

Road Safety Education and Training – An Alternative Perspective

Gayle Di Pietro¹; Linda Ivett¹ (Presenter)
¹VicRoads

Biography

Linda Ivett joined VicRoads from the Department of Education where she held a variety of positions as a teacher. In her early years with VicRoads as a Road Safety Education consultant Linda was responsible for development and delivery of road safety and education technology transfer programs to teachers, senior managers and road safety professionals. In recent years this focus has expanded to include local government professionals and both education and road safety professionals in Asia and the Pacific. She has managed the development of key Road Safety Education resources and programs for schools and local government such as *Starting Out Safely* and the national *Bike Ed* and the evaluation of *Safe Routes to Schools*. In her current position as Manager, Vulnerable Road Users Linda is responsible for strategic planning and program management of the Victorian Road Safety Education school's program and Victoria's pedestrian and motorcycle safety programs including the \$3.4 million Transport Accident Commission (TAC) funded motorcycle safety program.

Abstract

It has been stated that from a public health perspective, road safety education and training seem to be largely ineffective and divert funds, resources and attention away from better-based and more effective countermeasures. It has also been stated that road safety professionals and governments need to be more questioning of the worth of educational and training approaches and have the courage to say 'NO' to advocates, lobbyists and politicians who want to expend road safety funds and resources on unproven education and training programs (Christie 2002).

However, the contribution of road safety education and training as a road safety countermeasure should not only be evaluated against immediate outcomes relevant to the public health agenda, but also against the future requirements of maintaining positive health outcomes. Education and training play a vital role in preparing road users by developing skills and understandings and providing real world experiences which over time, enable them to make safe and responsible choices as road users; to contribute to the development of a 'road safety culture' in the community and set the scene for further initiatives to be introduced. These are surely legitimate uses of road safety funds.

Whilst it is sensible to fund countermeasures which will rapidly reduce the road toll, it is equally important that adequate funding also be allocated to education and training as part of a longer term strategy. The current emphasis in favour of engineering solutions and the focus on speed management cannot be denied, and is certainly a major priority. These measures will certainly have a positive impact on road trauma in the present, but they will do little to teach young people today and in the future, the knowledge, skills and attitudes that will influence them to behave safely on our roads. Whilst an engineering focus accepts the responsibility of creating a safe road environment, it is equally clear that such an environment is still a long way from being realised. In these circumstances, a reasonable balance between engineering, enforcement and education should be maintained. It should also be acknowledged that the National Road Safety Strategy 2001-2010 and the National Road Safety Action Plan clearly articulate the role of education and training with specific reference to the preparation of road users.

The road safety education and training literature cites numerous examples of programs that demonstrate positive road safety outcomes. This paper will discuss these examples with a particular emphasis on the role of parents as educators and role models. The considerable body of research, which describes the road safety benefits of practical, supervised training of young children, will also be addressed.

1. BACKGROUND

Road traffic injuries constitute a major public health problem.

Across the world they are the leading cause of death by injury, the 10th leading cause of all deaths and the 9th leading contributor to the burden of disease worldwide. (WHO p.1)

In Australia there have been over 163,00 fatalities on the road. In addition to the burden of personal suffering, the monetary cost of crashes has been estimated to be in the order of 15 billion dollars per annum. (The National Road Safety Strategy. P1)

Useful solutions to the road trauma problem originate in several realms, including public health, medicine, education, environmental planning, engineering and enforcement. Yet the road safety problem is often seen as the concern of transport agencies, rather than public health agencies.

Whilst some funding bodies and stakeholders are not advocates of road safety education there are others who endorse the role that education can play in reducing the deaths and injuries that are a result of road trauma.

