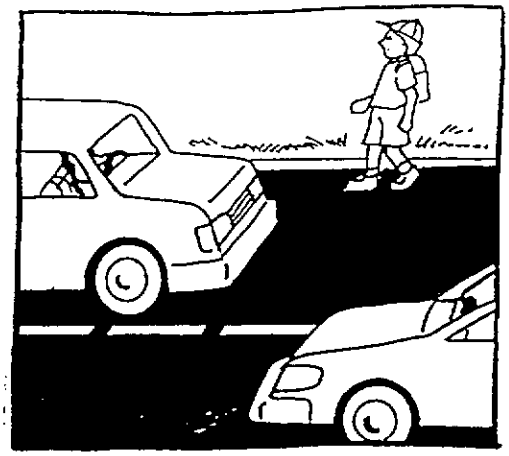
Circle what you think is the right answer

6. Where is the safest place for the boy to walk?

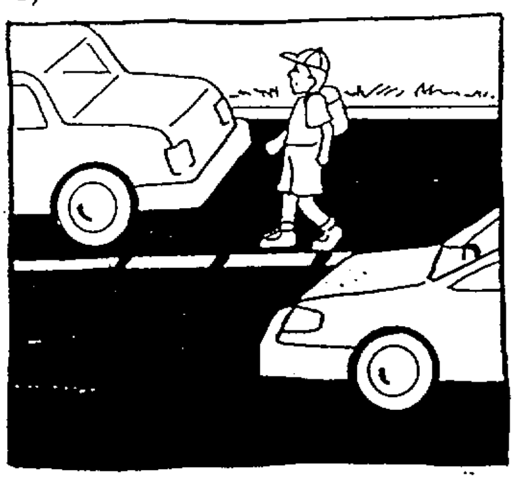
a) on same side of road as cars are travelling



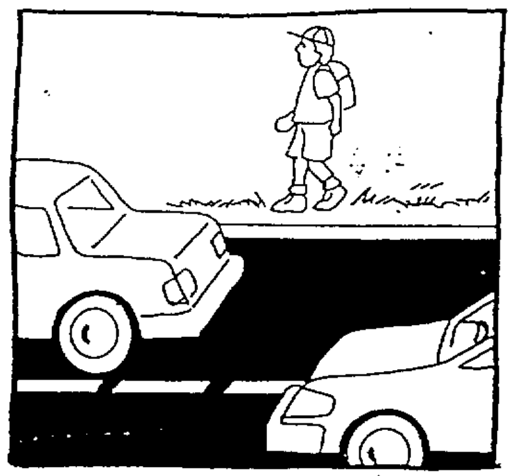
b) on side of road walking toward cars



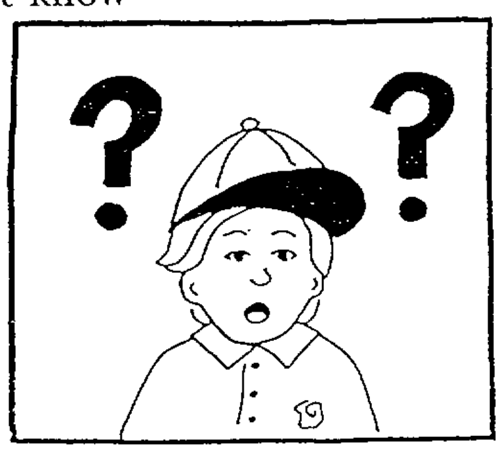
c) middle of road



d) on grass on side of road



e) don't know

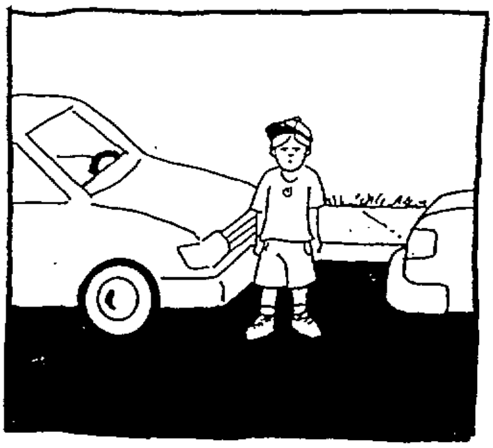


(69)

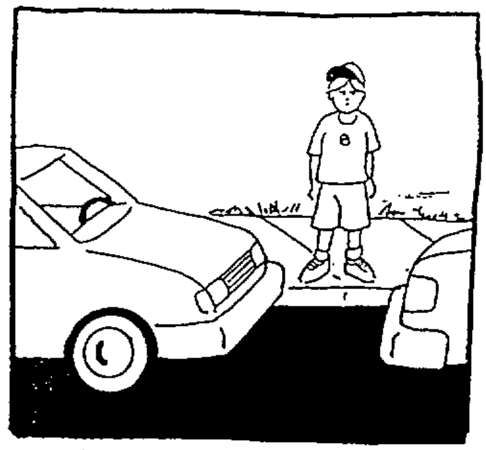
Circle what you think is the right answer

7. If the only place to cross the road was between parked cars where should the boy stop to look before crossing the road?

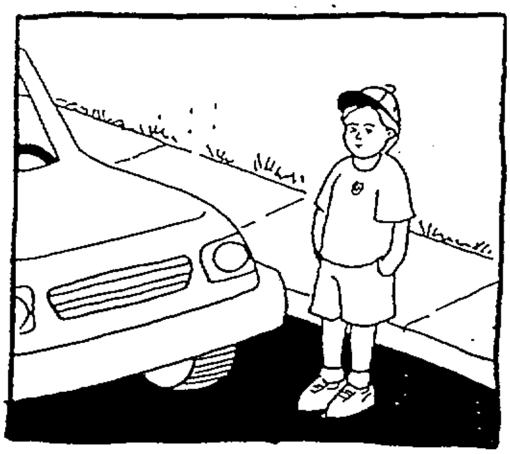
a) next to the road edge of car



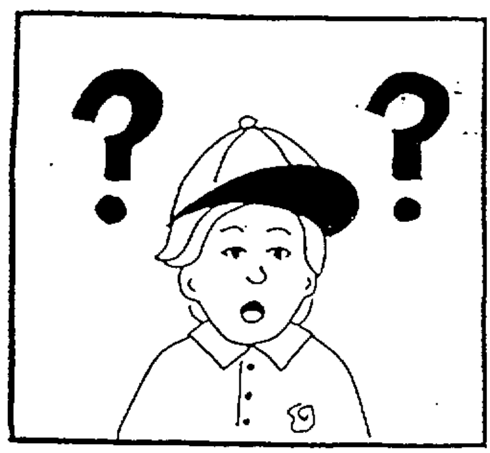
b) on the footpath



c) between footpath and cars



d) don't know

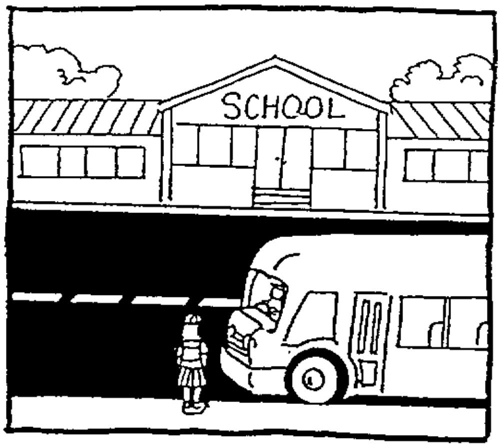


(70)

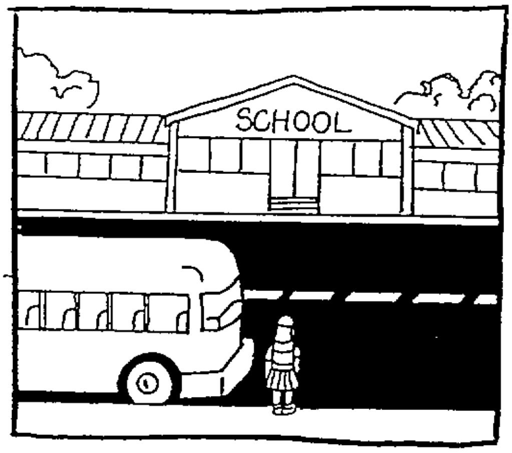
Circle what you think is the right answer

