



# ***The Big Five Road Safety Measures***

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What works in road safety:  
A behavioural perspective

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# Scope of Presentation

- Background & context
- Road user behaviour : why is it important to road safety?
- What forms or supports behaviour?
- Can behaviour be changed or modified?
- What works in changing road user behaviour
  - what do we mean by “work”?
  - what seems to work
  - what doesn't seem to work
- What can be done
- Words of wisdom about road user behaviour
- Conclusions & Big Five

# Context: Mechanisms for Making Road Safety Work

- Reductions in Australian road deaths & injuries have resulted from multi-action approach at national, state & local level over last three decades. Main features have been
  - **Planning & conceptualisation of road safety issues, combined with research & evaluation of initiatives**
    - use of conceptual tools such as Haddon's matrix to target human, vehicle and environmental factors
    - identifying, applying & expanding what works
    - discarding what doesn't work
  - **Application of the "3 E's" at national, state & local level**
    - Education
    - Enforcement
    - Engineering
  - **Bi-partisan political support, generation of willingness to pay & community support**

# Haddon's Matrix

(after Haddon, 1968)

## Factors

Phase	Human Factors	Vehicle Factors	Environmental Factors
Pre-event (crash)			
Event			
Post-Event			

Note:

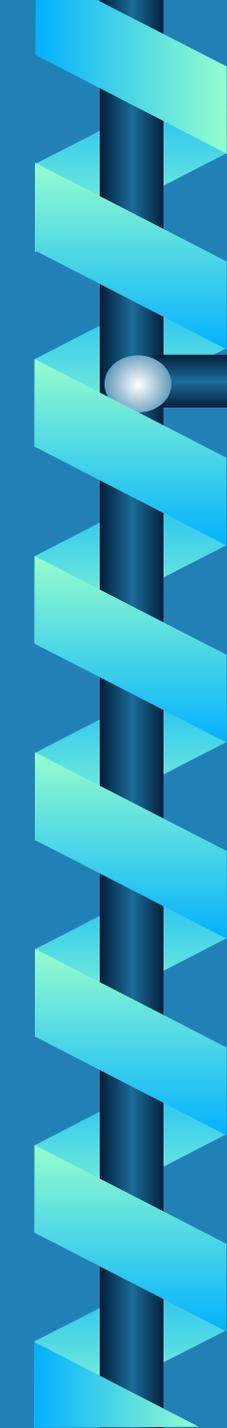
Pre-event phase: all factors that determine whether the event leading to injury will take place

Event phase: all factors that determine whether an injury will occur once the incident has been initiated

Post Event phase: all factors that determine the final damage & permanent handicap stemming from injury

# ***An Example: National Road Safety Strategy***

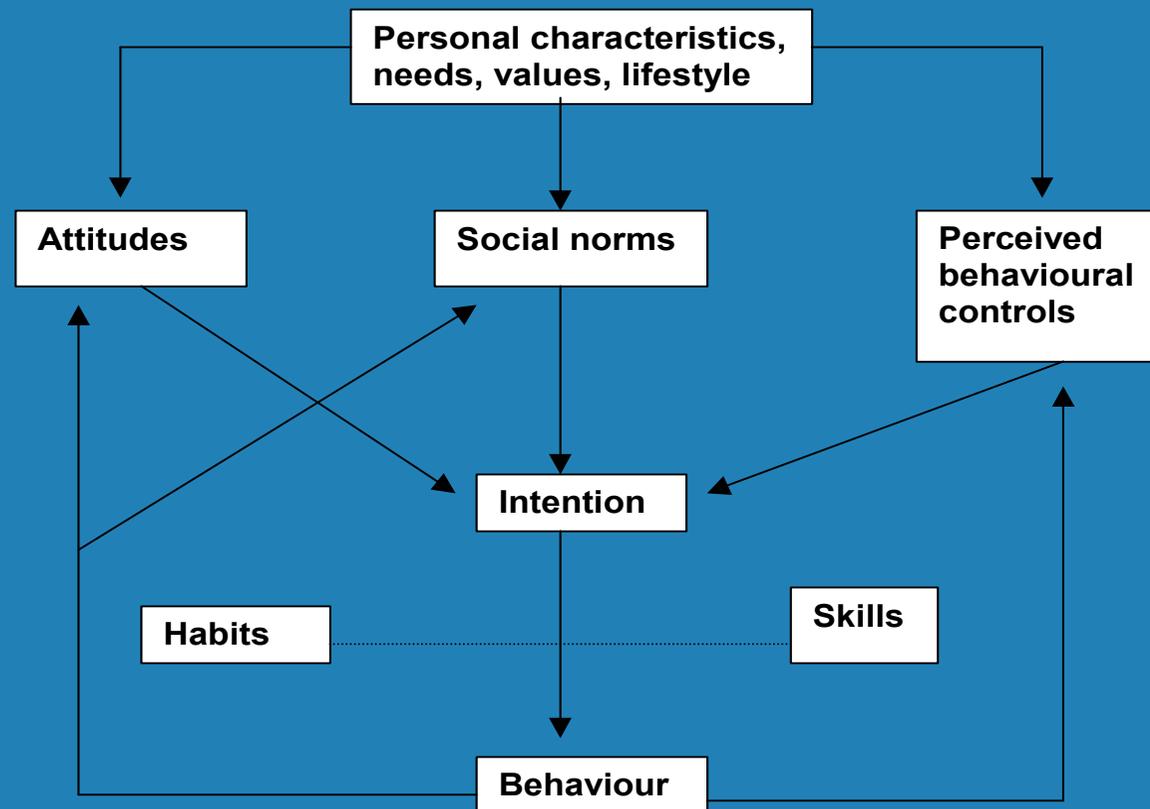
- **Target (by 2010)-compared with 1999**
  - 40% decrease in road fatalities per 100,000 population
- **Specific target areas**
  - improved road user behaviour
  - improved vehicles
    - (occupant protection/crashworthiness)
  - improved trauma, medical & rehabilitation services
  - improved (consistent/national) road safety policies
  - use of technology to reduce human error
    - intelligent transportation systems -roads & vehicles
  - encouragement of alternatives to motor vehicle use