- WHO, 2001, urges “the development of a multi-disciplinary national strategic plan within countries by strengthening capacity, collection of data, research, training, and the development of road traffic injury prevention interventions. (p.15)
- The World Bank (2003), states that one of the most important groups who have a role to play in reducing road crashes is the education sector who can: *make a formal commitment to promote effective Road Safety Education in schools and pre-schools so that appropriate behaviour is fostered from an early age; develop links between schools and other agencies, such as the police, in relation to road safety; and assist in the life-long education of road users.* (p. 1). The World Bank also urges the individual road user to attain a greater understanding, awareness, and practice of safe behaviour and skills; and to make a personal commitment to improve road safety by adopting more courteous and considerate road behaviour and demonstrating care for the safety of others. (p. 4)
- From the Australian Transport Council “*Young road users need to be educated in road safety in order to develop the knowledge and attitudes that lead to responsible behaviour on the road. This process includes parents, school based programs and novice driver training.... The behaviour of experienced road users will be improved through an on-going series of co-ordinated public information initiatives.*” (p.5)
- The Victorian *Arrive Alive* strategy identified seventeen key challenges and proposed ways to address each challenge in an integrated way, including “*Conduct promotional and educational campaigns, in order to influence and modify road users’ behaviour.*” “*Many of the road safety initiatives will be delivered through strengthened partnerships with businesses, schools, local government and the general community.*”

Perhaps the purpose and contribution that road safety education can make is not well understood by its critics. Road safety education of itself does not have within its aims to

reduce road trauma. Rather, the aim of road safety education is to deliver developmentally appropriate education that prepares children and young people to become safe and independent road users. The achievement of this is undertaken through pre-schools, primary and secondary schools and a variety of community settings. It is one strategy or approach within a broader range of strategies or interventions that combine to address road fatalities and injuries.

2. ENGINEERING, EDUCATION AND ENFORCEMENT – A COMBINED SOLUTION

The road safety problem arises because people are interacting with their physical environment – roads, cars, buses, and other road users – under complex conditions and with human vulnerabilities. For a larger part of the twentieth century, society considered injuries to be random, chance events, or “accidents” which could not be predicted or prevented. We now know that road trauma is a preventable public health problem.

During the 1970s much work was undertaken to identify and understand the contributing factors to road crashes. According to Treat, 1979, the human contribution to crashes accounts for about 90%, the road environment between 20% and 30% and vehicle factors for between 3% and 10 %, and of course many of these factors combine.

Treat, 1979, and Haddon, 1981, stated that reliance on any one approach to address the road injury problem is not useful or effective. What will work best is using a number of interventions or prevention strategies over different time frames and from each of the different fields – education, engineering and enforcement. In each field there needs to be strategies that work in the short term, medium term and the long term.

Most risk reduction strategies involve a component of behaviour change. Even some engineering solutions will not result in health improvements unless people are willing to, and know how to, change their behaviour. Long-term behavioural change implies a voluntary change in behaviour, and to do this education is the key strategy.

There needs to be a recognition and acceptance that behaviour change programs (which are primarily educational programs) take a long time to automate the desired behaviour and to address relapses. If evaluators are anticipating seeing comparable, immediate and entrenched change in all participants then they may be disappointed. If they are measuring the effectiveness of behaviour change programs with the same measures used to evaluate the effectiveness of enforcement or engineering interventions then this is not appropriate.

Like education, engineering treatments alone are not the solution to the road trauma problem.

In response to increasing motor vehicle demands, transportation agencies have emphasised designing and building roads and have directed large sums towards it. Our road systems have multiple objectives and are used by different types of users and for different purposes some of which are, at least in part, incompatible. Issues that have arisen because the vehicle has been favoured ahead of the pedestrian or cyclist include:

- So that traffic can move efficiently pedestrian crossings are spaced too far apart which encourages mid block crossing
- Intersections may be too wide for a child or the elderly to cross in time
- Some streets lack footpaths, there may be no safe shoulder on rural roadways or insufficient consideration of the needs of pedestrians and cyclists in new medium density living housing developments
- In relation to children walking to school – roads are designed more for the car than for pedestrians or cyclists and are perceived as dangerous by parents who drive their

child – thus increasing the complexity and congestion of the school drop-off point or make unsafe driving manoeuvres in the area.

3. WHY IS THE CONTRIBUTION THAT ROAD SAFETY EDUCATION MAKES NOT ALWAYS RECOGNISED?

Despite any evidence of success to improve health and injury outcomes, providers of road safety education programs continually have to argue for their existence or continuance.