8. After getting off the bus the girl should:

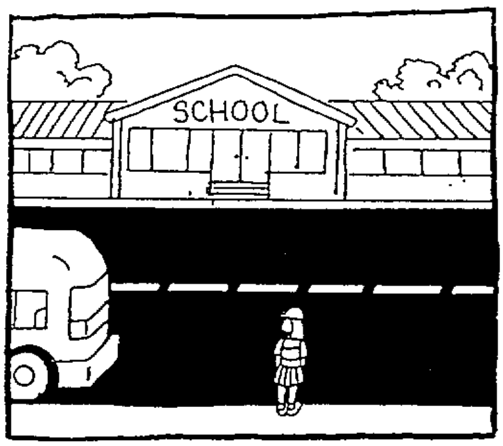
a) cross in front of bus when road is clear



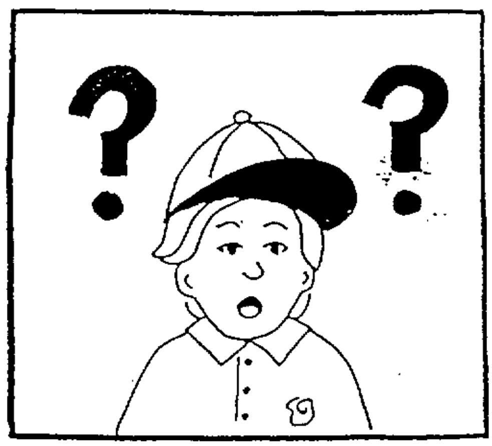
b) cross behind the bus when the road is clear



c) wait until bus has pulled away and cross when road is clear



d) don't know

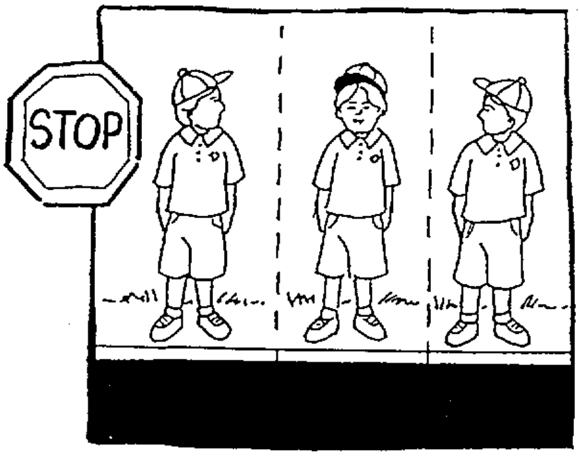


(71)

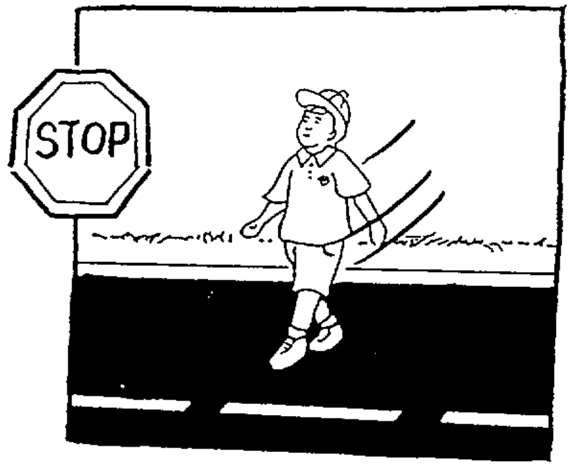
Circle what you think is the right answer

9. When the boy has found a safe place to cross the road he should:

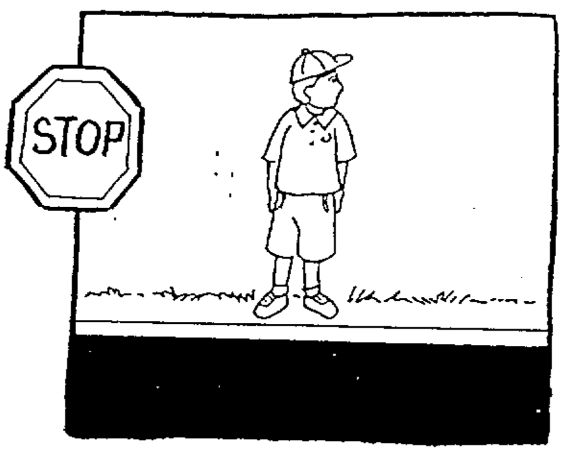
a) stop and look in all directions



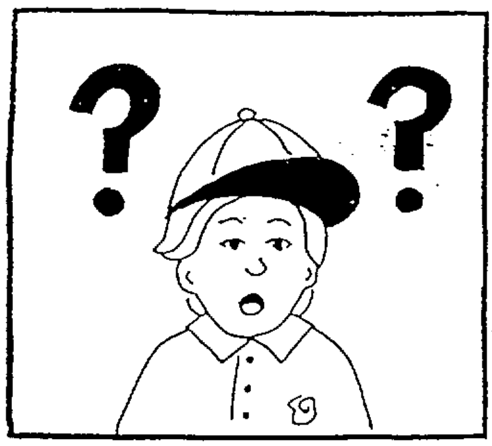
b) stop and walk across quickly



c) stop and look to the left only



d) don't know

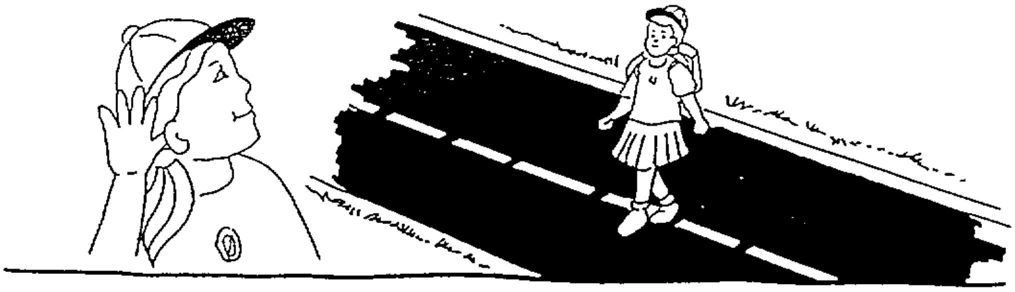


(72)

Circle what you think is the right answer

10. When the road is clear the girl should cross by:

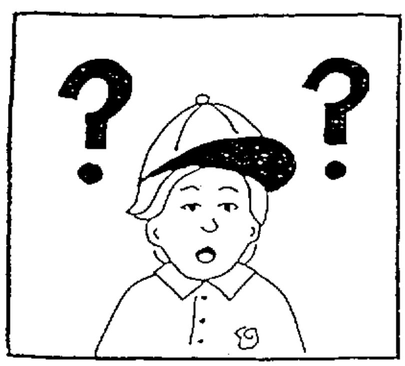
a) listening for traffic and looking straight ahead



b) watching and listening for traffic

c) walking slowly looking only in one direction

d) don't know

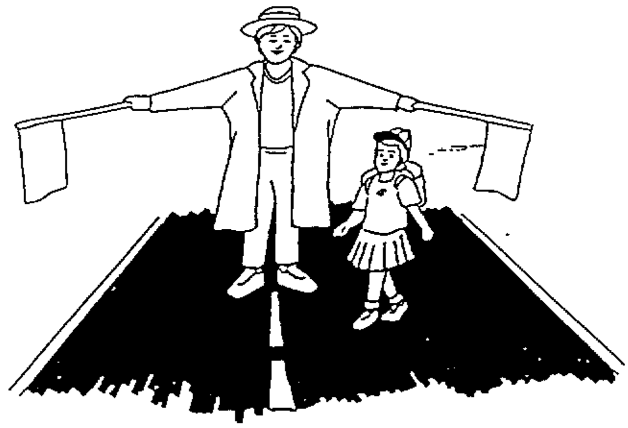


(73)

Circle what you think is the right answer

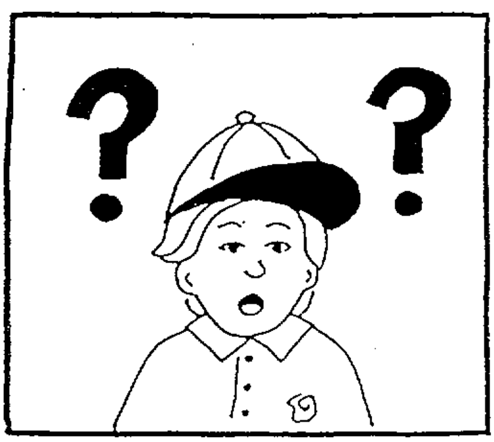
11. Do you have a crossing attendant near your school?