# Why is road user behaviour important to road safety practitioners?

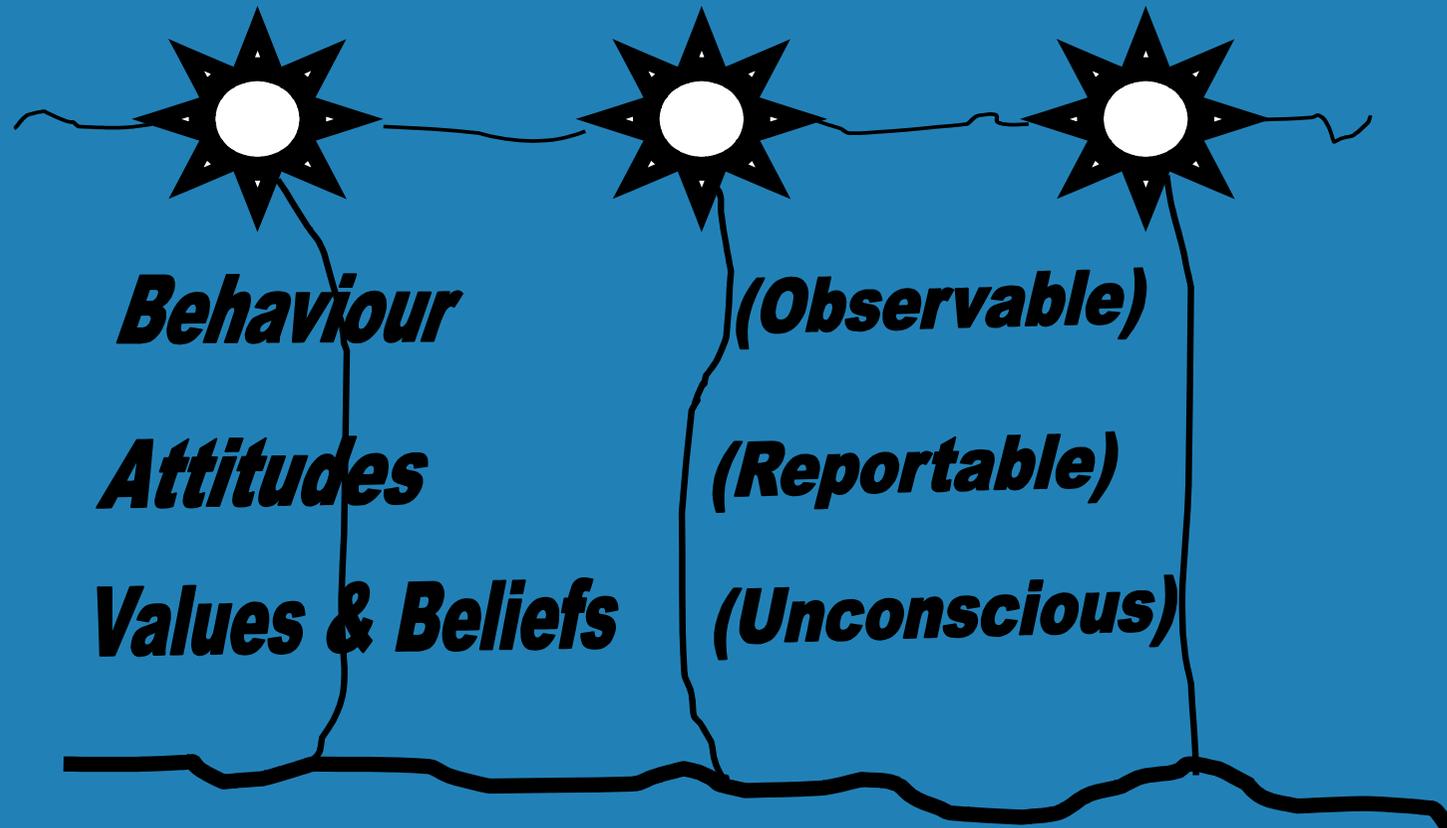
- Behaviour is what people actually do & what we can see - is what gets them into trouble or keeps them out of it
  - behavioural/human factors are perhaps greatest contributors to crash causation
- Behaviour can be recorded & measured - can shape and control it to some extent
- Road user behaviour often the most obvious target for intervention, but may not always be the most efficient or effective approach