Possible reasons for this are:

1. The long-term focus of prevention education programs does not fit the short-term requirement for political priorities. (Hawe 2002, Toumbourou 2002). With annual budgets that can't be rolled over, and with fixed terms for governments, short-term outcomes need to be shown for any investment before the end of their term or the end of the financial year. Modifying human behaviours, which is the focus of road safety education, takes a long time.

2. Public opinion often requires immediate responses to immediate problems. Where community awareness is lacking it may be difficult to link investment in childhood and adolescence with the 'downstream' social problems that prevention investment aims to reduce (Toumbourou 2002 p.7). There is growing evidence that early intervention pays economic, social and health benefits in the long term.

3. The measures used to determine the effectiveness of Road Safety Education programs are not, (and should not be), the same as the measures for engineering or enforcement initiatives. The nature of learning and application of learnings means that the effect of an educational program may in some cases be immediate and in others, long term. Traditional measures of road safety interventions usually rely on qualitative measures, whereas contemporary measures of road safety education programs utilise a combination of qualitative and quantitative measures. The question is - if you can't immediately and simply count it does it mean it hasn't worked?

The debate continuously arises concerning the relative value of road safety education and skills training versus engineering modifications. Is it an either-or proposition? Schrieber and Vegega (2002) reported on such a debate at a recent multi-disciplinary road safety conference in Atlanta.

Although some health educators and psychologists acknowledge that classroom education has not been particularly successful in improving pedestrian safety behaviour among young children they recognise that skills training has some merit – particularly at the roadside. Schrieber and Vegega (2002), report that crashes between child pedestrians and motor vehicles decline after classroom education, but the degree of pedestrian behavioural change was not large. By comparison, correct behaviours for certain road crossing skills had increased up to 40%-70% among children exposed to skill training interventions in the United Kingdom and to 30% -50% of lower elementary children exposed to such training in the United States.

The counter view is that no single educational program has demonstrated sufficient impact on the majority of students to merit endorsement and widespread dissemination. Road safety education programs have modest and limited benefits, and that "even after training, young children remain at substantial risk for pedestrian injuries" (Klassen et al (2000) cited in Schrieber et al (2002)). This is largely the case because for pedestrians, and particularly child pedestrians, the margin of error is so small. A consequence of this is to abandon any attempt to educate or train children in street crossing, and in its place make roadway changes and enforce pro-pedestrian laws.

In the end it is likely that a combination of educational and engineering measures will be needed. Cross disciplinary discussions need to relate and compare findings of interventions, including strengths and limitations of each type of program, and help each other to improve them. We need to accept that no educational, or environmental or enforcement intervention in itself is a sufficient solution to reduce death and injury on the roads.

It is not always easy to assess the effects of injury prevention initiatives, because of the difficulty of ascribing any change in population health or statistical evidence to a particular intervention. In the case of road safety outcomes, there may be a number of concurrent engineering and enforcement initiatives and education programs that contribute to the outcome. It is the synergy between a number of approaches or safety initiatives that reduces the risk exposure of children and young people and keeps road users safer. Remove one initiative, and the outcome may be quite negative. There is also the added constraint that to be effective, each approach may require different time periods between the intervention or program and the expected change in the population's health and injury rates.

4. EDUCATION – PART OF THE SOLUTION

Even if we had the most perfect road system or the most forgiving environment that separates different kinds of traffic and minimises conflict, we would still have to educate roads users about how it works, their role as a pedestrian, cyclist, motorcyclist, driver or public transport user, and the skills, and knowledge required to be safer. Through public education campaigns, we would also need to inform the travelling public about the penalties of misuse – including the financial, physical, social and emotional consequences. No matter how well the road environment is engineered the following facts will always remain the same:

- no-one is born knowing how to use the system
- the transport system and road environment that children inherit will still be complex and inherently dangerous
- the skills individuals need to manage even the perfect traffic environment would still be perceptual and motor skills and it takes years to reach competency in these skills
- there are some social, cultural, emotional and lifestyle factors over which the individual has little control or when they have choices they do so in an unsafe and anti-social way
- there will always be a need for modelling, supervision and training of children by parents and others, as they are the first points of contact between the child and the road environment.