a) yes



b) no

c) don't know

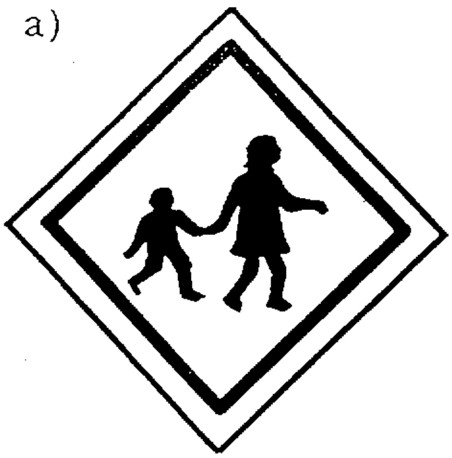


(74)

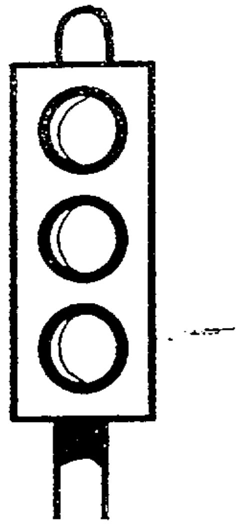
Circle ALL the correct answers

12. Which road signs show a crossing place for pedestrians?

a)



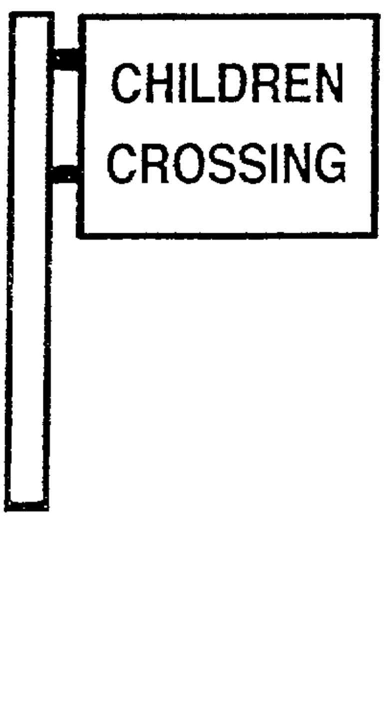
b)



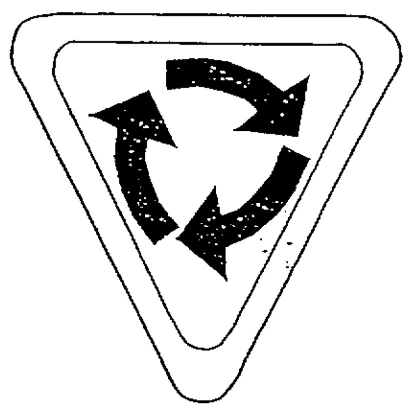
c)

d)

e)



f)



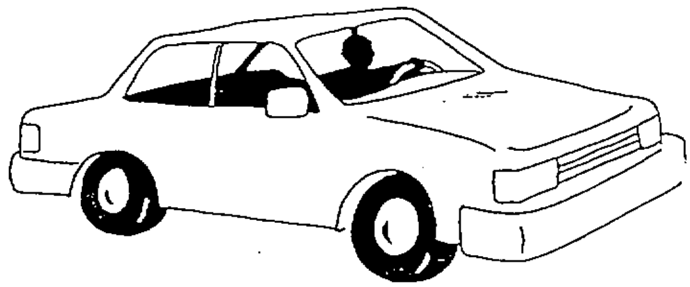
(75-80)

The next questions are about things that you do. Circle what you think is the right answer.

13. How do you get to school on <u>most</u> days?

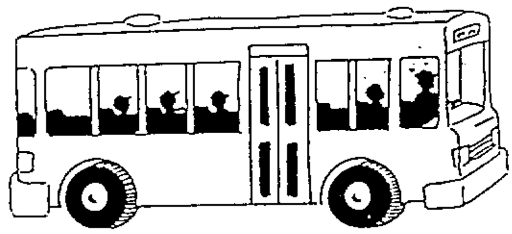
a) walk

b) by car



c) ride my bike

d) by bus

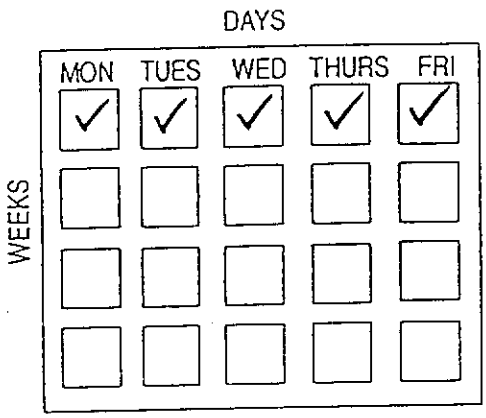


(81)

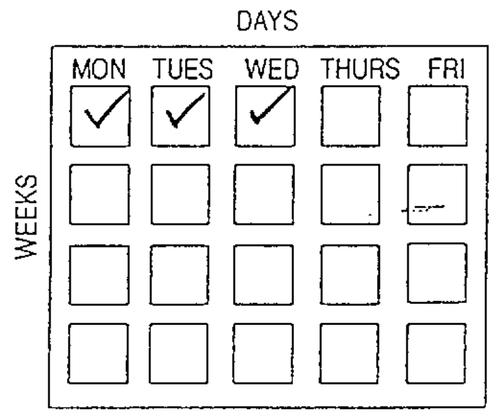
Circle what you think is the right answer

14. How often do you walk to or from school?

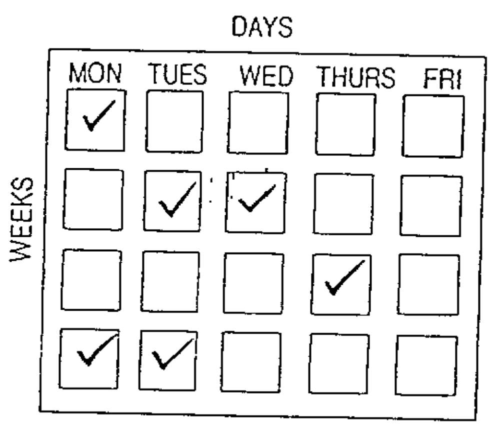
a) 4-5 days a week



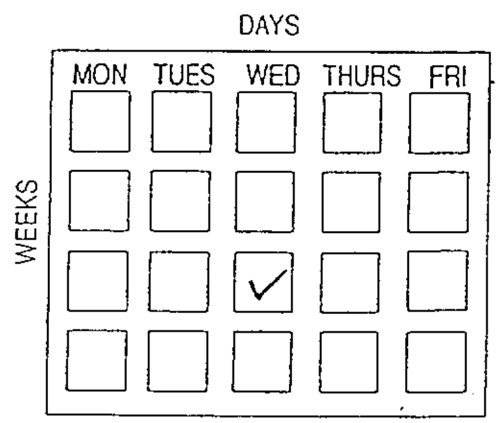
b) 3-4 days a week



c) 1-2 days a week



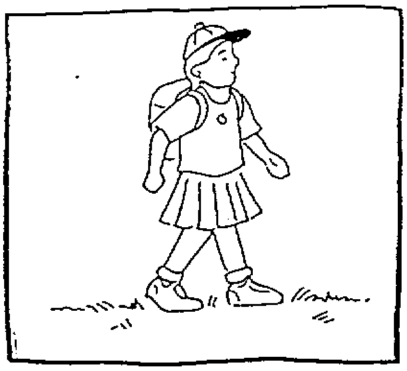
d) no days or only a few times a year



Circle what you think is the right answer

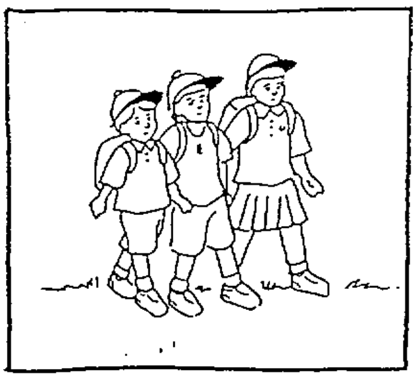
15. If you <u>ever</u> walk to school do you <u>mostly</u> walk:

a) by yourself



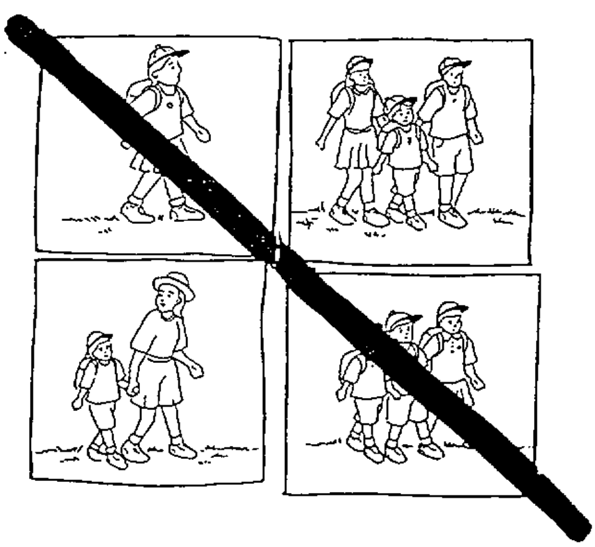
b) with an adult

c) with other children,
12 years or under



d) with teenagers
(13 - 18 years)

e) I almost never walk to school

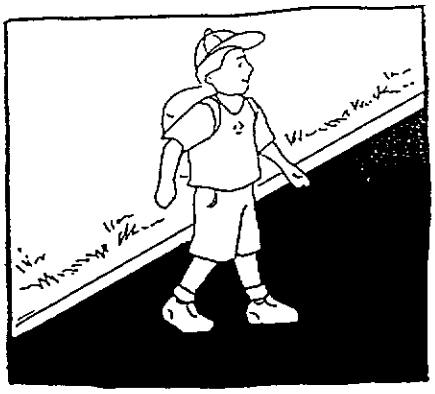


(83)

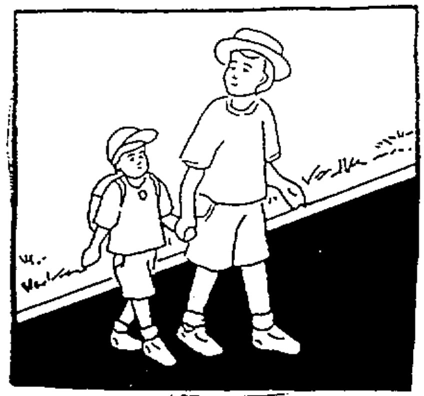
Circle what you think is the right answer

16. Who do you usually cross the road with?

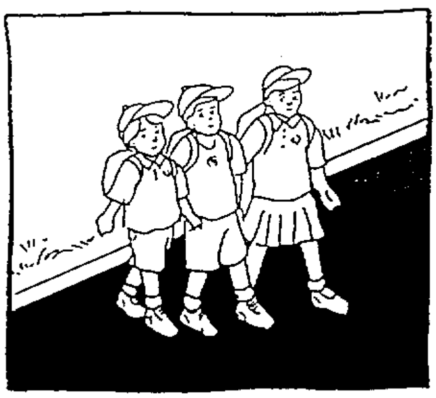
a) on your own



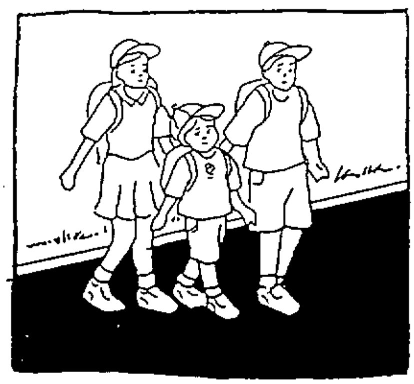
b) an adult



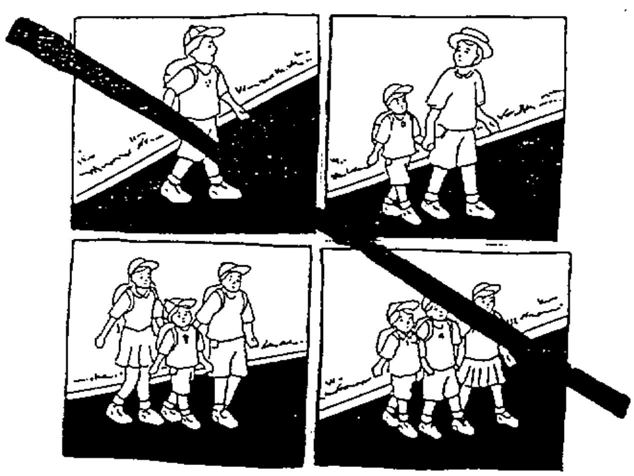
c) other children, 12 years or under



d) a teenager (13 - 18 years)



f) I almost never cross the road

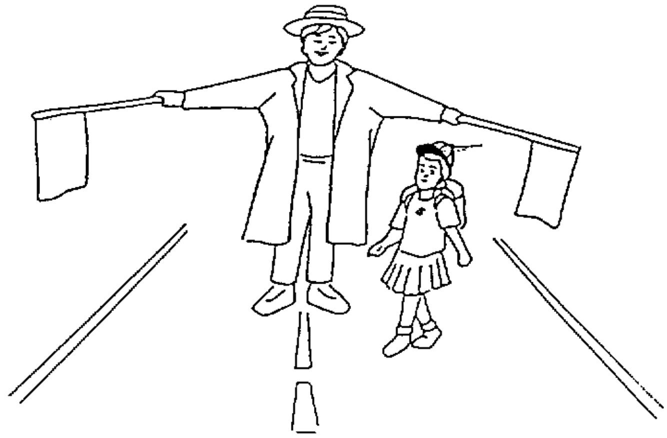


(84)

Circle what you think is the right answer

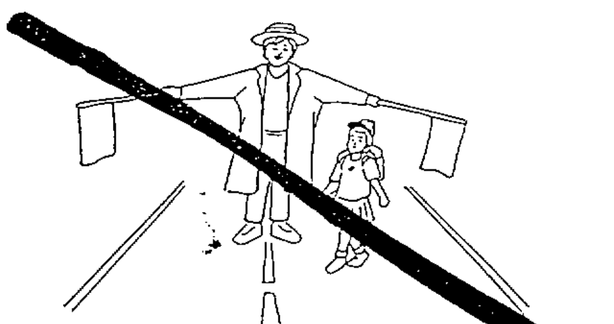
17. Have you ever used a crossing attendant to help you cross the road?

a) Yes



b) No

c) We don't have one near our school



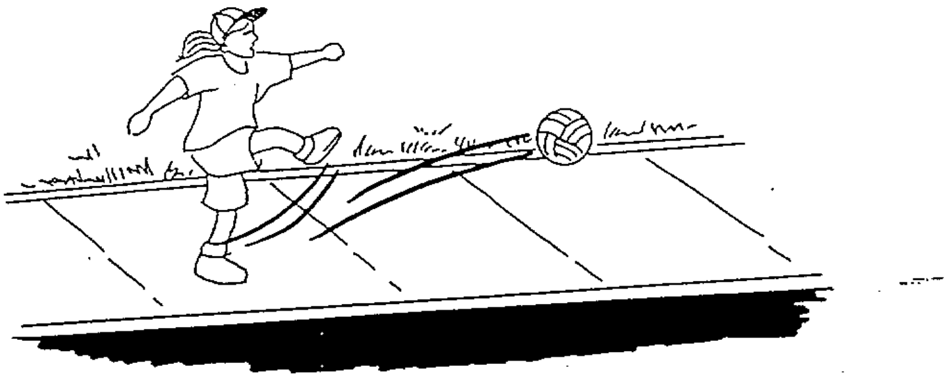
(85)

