

Travel time savings and speed: actual and perceived

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Abbreviations and acronyms

AA	Automobile Association
ANOVA	analysis of variance
GPS	global positioning system
LTSA	Land Transport Safety Authority
MoT	Ministry of Transport
Transport Agency	New Zealand Transport Agency

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Executive summary

Speeding poses a safety risk for the speeding driver and for other drivers on the road. This project aimed to understand time saving as a motivation for New Zealand drivers' speeding in the context of other motivations for speeding, and to investigate the effect of education that aimed to improve participants' understanding of the costs and benefits of speeding.

The project comprised an initial survey about attitudes (850 responses), an educational intervention (534 completions), a follow-up survey (338 responses) and collection of real driving data from a small sub-sample of 25 drivers.

A review of the literature showed that drivers tended to underestimate the time they would save by increasing their speed from a low speed and overestimated the time they would save by increasing their speed from a high speed. The benefits of speeding included time saving and enjoyment, while reasons for choosing lower speeds included safety, penalties and other financial costs. The literature suggested that drivers were generally aware of the costs and benefits of speeding, though might be less aware of the extent of each. The findings of the literature review were used in the development of the education intervention and the survey questions.

In the literature, a commonly cited reason for speeding is that drivers want to arrive at the destination faster. Drivers who choose to speed to save time are those whose speeding behaviour falls into the violation category, as opposed to accidental lapses and other speeding behaviour. They make a conscious decision that the benefit of increasing speed (arriving at their destination sooner) outweighs the costs of speeding (financial, safety, possible penalties). If that cost-benefit decision is based on incorrect information, providing correct information may result in a different outcome. For example, the driver's decision to speed may be based on an inflated estimate of the time they may save and an underestimate of the increased safety risk. If the driver instead has correct information about time saving and risk they may make a different speed choice.

The initial survey of respondents in the present study found that choosing to speed to save time was not a motivation for all drivers. Just under one-third (32%) of drivers agreed that when they chose to speed it was to arrive at their destination sooner, while nearly half (48%) disagreed.

Respondents were also asked to estimate the time savings from increasing their speed in two different scenarios. In the low-speed scenario, with a speed change from 50km/h to 60km/h, three-quarters (72%) of drivers underestimated the amount of time they would save. In the higher-speed scenario, with a change from 95km/h to 110km/h, more than half (60%) overestimated the time they would save.

Drivers who aimed to travel over the speed limit in both 50km/h and 100km/h zones felt the speed limits were too low. These drivers were younger and more likely to agree that they chose to speed because they would get to their destination sooner.

The majority of drivers (71%) recognised that increasing speed increased fuel consumption and most estimated the degree of the increase within five percentage points. However, under one-third (30%) of respondents estimated the fuel saving correctly. Nearly half (46%) of the drivers reported that they chose not to speed because of the increased fuel costs. Increasing understanding of the fuel costs of speeding could change the way other drivers evaluate the costs and benefits of speeding.

Males and females had different reasons for speeding or not speeding. Female drivers were more likely to agree they chose not to speed because of the risk of crashing and the penalties for being caught. They were less likely to agree they chose to speed because they believed it was safe or because of the

behaviour of other drivers. Younger drivers responded differently from older drivers. Younger drivers were more likely to choose to speed because of other traffic and because they believed it was safe to do so. Younger drivers were more likely to choose not to speed because of the financial costs of fuel and the extra wear and tear on the car.

More commonly, respondents' preferred speeds and definitions of speeding matched the popular understanding of Police speed enforcement thresholds. For example, in 50km/h zones, nearly one-third (30%) considered they would be speeding at 55km/h and a further third (33%) at 60km/h. In 100km/h zones, substantial proportions considered themselves to be speeding at 105km/h (18%) or 110km/h (36%). Identifying speeds on 5km/h margins may also be related to the intervals displayed on car speedometers or just a tendency to round numbers to the nearest five. There was a correlation between drivers' preferred speed and their definition of speeding, with their preferred speed almost always falling below their definition of speeding. This finding suggests that people's speed choice could be influenced by changing their definition of speeding.