For the road system to work perfectly there would need to be willingness on the part of all road users to comply and contribute appropriately. We need to bring about a change in the culture so that travelling around safely and courteously is desirable and the norm. Culture change is possible, as we have seen with drink driving.

Thomson, 1996, argues:

Children need a range of fundamental skills in order to interact with traffic, together with the ability to deploy these strategically in different traffic situations. To acquire and implement such skills requires a focussed and targeted training program and the training of road user skills should be practical in nature.

Unfortunately, there seems to be a widespread view at present that education has not achieved as much as had been hoped and that there may even be quite strict limits to what can be achieved through education. This would, of course, shift the emphasis away from education altogether and towards engineering or urban planning measures aimed at creating an intrinsically safer environment in which the need for education might be reduced or even eliminated. However, whilst engineering measures undoubtedly have a major role to play in the effort to reduce accidents, this outlook is

both overly optimistic about the benefits of engineering and overly pessimistic about the limitations of education. (Thomson, 1996 p.1)

Elliott's (1999) review of best practice in road safety education, and the work of Thomson, 1996, reinforces the importance of practical roadside training and the critical role of parents as both models and mentors. Parents and caregivers are recognised as the primary road safety models for their children as children begin learning about road use from the moment their capsule is bolted into the car or they are strapped into their pusher for a walk. Children observe their parents as drivers, passengers, pedestrians (or cyclists). They will imitate the adult behaviours and deduce norms that they see and are told. This road use modelling will influence their own behaviours when they themselves become independent road users and parents/models themselves.

Road safety education programs need to target parents and carers. Creating a positive parental role within the road safety education framework is helpful to the child's internalisation of key information and positive road safety behaviours. Parental involvement in road safety education may also influence the parents themselves to become better role models for road safety (e.g. wearing a seat belt, not speeding, refraining from reckless driving). Safety preparedness programs are more likely to be effective when parents are involved, (Elliott 1999, Thomson et al, 1996).

Rivara et al (1991) cautions that parents may not know what to teach, or may even overestimate a child's ability to negotiate traffic. To undertake road safety training parents need to be provided with, and supported to deliver, the training and skills required. Parents need to:

- understand the developmental issues that arise for road users and that teaching and training should be consistent with the developmental level of the child
- recognise that children and young people learn at different rates and have different preferred learning styles
- understand that a time lag may exist between experience and skills development.
- know that children younger than the age of seven or eight should be accompanied by an adult when crossing the street
- learn that education should be based on practical training in a realistic road environment such as training in crossing streets, crossing near parked cars and crossing at intersections.

Despite the early and continuous work undertaken by parents it is important that children also receive road safety education as part of a school curriculum to both reiterate and confirm earlier learnings, and also to offer a range of perspectives from peer-led or student centred programs. Road Safety Education programs contribute to the central purpose of schooling, which is to educate young people and prepare them for living and working in the world around them. School based road safety education is not only about individual preferences, but also about how communities and societies shape and assist new road users to manage the road and transport system safely.

Most classroom based road safety education in the past has taken place with the aim of increasing children's knowledge about traffic and their attitudes towards safety. The assumption was that, by building their knowledge of managing traffic and encouraging appropriate attitudes toward safety, children would be able to generalise what they learn in the classroom to real life traffic situations. But knowledge alone is not enough, and attitudes arise out of family and culture experiences and cannot be easily changed in a short period.

School based road safety education programs should promote the development of physical and psychological skills and their application in a variety of traffic contexts. Unlike knowledge based methods that may change a child's attitude or ability to correctly answer

questions about road safety, practical skills training methods will lead to measurable changes in children's behaviour in traffic, particularly in the short and medium term. They will improve children's judgement, increase their ability to cross at parked cars and intersections, help them to learn to time crossings better and plan safer routes, and reduce their roadside impulsivity.

Thomson cites many successful road user skills training programs – for example, improving the ability to make road side timing judgements (Lee et al., 1984; Demetre et al., 1992); find safe places to cross (Amfo-Boateng et al, 1991); plan safe routes (Thomson et al., 1992); cross at parked cars (Rothengatter, 1981); and cross safely a junctions (Rothengatter, 1981). Additionally, one of the key goals of road safety education programs should be to create a social environment where safety and safety practices are a high priority and the norm.