ADMINISTRATOR PROMPT: 'PLAY' MEANS ROLLERBALDING, CYCLING AND GAMES YOU LIKE TO PLAY

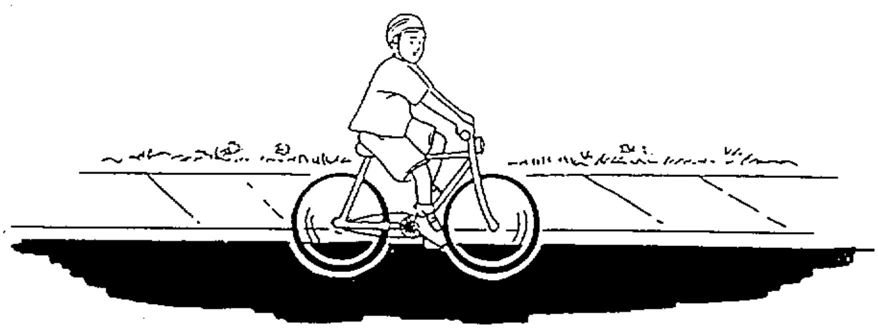
Circle ALL the correct answers

18. Do you ever play on the:

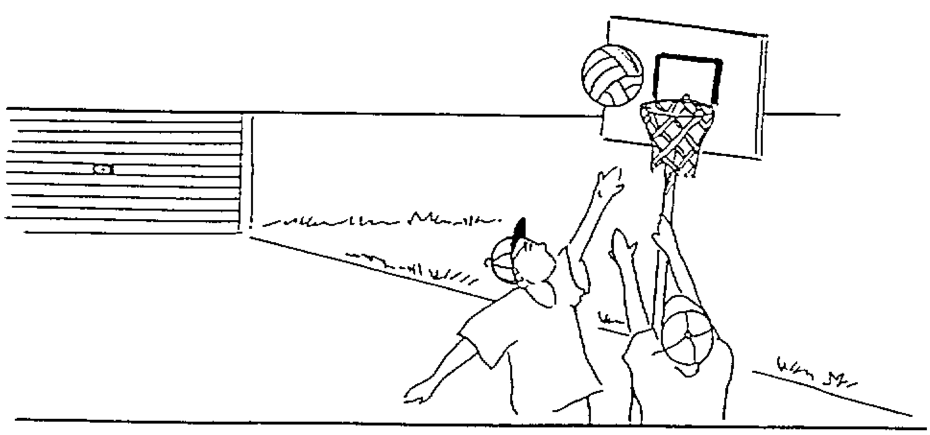
a) footpath Yes No



b) road Yes No



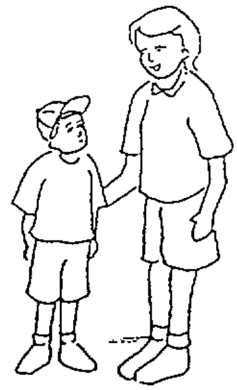
c) driveway Yes No



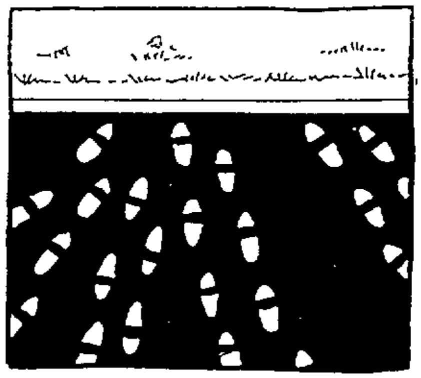
(86-88)

Circle what you think is the right answer

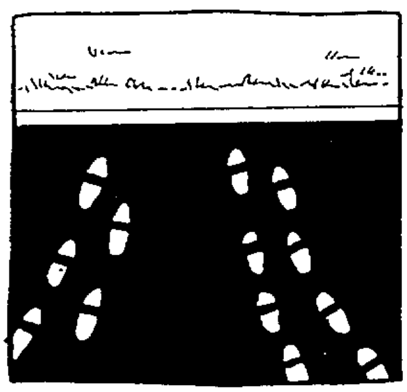
19. How often have your parents talked to you about how to cross the road safely?



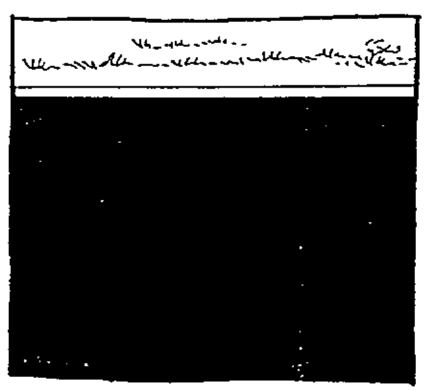
a) 3 or more times



b) 1 or 2 times



c) never



Circle what you think is the right answer

20. How many times a day do you cross a road by yourself?

a) never

0

b) one or two times

1-2

c) three or four times

3-4

d) more than four times

4+

(90)

Circle what you think is the right answer

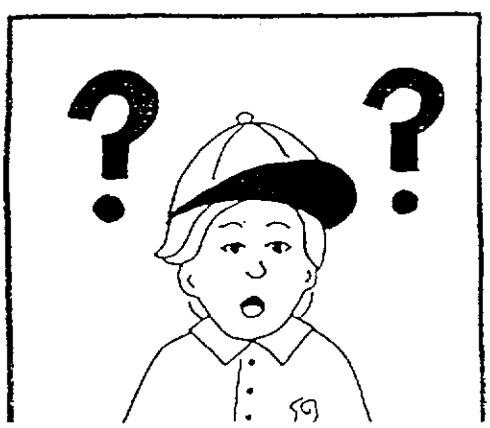
21. Would you be allowed to cross the road if you were the person in the picture?

a) Yes

ADMINISTRATOR PROMPT: CROSSING THE ROAD WITH A CROSSING ATTENDANT IS *NOT* CROSSING BY *YOURSELF*

b) No

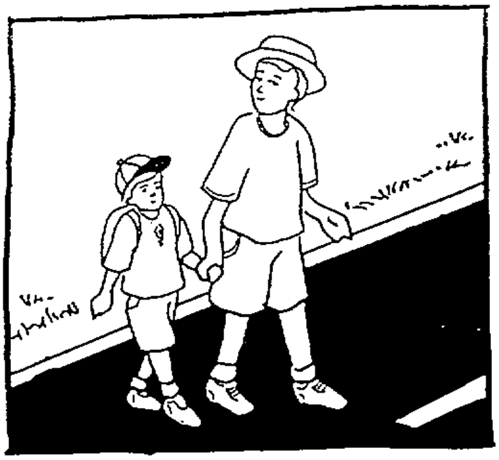
c) Don't know



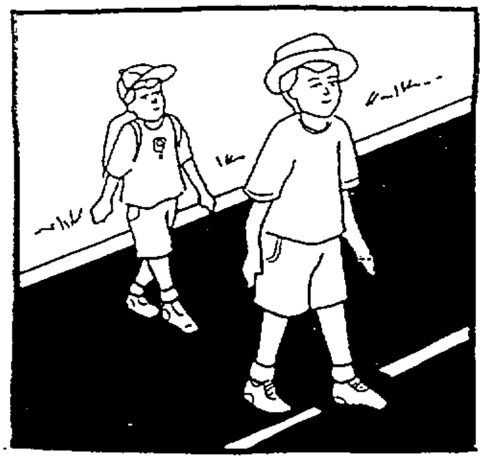
Circle what you think is the right answer

22. When you cross the road with an adult do you walk:

a) next to them

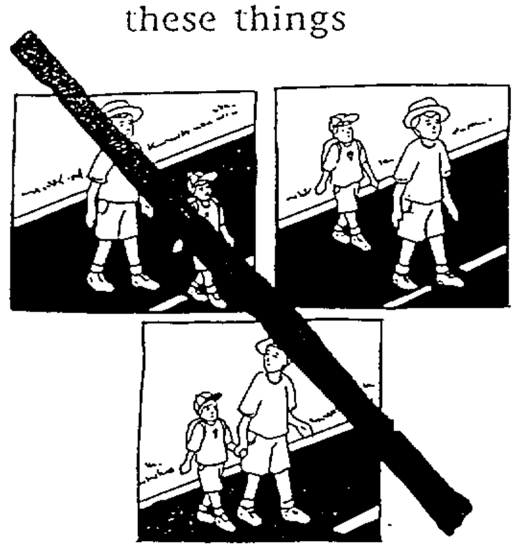


b) behind them



c) in front of them

d) I don't do any of these things



(92)

You have now finished, thank you for helping us.

Appendix 25

Test-retest teacher pre-test self-report questionnaire

Curtin
University of Technology
Perth Western Australia

Child Pedestrian Injury Prevention Project

CONFIDENTIAL QUESTIONNAIRE

Dear Year 2 Health Education Teacher

Thank you for participating in this study. The Curtin University, Centre for Health Promotion Research is conducting this survey to gather information about Year 2 teachers' health education attitudes and practises. This information is needed to determine the most effective way to teach pedestrian safety education.

We have asked you to identify your name and school on this survey. This is to allow the research agency to match this information with your students' surveys for analysis. All identifying information will be strictly confidential. The results presented at the end of the study will be confined to answers. Only summary information which does not identify individuals will be provided to your school when the project is complete in 1998.

The time required to complete this survey is approximately 15 minutes. Each question has a number of alternatives, please answer the questions honestly and to the best of your knowledge.

If you have any questions about the survey, please contact Margaret Hall or Steve Jones on Ph: 351 3807.

Thank you very much for your help.