The education intervention was offered both online and in hard copy. Respondents completed a standard information package and then were invited to participate in the follow-up survey. Two national interventions took place between the two surveys: the Police *Safer Summer* road safety campaign, which featured a lowered speed enforcement threshold over the 2013/14 Christmas holiday period, and a NZ Transport Agency (the Transport Agency) advertising campaign targeting speed choice. Under one-third (32%) of respondents reported they learned something new from the education material but a higher proportion, nearly half (47%) reported they intended to change their driving as a result. The education material could have acted as a reminder to those who already knew the content, and so still affected respondents' attitudes.

The preferred speeds respondents reported in the follow-up survey decreased from the initial survey. Nearly half of respondents reported lower preferred speeds in 50km/h zones (40%) and 100km/h zones (41%) in the follow-up survey. The mean preferred speeds decreased by 1.1km/h and 1.2km/h respectively. Changes in preferred speed were correlated with changes in definitions of speeding. Drivers who decreased their numeric definition of speeding were more likely to report a lower preferred speed.

Many drivers recognised that exceeding the speed limit resulted in increased crash risk. In the initial survey more drivers agreed they chose not to speed due to the increased severity of a crash than the increased likelihood of a crash. Of all the reasons to choose not to speed included in the survey, drivers most strongly agreed they chose not to speed due to safety concerns. This finding is consistent with surveys conducted in other countries. There was little shift in drivers' views on their reasons for speeding in most areas investigated in the follow-up survey.

The comparison between the pre- and post-education intervention surveys suggests the education intervention may have changed many respondents' attitudes towards speed which in turn may lead to a change in their driving behaviour.

Changes in actual driving behaviour following the same intervention were explored in a small sample of drivers by recording driving behaviour with data loggers that recorded information about the speeds drivers travelled. The driving behaviour measured through the use of the data loggers did not identify any significant changes before and after the education. It may also be possible that the data loggers themselves acted as an intervention that altered participants' driving behaviour, increasing the difficulty of detecting change in response to the intervention. It is important to also note that the sample size was small limiting the possibility of detecting statistically significant differences between the before and after measurements for participants and between control and intervention groups. Further investigation with a larger sample group is recommended.

New Zealand drivers' attitudes to speeding are consistent with those of drivers internationally as described in the literature. The increased risk of crashing and the increased severity of crashes, should they occur, is well understood and drivers most commonly choose not to speed because of those risks. Drivers' definitions of speeding and preferred travel speeds were closely linked to each other and appeared to be linked to enforcement thresholds, suggesting that changing definitions of speeding may be a way to influence drivers' speed choices.

Drivers do not have a good understanding of how much time they would save by speeding. Some drivers choose to speed because they want to save time, but generally underestimate time savings from increasing low speeds and overestimate time savings from increasing high speeds.

Providing information about the costs and benefits of speeding was the basis of the education intervention. The intervention was inexpensive to develop and distribute and appears to have contributed to a change in some attitudes towards speeding including self-reported preferred speeds and definitions of speeding. The findings support the conclusion that drivers' attitudes towards speeding may be changed through the provision of information on the costs and benefits of speeding. The findings do not allow definitive conclusions to be drawn about the extent attitudinal change results in behaviour change.

The researchers recommend further exploring:

- opportunities to change drivers' definitions of speeding and the effect changes in the definition of speeding could have on preferred travel speed
- education interventions targeting individuals' differing levels of knowledge of the costs and benefits of speeding
- the methods drivers use to calculate time savings, which may assist in targeting the content of education interventions.
- driver behaviour through larger scale data logger studies, which could identify changes in driving behaviour that are not significant in smaller samples.

Abstract

This project aimed to understand time saving as a motivation for New Zealand drivers' speeding behaviour in the context of other motivations for speeding, and to investigate the effect of education designed to improve participants' understanding of the costs and benefits of speeding.

The project consisted of four parts: an initial survey on attitudes, education for drivers, a follow-up survey, and collection of real driving data from a small sub-sample of drivers.