Effective road safety educational programs need to be based on a developmentally appropriate curriculum, be well resourced, and integrated within a wider sector of ongoing intervention and harm minimisation activities, and they require clear and explicitly stated objectives.

5. COSTS AND BENEFITS OF DIFFERENT INTERVENTIONS

Decision-makers begin the policy debate about funding priorities with information about which interventions would yield the greatest possible improvements in population health for the available resources.

To answer key policy questions on the effectiveness of road safety initiatives, it would be necessary to compare the cost and effectiveness of interventions to the situation that would exist if they were not conducted.

Public health practitioners would agree that several factors influence the cost effectiveness of education programs. These measures are not the same as those applied to engineering or environmental interventions. Cost effectiveness analysis can be, and is, undertaken in many ways.

There are two broad approaches to reducing risk. The first is to focus the intervention on the people likely to benefit, or benefit most from it. The second is to seek to reduce risks in the entire population regardless of each individual's level of risk and potential benefits. In some cases both approaches are used at the same time. Some risks can be reduced relatively easily, at low cost, and others cannot. The same interventions can be very cost effective and some not cost effective at all in different settings and with different groups.

Effective risk reduction and injury prevention strategies are generally based on a combination of interventions rather than just one approach. The combination is found to be most effective. As an example, *Safe Routes To School* is a local community-based road safety program that includes education and low cost engineering treatments to deal with road safety issues confronting children in their local area. In the first stage, through community consultation, surveys and/or observations the problem and the extent of it are established. The problem or issue is next addressed through the development of an Action Plan. Following this, the installation of local, low cost road environment improvements and focussed educational programs – to the whole of the school community, including parents, is implemented. According to Corben, 2003, in Victoria where a *Safe Routes to School* program has been implemented there has been found to be a reduction of 17.9% in casualty crashes involving school aged pedestrians and cyclists during school travel hours, and 12.6% at all times. Further, it has been found that there is a decrease of 4.8% in crashes involving all road users at school travel times.

The effect of conducting all interventions at the same time, such as in the *Safe Routes to School* program, might be more than would be expected by adding the benefits of conducting each intervention singly. The effect of conducting one without the other may be difficult to measure. Further, you would need to establish what effect removing one of these interventions would have on the success in the long term.

It is unlikely that an engineering or enforcement treatment has ever been introduced without some flow on education, for example the introduction of speed interventions in local streets would be accompanied by a education initiative that outlines the reasons why such an intervention is necessary. The point of entry for the education would depend on the engineering treatment being implemented. The problem is that we rarely have a comparison community where a single initiative can be measured for its effectiveness.

Engineering interventions often have a single purpose and are easily measured for success or failure, where-as school education interventions address multiple risk factors over different time frames. For instance in a sequential and continuous program, such as *RoadSmart*, children will learn different things about the road environment, for example, where dangers come from, how to manage dangers and the skills for crossing roads. In the early years it would be difficult to measure the effectiveness of this educational approach, because much of the workload associated with using the road is taken up by the accompanying adult. Further, the program is long term, multi-faceted, and builds continuously upon earlier learnings. The effectiveness of such a program may not be apparent until young people are independent road users.

If we recognise that interventions operate over different time frames, it may also be important to fund road safety programs over different time frames to address these variances and in particular to accommodate the long term, sequential nature of educational programs.

When determining how road safety funds should be spent, there is a need for well resourced education of road users, but particularly of the young in order to ensure adequate preparation of the skills, knowledge and behaviours for independent road use. Any reduction in children and young people's access to road safety education may constitute issues of equity and be leaving road use up to 'trial and error', a potentially deadly way to learn.

6. IN CONCLUSION

Strategically, there are a number of good reasons for undertaking road safety education, including:

- Achieving long term safe road use practices,
- Assisting short term enforcement strategies, such as drink drive or speeding campaigns
- Achieving maximum use of safety facilities, such as pedestrian crossings and bicycle paths
- Achieving maximum application or use of safety equipment, such as seat belts and helmets
- To contribute to the development of a 'road safety culture' in the community.

The challenge and responsibility of reducing risks and dangers on the road need to be shared by individuals, whole populations and their governments. The wisdom, skills and input of engineers, enforcers and educators are equally important.