Margaret Hall (Research Associate) Steve Jones (Project Director)

Study Code Number: ☐☐☐☐☐☐☐☐☐☐☐☐☐

TEACHER PROFILE

1 Name ______________________________
(Please print in upper-case letters)

2 School ______________________________
(Please print in upper-case letters)

3 What is the Year level of your class in 1995?
(Circle one number)
Year 1/2 1
Year 2 2
Year 2/3 3
Year 2 Health class only .... 4 *(14)*

4 How many students in your Year 2 health class?
(Write in the boxes provided)
☐☐ students *(15-16)*

5 What is your teaching status in 1995?
(Circle one number)
Full time 1
Tandem 2
Part-time 3
Health Specialist .... 4 *(17)*

6 Gender
(Circle one number)
male 1
female .... 2 *(18)*

7 Age group
(Circle one number)
20 to 24 years 1
25 to 29 years 2
30 to 34 years 3
35 to 39 years 4
40 years & over .... 5 *(19)*

8 **What is your highest academic qualification.**
(Circle one number)

Diploma of Teaching.................... 1
Bachelor Degree...........................2
Postgraduate Qualifications 3
Specify

Other: please specify..................... 4 (20)

9 **For how many years have you been teaching?** ☐☐ years (21-22)
(Write in the boxes provided)

10 **For how many years in total have you taught Year 2 students?**
(Write in the boxes provided)
☐☐ years (23-24)

11 **Did you study health education in your tertiary training?**
(Circle one number)

Yes 1
No... 2
Can't remember 3 (25)

12 **How many hours of health education training (in-services, workshops etc.) have you received in the last 5 years?**
(Circle one number)

0 hours 1
1-3 hours.................................... 2
4-6 hours.....................................3
> 6 hours 4 (26)

13 **Have you attended any road safety in-service courses in the last 2 years?**
(Circle one number)

Yes...1
No...2 go to question 14
Can't remember .... 3 go to question 14 (27)

13.1 **If yes, please state which aspect(s) of road safety was/were addressed - bike, pedestrian, seat belts, etc.**

ATTITUDES AND PRACTISES REGARDING HEALTH EDUCATION

14 **In 1995 how many minutes of class time PER WEEK do you allocate to health education?**
(Write in the boxes provided)
☐☐ minutes per week (28-29)

15 **Have you taught any pedestrian safety lessons to your Year 2 students this year?**
(Circle one number)

Yes .... 1 go to question 15.1
No... 2 go to question 16
Can't remember .... 3 go to question 16 (30)

15.1 **How many lessons of pedestrian safety have you taught this year?**
(Write in the boxes provided)
☐☐ lessons (31-32)

15.2 **What was the average duration of EACH lesson?**
(Write in the boxes provided)
☐☐ minutes duration (33-34)

16 Please circle the subjects in which you usually teach pedestrian safety.
(Circle as many as apply)

health education	1	(35)
mathematics	1	(36)
social studies	1	(37)
science	1	(38)
language	1	(39)
Other: please specify	1	(40)

17 If you have taught pedestrian safety to Year 2 students in 1995 and/or in previous years, where did you practise safe road crossing behaviour with your Year 2 students?
(Circle appropriate numbers)

In the classroom	1	(41)
Outside the classroom but within the school grounds	1	(42)
In the road environment	1	(43)
Did not go outside the classroom at all	1	(44)
Did not practise safe road crossing	1	(45)
Have not taught Year 2 students before	1	(46)
Other: please specify	1	(47)

____

18 Have you ever invited a guest to speak to your class (any year level) about pedestrian safety?
(Circle one number)

Yes	1	
No	2	(48)

If yes, please specify from where or what agency/organisation:

____

19 Using a scale from 1 to 4, rate the following HEALTH TOPICS in order of importance for your Year 2 students where 1 is assigned to the topic most important.
(Write in the boxes provided)

Nutrition	☐	(49)
Fire Safety	☐	(50)
Pedestrian Safety	☐	(51)
Sexuality Education	☐	(52)

20 Using a scale from 1 to 5, rate the following SUBJECTS in order of importance for your Year 2 students where 1 is assigned to the subject most important.
(Write in the boxes provided)

Health Education	☐	(53)
Physical Education	☐	(54)
Mathematics	☐	(55)
Science	☐	(56)
Language	☐	(57)

21 **What status do you believe is assigned by the Education Department of WA to teach the following subjects to Year 2 students?**
(Circle appropriate numbers; please answer for all topics)

	Voluntary	Highly Recommended	Mandatory	
Health Education	1	2	3	*(58)*
Physical Education	1	2	3	*(59)*
Mathematics	1	2	3	*(60)*
Science	1	2	3	*(61)*
Language	1	2	3	*(62)*

22 **Consider the following curriculum materials.**
(Circle appropriate numbers)

Please circle those you have seen.			If 'yes' how much have you used?			
	Yes	No	Most	Some	None	
WA K-10 Health Education Year 2 Teachers Guide Road Safety Lessons	1	2	1	2	3	*(63-64)*
Out and About	1	2	1	2	3	*(65-66)*
Main Roads WA materials	1	2	1	2	3	*(67-68)*
Police materials	1	2	1	2	3	*(69-70)*
Bike Ed (Police) materials	1	2	1	2	3	*(71-72)*
Bike West materials	1	2	1	2	3	*(73-74)*
Designated Safe Routes	1	2	1	2	3	*(75-76)*
Constable Care materials	1	2	1	2	3	*(77-78)*
Kangaroo Creek Gang materials	1	2	1	2	3	*(79-80)*
Other : please specify	1	2	1	2	3	*(81-82)*

23 For each of the following statements indicate how true it is for you.

(Circle one number for each question)

		Strongly Disagree	Disagree	Agree	Strongly Agree	Unsure	
.1	I prefer to be one of the first in my year level/school to try new materials.	1	2	3	4	5	(83)
.2	I enjoy being the first teacher in my school to try something new.	1	2	3	4	5	(84)
.3	I like to try things that I see on TV or read about.	1	2	3	4	5	(85)
.4	I'm always looking for something new for my class/es.	1	2	3	4	5	(86)
.5	If I don't know what to do, I ask someone to show me.	1	2	3	4	5	(87)
.6	Incentives such as stickers, pens, etc., would motivate me to consider teaching some new materials.	1	2	3	4	5	(88)
.7	I like to be the first to try a new program.	1	2	3	4	5	(89)
.8	It's important to me professionally to be first to try.	1	2	3	4	5	(90)
.9	I usually go along with my colleagues' recommendations about teaching materials.	1	2	3	4	5	(91)
.10	I prefer to try new materials after seeing other teachers successfully use them.	1	2	3	4	5	(92)
.11	I usually wait until some colleagues use a program to try it.	1	2	3	4	5	(93)
.12	I would wait until the Education Department required a program to be used before I would adopt it.	1	2	3	4	5	(94)
.13	I prefer to use traditional methods in my teaching.	1	2	3	4	5	(95)
.14	Pressure from others is the only reason I would use a new road safety program.	1	2	3	4	5	(96)
.15	I'm uncomfortable using materials I haven't used before.	1	2	3	4	5	(97)
.16	I prefer using materials I've used in the past.	1	2	3	4	5	(98)
.17	It's necessary for me to talk with someone who's already taught a program before I decide to teach it.	1	2	3	4	5	(99)
.18	I prefer to wait until an idea is thoroughly tested before adopting it.	1	2	3	4	5	(100)

For each of the following statements indicate how true it is for you.
(Circle one number for each question)

		Always	Sometimes	Never	
24	I modify lessons from resources to suit my students.	1	2	3	*(101)*
25	I am required to teach too many new programs.	1	2	3	*(102)*
26	I send home activities for students to do with their parents.	1	2	3	*(103)*
27	I contact health agencies for resources and information for my health education lessons.	1	2	3	*(104)*
28	I am asked to chair/lead committees at my school.	1	2	3	*(105)*

29 **Which of the following statements is MOST true for you about your use of a new teaching program, a new teaching strategy or a new teaching resource in any subject area in 1994?.**
(Circle one number)

Didn't try anything new in this category.. 1

Didn't try until required.. 2

Was among the last in my school to voluntarily try it........................ 3

Tried it along with many others in my school, after 4
watching a few other teachers successfully use it

Tried it after another teacher found/introduced it.............................. 5

Was the first in my school to try it.. 6

I have not been exposed to, nor found the need for, ... 7
any new programs, strategies or resources.