# A Model of Behavioural Determinants *(after OECD 1993, Fig 11.1p25)*



# Relationship between Values, Attitudes & Behaviour: The “Lily Pond” Analogy

(After Williams et al (1989) Changing Culture, London: Institute of Personnel Management, p12)



# Role of Expectancy & Subjective Risk Assessment in Road Users

- Risk of death/injury very low at individual level
  - a typical driver could expect to be involved in one casualty and about four property damage crashes in a 55 year driving career (based on ABS & ATSB data).
  - In a typical year, >98% of all drivers will not be involved in a casualty crash (based on 1999, RTA (NSW) data)
  - in a typical year, >95% of P drivers will not be involved in a casualty crash (based on 1999, RTA (NSW) data)
- Encourages people to think that accidents/crashes will not happen to them
  - helps create optimism bias
  - helps desensitize road users to risks/consequences
  - helps maintain established behavioural patterns - including elements of risk-taking/illegal behaviour

# Can Behaviour be Changed?

- Yes, can be changed directly or indirectly, but change may not be easy to achieve
- Direct - by directly changing or influencing behaviour (eg enforcement/deterrence via law of proscribed behaviour such as drink driving)
- Indirect - by changing environment or circumstances that support behaviour (eg exposure reduction, modifying vehicles , duplicating highways, removing dangerous poles) or
- Combination - mix of Direct/Indirect approaches may be used - targets can be road users, vehicles, road environment &/or social environment

# Common Misconceptions About Behaviour Change (after Elliot, 1989 & 1992)

- People are rational & only need information to change
- Advertising alone is critical to changing behaviour en masse
  - If advertising is sophisticated & appealing enough people will extract the intended meaning & act accordingly
- Best way to achieve behaviour change is to change individuals
- People are interested in our messages about the need to change
- Behaviour is the result of attitudes, so attitudes need to be changed first

# Some Major Behaviour Change & Maintenance Techniques

- Modelling (social learning): active/passive
- Behaviour modification via positive &/or negative reinforcement
  - General/specific deterrence via laws & enforcement
- Cognitive dissonance: creation of conflict between thought & action
- Persuasion - individual/group via presentation of information & promotion of the benefits of alternatives
- Marketing or customer centred approach - encouraging existing acceptable behaviour
- Harm minimisation
- Modification of the physical &/or social environment

**NB: These often appear in combination as some are variations on the same theme**



## Despite our best efforts, people make mistakes - human errors - when driving

Every two miles [3km], the average driver makes four hundred observations, forty decisions, and one mistake. Once every 500 miles [800km], one of these mistakes leads to a near collision and once every sixty one thousand miles [98,000 km] one of these mistakes leads to a crash. When people drive, in other words, mistakes are endemic and accidents inevitable... (p50)

*Malcolm Gladwell (2001), Wrong Turn – How the fight to make America's highways safer went of the rails. The New Yorker, June 11, 50-61*

# What do we mean by “work”?

- A program or initiative that “works” in road safety terms:
  - reduces crash involvement
  - reduces death/injury (rates &/or severity)
- More Indirect Measures
  - reduces community/society costs arising from road crashes
  - changes road user behaviour in the desired direction

## 2:What do we mean by “work” ?- An Example

**In simple terms, what effect did the initiative or intervention have:**

- **Members of the target group liked it** (eg they enjoyed the video on seat belt wearing)
- **The process worked satisfactorily** (eg the video was shown at the right time to the right people)
- **Members of the target group improved their knowledge &/or changed their behavioural intentions** (eg people’s knowledge about seat belt wearing was improved by the video & most claimed that they would now wear them at all times when in vehicles)
- **Members of the target group changed their behaviour** (eg people who viewed the video had higher wearing rates than those who didn’t - verified by unobtrusive observation)
- **Accident, crash or injury rates were reduced** (eg people who viewed the video had higher wearing rates in crashes & lower levels of death/injury)