Road Safety Education programs contribute to the central purpose of schooling, which is to educate young people and prepare them for living and working in the world around them. School based road safety education is not only about individual preferences, but about how communities and societies shape, and respond to, a serious, enduring social problem.

We need to reduce the risks to children and young people when using the road environment.

We can commence this by developing and implementing strategies that teach adults the normal expected capabilities and vulnerabilities of children in different demographic groups.

We need to be prescribe the norms for adult supervision of children in different traffic environments

We need a comprehensive taxonomy of the skills and competencies children and young people need to interact safely with traffic

We need to identify the skills that are trainable, their optimal training conditions, and target groups.

And finally.

We must be doing something right – as most young people make most journeys safely, and most do not kill or injure others.

Is this an outcome of education, enforcement or engineering? How can we really tell?

Bibliography and background references

Australian Institute of health and Welfare. (2002) National Public Health Expenditure Report 1999-00. http://www.aihw.gov.au/expenditure/public_health.html

Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Prentice-Hall: Englewood Cliffs, N.J.

Ampofo-Boateng K, and Thomson, JA, (1991). Children's perception of safety and danger on the road. *British Journal of Psychology*, 82, 487-505

Bandura, A. (1986) *Social foundations of thought and action; A social cognitive theory*. Prentice Hall: Englewood Cliffs, N.J.

Becker, M. (1974) The health belief model and personal health behaviour. *Health Education Monographs*, 2, pp. 324-508

Cairney, P. (2001) *What makes a Successful Community Road Safety Project*. ARRB Transport Research.

Clayton, A. (1998) *16+ Education*. Paper presented to the Road Safety Education Conference York. UK.

Christie, R. (2002) *Road Safety Education and Training From a Public Health Perspective*. Paper presented at the Road Safety Research, Policing and Education Conference. Adelaide

Corben, B. (2003)

Demetre JD, Lee DN, Pitcairn TK, Grieve R, Thomson JA, and Ampofo-Boateng K, (1992) Errors in young children's decisions about traffic gaps: Experiments with roadside simulations. *British Journal of Educational Psychology*. 83, 189-202

Department of Human Services. Victorian Government (2002) *Measuring Health Promotion Impacts: A Guide to Impact Evaluation in Health Promotion*. Melbourne Victoria

Elliott, B. (1999) *The Traffic Safety Education of Pre-School Children: An Extensive Review of Best Practice From Around The World*. A report prepared for VicRoads.

Glanz, K. and Rimer, B.K. (1995). *Theory at a glance: A guide for health promotion practice*. Bethesda, MD: National Institute for Health, National Cancer Institute.

Grzebieta, R. (2003). Presidents report. *Australian College of Road Safety. Quarterly Report. July 2003*.

Haddon, W. Advances in the epidemiology of injuries as a basis for public policy. *Public Health Rep* 1980;95:411-21