Can't Remember.. 8 *(106)*

HEALTH KNOWLEDGE

(Circle one number for each question)

		True	False	Don't Know	
30	The incidence of pedestrian injury is greatest in Western Australian children aged 0-4 Years.	1	2	3	*(107)*
31	Most children have neither the cognitive nor perceptual ability to cross the road safely on their own until they are aged10 years.	1	2	3	*(108)*
32	Pedestrian safety research has found boys generally cross the road more safely than girls.	1	2	3	*(109)*
33	The number of Western Australian children aged 5-9 years who have been killed or injured as a pedestrian has decreased in the last three years.	1	2	3	*(110)*
34	The most common statement made by children injured as pedestrians is that they didn't see the car.	1	2	3	*(111)*
35	Most children aged 5-7 years are able to judge a safe gap in traffic.	1	2	3	*(112)*
36	Children aged 5-9 do not need to practice crossing the road in real traffic situations because the road crossing knowledge they gain inside the classroom will transfer to behaviour outside the classroom.	1	2	3	*(113)*
37	A traffic drill like 'Stop, Look and Listen' should be rote learnt by children to enhance road crossing skills.	1	2	3	*(114)*
38	When standing at the edge of a road, a child aged 5-9 and an adult both have the same field of vision.	1	2	3	*(115)*
39	When a child aged 5-9 hears a car approaching he/she can determine the direction from which the car is coming.	1	2	3	*(116)*
40	When a child aged 5-9 sees a car in the distance they can always determine whether the car is moving or stopped.	1	2	3	*(117)*
41	Most children aged 5-9 assume cars can stop instantly.	1	2	3	*(118)*

SCHOOL PROFILE

42 Are you aware of any former student of your SCHOOL, or any of your previous SCHOOLS, that was killed as a result of being hit by a car?
(Circle one number)

Yes 1
No......................2 (119)

43 Are you aware of any former student of your CLASS,or any of your previous CLASSES, that was killed as a result of being hit by a car?
(Circle one number)

Yes 1
No......................2 (120)

44 Are you aware of any student of your school,or any of your previous schools, that was INJURED as a result of being hit by a car?
(Circle one number)

Yes 1
No......................2 (121)

45 Are you aware of any former student of your CLASS,or any of your previous CLASSES, that was INJURED as a result of being hit by a car?
(Circle one number)

Yes 1
No......................2 (122)

46 Who was primarily responsible for deciding that your school would be a part of the Child Pedestrian Injury Prevention Project?
(Circle one number)

Principal (alone)....................1
You (alone)....................2
Another Year 2 teacher (alone) 3
You and the other Year 2 teacher/s 4
Principal, you and other Year 2 teacher/s....................5
The whole school staff 6
Don't know....................7
Other: please specify....................8 (123)

____

Thank you for participating in this study.

Healthway
Project funded by
WESTERN AUSTRALIAN
HEALTH PROMOTION FOUNDATION

curtin
University of Technology
Perth Western Australia
School of Public Health

Appendix 26

Univariate comparisons between high intervention group teachers and moderate intervention group teachers

Characteristics of 1995 teacher cohort

Variable	High Intervention Group (n=31)	Moderate Intervention Group (n=30)	χ^2(df)	p value
	n(%)	n(%)		
Age [a]			0.03(1)	0.85
20-29	2 (6.9)	5 (16.7)		
30-39	8 (27.6)	7 (23.3)		
40 or older	19 (65.5)	18 (60.0)		
. missing	2	-		
Gender [b]				
Male	2 (6.5)	1 (3.3)		
Female	29 (93.5)	29 (96.7)		
Teaching status			1.7(1)	0.20
Full time	26 (83.9)	21 (70.0)		
Part time	5 (16.1)	9 (30.0)		
University education [a]			1.8(1)	0.18
Completed 3 years of university	16 (55.2)	20 (66.7)		
Completed 4 years of university	12 (41.4)	9 (30.0)		
Completed 5 or more years of university	1 (3.4)	1 (3.3)		
. missing	2	-		
Teaching experience			t=1.7	0.10
Mean(years)	16.28	12.90		
. missing	2	-		
Experience teaching grade two students			t=0.94	0.35
Mean (years)	7.14	5.79		
. missing	3	1		
Health education training in the last 5 years [a]			0.3(1)	0.59
0 hours	17 (60.7)	19 (65.5)		
1-3 hours	8 (28.6)	8 (27.6)		
4+ hours	3 (10.7)	2 (6.9)		
. missing	3	1		
Road safety training in the last 2 years [b]				
Yes	1 (3.4)	-		
No	28 (96.6)	30 (100.0)		
. missing	2	-		
Importance of pedestrian safety as a health topic for students [a]			0.98(1)	0.32
Most important health topic	13 (43.3)	11 (36.7)		
Second most important health topic	15 (50.0)	17 (56.7)		
Third/fourth most important health topic	2 (6.7)	2 (6.7)		
. missing	1	-		
Hours spent on pedestrian safety lessons last year			1.14(2)	0.57
Did not teach grade two students	12 (41.4)	9 (31.0)		
0 - 2.9 hours	6 (20.7)	5 (17.2)		
3 - 6 hours	11 (37.9)	15 (51.7)		
. missing	2	1		
Child pedestrian in his/her school killed			1.0(1)	0.32
Yes	12 (38.7)	8 (26.7)		
No	19 (61.3)	22 (73.3)		
Child pedestrian in his/her school injured [b]				
Yes	26 (83.9)	26 (86.7)		
No	5 (16.1)	4 (13.3)		

[a] Cells with low numbers collapsed for chi-square analyses
[b] Differences between groups not tested

Characteristics of 1996 teacher cohort

Variable	High Intervention Group (n=29)[c] n(%)	Moderate Intervention Group (n=35) n(%)	χ^2(df)	p value
Age			0.65(2)	0.72
20-29	7 (25.0)	9 (25.7)		
30-39	5 (17.9)	9 (25.7)		
40 or older	16 (57.1)	17 (48.6)		
. missing	1	-		
Gender[b]				
Male	1 (3.4)	4 (11.4)		
Female	28 (96.6)	31 (88.6)		
Teaching status			0.01(1)	0.95
Full time	23 (79.3)	28 (80.0)		
Part time	6 (20.7)	7 (20.0)		
University education[a]			0.01(1)	0.91
Completed 3 years of university	15 (51.7)	18 (51.4)		
Completed 4 years of university	14 (48.3)	15 (42.9)		
Completed 5 or more years of university	-	2 (5.7)		
Teaching experience			t=2.07	0.04
Mean (years)	11.59	15.91		
Experience teaching grade three students			t=0.39	0.70
Mean (years)	4.48	4.11		
Health education training in the last 5 years			2.9(2)	0.23
0 hours	17 (58.6)	15 (42.9)		
1-3 hours	8 (27.6)	9 (25.7)		
4+ hours	4 (13.8)	11 (31.4)		
Road safety training in the last 2 years[b]			0.31(1)	0.58
Yes	5 (17.2)	8 (22.9)		
No	24 (82.8)	27 (77.1)		
Importance of pedestrian safety as a health topic for students[a]			0.25(1)	0.62
Most important health topic	8 (27.6)	11 (32.4)		
Second most important health topic	17 (58.6)	18 (52.9)		
Third/fourth most important health topic	4 (13.8)	5 (14.7)		
. missing	-	1		
Hours spent on pedestrian safety lessons last year			0.68(2)	0.71
Did not teach grade three students	10 (35.7)	15 (44.1)		
0 - 2.9 hours	9 (32.1)	11 (32.4)		
3 - 6 hours	9 (32.1)	8 (23.5)		
. missing	1	1		
Child pedestrian in his/her school killed			0.16(1)	0.67
Yes	7 (24.1)	10 (28.6)		
No	22 (75.9)	25 (71.4)		
Child pedestrian in his/her school injured			0.09(1)	0.76
Yes	18 (62.1)	23 (65.7)		
No	11 (37.9)	12 (34.3)		

[a] Cells with low numbers collapsed for chi-square analyses
[b] Differences between groups not tested
[c] 2 non-respondents