# Cost Effectiveness: Another way of defining what works

- Benefit-Cost Ratio (BCR) : benefit (result in \$) /cost (in \$)
- Some examples (from Harris et al, 1995):
  - Black Spot programs: >5:1 (BTE evaluation puts black spot BCR at 18:1 urban & <11:1, rural 1996-2002 - [www.dotrs.gov.au/bte](http://www.dotrs.gov.au/bte) )
  - Tactile highway edgelineing to combat fatigue related crashes 3.5:1 (with publicity campaign, 4:1)
  - Speed camera program with supporting publicity targeting speeding >25km/hr over posted limit: 12:1
  - Responsible serving of alcohol training for licensed premises staff: 5:1
  - Seat belts in school buses (retrofit):0.3:1
  - Passenger airbags (where seat belts compulsory): 0.18:1
  - Mandatory bicycle helmet wearing: 3:1

# Some Things that do Work in Terms of Changing Road User Behaviour & Reducing Crashes & Road Trauma

- RBT, plus enforcement & promotion
- Speed enforcement (camera/radar) & promotion
- Bicycle helmets, plus enforcement & promotion
- Seat belts/restraints, plus enforcement & promotion
- Responsible & moderate alcohol/beer sales
- Accident Black Spot programs
- Childrens' Traffic Clubs
- Programmed enforcement with marked police cars
- Alcohol ignition interlocks for high risk convicted drink drivers
- Increased supervised experience for learner drivers
- Graduated licensing for novice drivers

# Things that Don't Work in Terms of Changing Road User Behaviour & Reducing Crashes & Road Trauma

- ❁ **Education programs not linked to enforcement/compliance programs**
- ❁ **Most post-basic driver training/education - particularly off-road training**
- ❁ **Children's traffic schools**
- ❁ **Advertising/awareness campaigns not linked to enforcement, compliance or action programs**
- ❁ **Isolated "stunts" - eg visits to the morgue, putting a smashed car on display**

# A Few Words of Wisdom about Road User Behaviour

- **Most people (>80%) comply with legally/socially required behaviour most of the time, but compliant group likely to be different at any one time**
- **Perhaps 5-10% of population are “problem people” & are unlikely to change their behaviour as a result of interventions/appeals**
- **Behaviour change is most likely to succeed where the required behaviour is clear, simple & easy to communicate (eg “wear a seat belt” instead of “drive safely”)**
  - **target particular behaviour, not safety per se**
- **May be easier & more effective to modify environment or vehicles in some cases (eg remove/protect dangerous poles, modify a dangerous intersection)**

# Words of Wisdom: 2

- **Targeting behaviour related to injury risk/severity may be more fruitful (injury to death ratio about 14:1)**
- **Targeting behaviour via enforcement more likely to be effective than highlighting risk of death/injury:**
  - **risk of being booked via TINS >2,000 times greater than being killed, >130 times more likely than being hospitalised (based on Vic & NSW)**
  - **enforcement & deterrence more likely to change/maintain behaviour**
- **Awareness raising programs/measures not worthwhile on their own**
- **Training/education does not always lead to behaviour change**

# What can be done

Implement/maintain programs and measures likely to be effective, eg

- RBT operations & deterrence of drink driving (>20% of driver fatalities alcohol related)
- Speed camera enforcement - speed management (>20% of fatalities speed related)
- Fatigue (reduction, control & management)
- Bicycle helmet use
- Seat belt and child restraint use (>25% of vehicle occupant fatalities involved non-compliance)
- Responsible serving/sale of alcohol
- Accident Black Spot programs - identify & support
- Targeted enforcement - deter many, detect some
- Safer pedestrian use - younger and older people (14% of fatalities pedestrians)
- Safer fleet operations - local companies/organisations



# Conclusions

- Know more about what doesn't work in changing road user behaviour
  - Legislation, enforcement, (promotion & persuasion) & deterrence seem to be important change ingredients
- Best to know exactly what you want to change, what supports current behaviour & what is likely to support/motivate change to alternatives
- Changing environment &/or vehicles may be easier than trying to change behaviour of road users
- May be merit in maintaining and extending existing programs that are are successful - this important

# Big Five

- ⊙ RBT -enforcement & associated promotion
- ⊙ Speed enforcement & associated promotion
- ⊙ Seat belt/restraint use & associated promotion
- ⊙ Pedestrian safety - young/old
- ⊙ Eradication of ineffective programs - particularly unproven education/training