- Job S, Hatfield J, Hesketh B. (2003) *The development of messages and experiences to reduce road-related illusory invulnerability and risky driving, for school aged children and young children.*
<http://www.psych.usyd.edu.au/HumanFactors/DrivingSimulatorCurrentResearch.html#risk%20&%20Young%20Driver>
- Johnston, I. (2001) *Will a 4WD Strategy Work in the Shifting Sands of Policy?* Paper presented to the Road Safety Research Policing and Education Conference. Melbourne.
- Klassen TP, MacKay JM, Maher D, et al. Community-based injury prevention interventions. *The future of children: unintentional injuries in children.* Los Altos, CA: David and Lucile Packard Foundation. 2000; 10: 83-110.
- Lee DN, Young DS, and McLaughlin CM (1984) A roadside simulation of road crossing for young children. *Ergonomics*, 17, 319-330
- Munro, G. (1997) *School-based drug education: realistic aims or certain failure.* Paper presented at a seminar convened by the Centre for Youth Drug Studies at the Australian Drug Foundation, Melbourne, and at the International Conference on the Reduction of Drug Related Harm, Paris, 1997
- Murnane A, Snow P, Farrington F, Munro G, Midford R, Rowland B. (2002) *Effective Implementation Practice in Relation to School Drug Education.* National School Drug Education Strategy.
- Oldenburg, B., Glanz, K. and French, M. (1999) The application of staging models to the understanding of health behaviour change and the promotion of health. *Psychology and Health*. 1999, Vol. 14, pp. 503-516
- Pless L, Verrault R, Tenina S. (1989) A case-control study of pedestrian and bicyclist injuries in childhood. *American Journal of Public Health*. 1989; 79; 995-8
- Pless IB, Peckham CS, Power C. (1989) Predicting traffic injuries in childhood: a cohort analysis. *Journal of Paediatrics*. 1989 115: 932-8
- Prochaska, J.O. and Di Clemente, C.C. (1992) Stages of Change and the modification of problem behaviours. In M. Hersen, R.M. Eisler and P.M. Miller (Eds), *Progress in behaviour modification*. Sycamore: Sycamore Press.
- Renner, B. (2001) *Assessment of Health Behaviours.* International Encyclopaedia of the Social and Behavioural Sciences. Elsevier Science Ltd.
- Rivara, FP, Booth CL, Berman, AB, et al. Prevention of pedestrian injuries to children: effectiveness of a school training program. *Paediatrics* 1991; 88:770-5)
- Rothengatter JA, (1981a) *Traffic Safety Education for Young Children.* Lisse. Swets and Reitlinger
- Rothengatter JA, (1981b) The influence of instructional variables on the effectiveness of traffic safety education. *Accident Analysis and Prevention*. 13, 241-243
- Sallis, J.F. and Nader, P.R. (1988). Family determinants of health behaviours. In D.S. Gochman (ed) *Health behaviour: Emerging research perspectives*, pp. 107-119. New York: Plenum Press.
- Sanci, L., Toumbourou, JW., San, V., Rowland, B., Hemphill, S., Munro, G. (2002) *Drug Education approaches in secondary schools.* Drug Info Clearinghouse. Number 3. November 2002.
- Schofer, JL, Christofel KK, Donovan et al. Child Pedestrian injury taxonomy based on visibility and action. *Accident Analysis and Prevention* 1995; 27:317-33
- Schrieber R, and Vegega M. (2002) Education versus environmental countermeasures. Is it really an either-or proposition? *Injury Prevention*. 2002. 8; 10-11
- Schrieber and Vegega , eds (2002) *Reducing childhood pedestrian injuries: proceedings from a multidisciplinary conference US Public Health Service.* Atlanta, GA: Centres for Disease Control and Prevention.
- Smith, K. (2001) *The Design and Evaluation of Road Safety Publicity Campaigns.* Ross Silcock Limited.
- The National Road Safety Strategy. 2001-2010. Australian Transport Council.

- Thomson JA, Ampofo-Boateng K, Pitcairn T, Grieve R, Lee DN, and Demetre JD. (1992) Behavioural group training of children to find safe routes to cross the road. *British Journal of Educational Psychology*. 62, 173-183
- Thomson, JA, Tolmie, A., Foot, HC., McLaren, B. (1996) *Child Development and The Aims of Road Safety Education: A Review and Analysis*. Road Safety Research Report No. 1, Department of Transport, UK
- Toumbourou, JW. (2002) *Drug prevention strategies: A developmental settings approach*. Drug Info Clearing House Number 2. September 2002.
- Treat JR, Tumbas NS, McDonald ST, Shinar D, Hume RD, Mayer RE, Stanisfer RL and Castellan NJ. (1979) *Tri-Level Study of the Causes of Traffic Accidents. Vol 1" Causal Factor Tabulations and Assessments*. DOT HS 805085 Washington DC. US Department of Transport. National Highway Traffic Safety Administration.
- VicRoads. (2002) *Starting Out Safely. Early Childhood Education Program*.
- World Bank. (2003) *Roles and Responsibilities of Different Organisations in Tackling Road Safety*.
www.worldbank.org/html/fdp/transport/roads/safety/htm
- World Health Organisation (2001) *A 5-Year Strategy for Road Traffic Injury Prevention*. WHO Geneva
- World Health Organisation. (2002) *World Health Report 2002*. Geneva: WHO

Keywords

Education, child, road safety, behaviour, training