Characteristics of 1997 teacher cohort

Variable	High Intervention Group (n=30)[b]	Moderate Intervention Group (n=32)[c]	χ^2 (df)	p value
	n(%)	n(%)		
Age[a]			0.30(1)	0.58
20-29	3 (10.3)	4 (12.5)		
30-39	8 (27.6)	6 (18.8)		
40 or older	18 (62.1)	22 (68.8)		
. missing	1	-		
Gender			2.8(1)	0.09
Male	4 (13.3)	10 (31.3)		
Female	26 (86.7)	22 (68.8)		
Teaching status			0.20(1)	0.65
Full time	24 (80.0)	27 (84.4)		
Part time	6 (20.0)	5 (15.6)		
University education[a]			1.97(1)	0.16
Completed 3 years of university	17 (58.6)	13 (40.6)		
Completed 4 years of university	11 (37.9)	19 (59.4)		
Completed 5 or more years of university	1 (3.4)	1 (3.3)		
. missing	1	-		
Teaching experience			t=0.53	0.60
Mean (years)	16.17	17.34		
Experience teaching grade four students			t=0.53	0.60
Mean (years)	5.03	5.32		
. missing	1	1		
Health education training in the last 5 years			1.6(2)	0.45
0 hours	15 (50.0)	11 (34.4)		
1-3 hours	8 (26.7)	12 (37.5)		
4+ hours	7 (23.3)	9 (28.1)		
Road safety training in the last 2 years			0.92(1)	0.34
Yes	7 (23.3)	11 (34.4)		
No	23 (76.7)	21 (65.6)		
Importance of pedestrian safety as a health topic for students			1.5(2)	0.47
Most important health topic	6 (20.7)	9 (28.1)		
Second most important health topic	19 (65.5)	16 (50.0)		
Third/fourth most important health topic	4 (13.8)	7 (21.9)		
. missing	1	-		
Hours spent on pedestrian safety lessons last year			2.61(2)	0.27
Did not teach grade four	16 (53.3)	12 (40.0)		
0-2.9 hours	8 (26.7)	14 (46.7)		
3-6 hours	6 (20.0)	4 (13.3)		
. missing	-	2		
Child pedestrian in his/her school killed			0.52(1)	0.47
Yes	11 (36.7)	9 (28.1)		
No	19 (63.3)	23 (71.9)		
Child pedestrian in his/her school injured			0.53(1)	0.47
Yes	21 (70.0)	25 (78.0)		
No	9 (30.0)	7 (21.9)		

[a] Cells with low numbers collapsed for chi-square analyses
[b] 8 non-respondents
[c] 2 non-respondents

Appendix 27

Univariate comparisons between high intervention group students and moderate intervention group students

Characteristics of the student cohort by study condition

Variable	High Intervention Group n=535	Moderate Intervention Group n=514	χ^2 (df)	p value
	n(%)	n(%)		
Gender			2.52(1)	0.11
Male	275 (51.4)	239 (46.5)		
Female	260 (48.6)	275 (53.5)		
Age				
(mean years at baseline)	6.43	6.43		
Socio-economic status [a]			90.62(2)	0.00
Low	108 (20.2)	245 (47.7)		
Middle	208 (38.9)	116 (22.6)		
High	219 (40.9)	153 (29.8)		
Exposure to the road environment			1.05(3)	0.49
Mode of transport to school (on most days at baseline)				
Walk	144 (27.0)	138 (27.2)		
Bike	50 (9.4)	39 (7.7)		
Car	307 (57.6)	301 (59.4)		
Bus	32 (6.0)	29 (5.7)		
.missing	2	7		
Proportion of students crossing 1 or more roads alone each day (% at baseline)	41.6	38.2		

[a] Based on tertiles of postcode level 1991 Western Australian census data for the Index of Relative Socio-economic Disadvantage of the student's school postcode

Appendix 28

Response rates for high intervention group students and moderate intervention group students

Response rates of the student cohort by study condition. N (percent of baseline respondents)

	Baseline	Post-test 1995	Post-test 1996	Post-test 1997	Longitudinal Cohort
Longitudinal cohort students surveyed	n=1571	n=1531	n=1402	n=1211	n=1531
High Intervention Group	764	700 (92%)	610 (80%)	535 (70%)	535 (70%) [a]
Moderate Intervention Group	767	702 (92%)	601 (78%)	514 (67%)	514 (67%)[a]
Total	1531 (97%)	1402 (92%)	1211 (86%)	1049 (86%)	1049 (69%)[b]

[a] Percent of baseline respondents who responded at all post-tests by experimental group

[b] Percent of baseline respondents who responded at all post-tests

Appendix 29

Spearman's rank correlation coefficients among 17 implementation variables

Spearman's rank order correlations among completeness and *fidelity* implementation variables 1995 -1997 (* p<0.05 ** p<0.01)

	WORK SAMP Core *n=192*	WORK SAMP Home *n=192*	WORK SAMP Core, home *n=192*	LOG Core *n=179*	LOG Home *n=179*	LOG Proc-essing *n=179*	LOG Optio-nal *n=179*	LOG Core, home *n=179*	LOG Core, home, proc. *n=179*	LOG Core, hm,pro, option *n=179*	S.R. Meth 1 *n=99*	S.R. Meth 2 *n=99*	*OBS Fidel.* *n=121*	*OBS Teach. style* *n=121*	*LOG Real road prac.* *n=112*	*LOG Simul-ated prac.* *n=112*	*S.R. Fidelity* *n=158*
WORK SAMPLES Core	1.00	0.48**		0.32**	0.14**	0.29**	0.28**	0.26**	0.28**	0.29**	0.23**	0.34**	-0.07	0.13	0.07	0.14	0.15
WORK SAMPLES Home		1.00		0.48**	0.51**	0.45**	0.36**	0.51**	0.51**	0.46**	0.30**	0.40**	-0.02	0.11	0.17	0.26**	0.16*
WORK SAMPLES Core, home			1.00	0.47**	0.37**	0.41**	0.37**	0.45**	0.45**	0.43**	0.27**	0.39**	-0.08	0.11	0.13	0.26**	0.19*
LOG Core				1.00	0.77**	0.66**	0.56**				0.32**	0.34**	0.14	0.17	0.01	0.46**	0.22**
LOG Home					1.00	0.63**	0.61**				0.26*	0.29**	0.07	0.14	0.09	0.39**	0.15
LOG Processing						1.00	0.74**	0.66**			0.46**	0.50**	0.07	0.12	0.01	0.48**	0.22**
LOG Optionals							1.00	0.57**	0.72**		0.51**	0.50**	0.02	0.22**	0.28**	0.29**	0.26**
LOG Core, home								1.00	0.88**		0.31**	0.33**	0.10	0.15	0.02	0.47**	0.20*
LOG Core,home,proc									1.00		0.42**	0.45**	0.08	0.15	0.02	0.52**	0.24*
LOG Core,hm,proc,opt										1.00	0.51**	0.52**	0.08	0.19**	0.14	0.44**	0.29**
SELF REP Method 1											1.00		0.06	0.28*	0.16	0.26**	0.20*
SELF REP Method 2												1.00	0.05	0.29*	0.10	0.33**	0.20
OBSERVED Fidelity													1.00	0.51**	-0.01	0.12	0.10
OBSERVED Teach Style														1.00	-0.07	0.25*	0.11
LOG Real road practise															1.00		-0.02
LOG Simulated road prac																1.00	0.01
SELF REPORT Fidelity																	1.00

Note: Correlations between individual variables (eg: log core) and their composites (eg: log core, home) have been excluded from the table.

Appendix 30

Distribution of dependent variables for high intervention group students and moderate intervention group students

Distribution of student cohort dependent variables at baseline and post-tests by study condition

Variable	High intervention group n=535	Moderate intervention group n=514
Pedestrian Safety Knowledge		
Score out of 10; Mean (sd)		
Baseline value	6.07 (1.80)	6.10 (1.79)
Post-test 95	7.79 (1.37)	7.70 (1.44)
Post-test 96	8.27 (1.20)	8.25 (1.36)
Post-test 97	8.16 (1.07)	8.26 (1.02)
Change in variable from baseline to post-test 97	2.09 (1.94)	2.15 (1.92)
Road Crossing Behaviour		
0 - greatest risk to 3 - lowest risk; Mean (sd)		
Baseline value	1.99 (1.03)	2.01 (1.01)
Post-test 95	1.90 (1.03)	1.97 (1.05)
Post-test 96	1.81 (1.05)	1.87 (1.05)
Post-test 97	1.36 (1.12)	1.51 (1.12)
Change in variable from baseline to post-test 97	-0.63 (1.26)	-0.49 (1.34)
Road Playing Behaviour		
0 - greatest risk to 3 - lowest risk; Mean (sd)		
Baseline value[a]	2.03 (0.84)	2.18 (0.74)
Post-test 95[b]	2.12 (0.85)	2.25 (0.73)
Post-test 96[a]	1.92 (0.88)	2.18 (0.80)
Post-test 97[a]	1.52 (0.96)	1.92 (0.92)
Change in variable from baseline to post-test 97[a]	-0.52 (1.17)	-0.27 (1.10)

Unadjusted means

[a] Significant differences between high and moderate groups $p < 0.01$

[b] Significant differences between high and moderate groups $p < 0.05$