Results showed that while some drivers sped to save time, drivers more strongly agreed they chose not to speed due to the safety risk and penalties if caught speeding. Respondents tended to overestimate the time savings at high speeds and underestimate the time savings at lower speeds. Most drivers were aware that increasing speed above 100km/h would use more fuel and the majority gave estimates of the fuel savings close to the correct amount.

Following education, drivers' preferred driving speed and the speed they considered to be speeding decreased. Fewer drivers said they chose to speed because they believed it was safe to do so or because of the influence of other drivers. Drivers did not improve in their ability to accurately estimate travel time savings from increased speed; however, they gave lower estimates for the amount of time that would be saved by increasing speed.

1 Introduction

1.1 Background

Speeding poses a safety risk for the speeding driver and for other drivers on the road. Research shows that higher speed results in more crashes, more severe injuries and that fewer New Zealanders would be killed or injured if drivers slowed down. Despite the widespread understanding of these facts, speeding is commonplace on New Zealand roads. Drivers' decisions to speed may be based on their perceptions of the costs and benefits of speeding, for example fuel costs and travel time savings. If those perceptions are based on an incorrect understanding of those costs and benefits, education providing drivers with correct information may influence their speed choices.

Malatest International was contracted by the New Zealand Transport Agency (the Transport Agency) to carry out this project. The project aimed to understand time saving as a motivation for New Zealand drivers' speeding in the context of other motivations for speeding, and to investigate the effect of education that aimed to improve participants' understanding of the costs and benefits of speeding.

1.2 Objectives of the research

The current project sought to understand, and improve, drivers' perceptions and knowledge regarding the costs (increased fuel cost and increased crash risk) and benefits (reduced travel time) of speeding. It also explored whether educating drivers on the costs and benefits of speeding increased the likelihood of drivers travelling at lower speeds.

The key objectives were to answer the following questions:

- Do drivers overestimate the travel time savings from speeding?
- What proportion of speeding is undertaken in order to save time?
- Are drivers aware of the increased crash risk from higher speeds and risky overtaking?
- Are drivers aware of how much extra fuel they use when they speed?
- If drivers have better, more accurate information regarding speeding, would they be more likely to travel at safer speeds?

1.3 Structure of this report

This report is divided into the following chapters:

- Chapter 2: Literature review: review of the literature on speeding, speed choice, and interventions that aim to influence drivers' speed choices.
- Chapter 3: Methodology and project participation: an overview of the methods used for this project including survey response rates.
- Chapter 4: Initial survey and profile of New Zealand drivers: summary of results from the initial survey weighted to key demographics from the New Zealand Census.
- Chapter 5: The education intervention: description of the education intervention used to influence participants' attitudes towards speed.

- Chapter 6: Follow-up survey results: results of the follow-up survey highlighting changes following the delivery of the education intervention.
- Chapter 7: Changes in driving behaviour: results showing change in the driving behaviour of a small sample of drivers who drove with data loggers installed in their vehicles before and after the education intervention.
- Chapter 8: Discussion of findings: discussion of the results and their implications for New Zealand.

2 Literature review

2.1 Speed in New Zealand

In New Zealand, the document *Down with speed* (ACC and LTSA 2000) lists the following facts about speeding:

Higher speed results in more crashes: The research comparing the reported (or measured) pre-crash speeds of vehicles with mean traffic speeds has shown that, in both urban and rural environments, the risk of crashing increases as the pre-crash speed increases (Elvik 2009). It also increases as the pre-crash speed increases above the mean traffic speed (van Nes et al 2010).

The relationship between speeding and increased risk of crashes is supported further by findings that drivers who have been caught speeding are more likely to have been previously involved in crashes. For example, results from a Scottish household survey of 1,000 drivers showed that both male and female drivers who had been caught speeding were significantly more likely to have been involved in a road traffic crash in the preceding three years. The figures were almost double: 21% of males and 21% of females who had been caught speeding had a road traffic crash in the preceding three years, compared with 12% of males and 11% of females who had not been caught speeding (Stradling et al 2003).

Higher speed results in more severe injuries: The severity of injuries resulting from a crash is directly related to the pre-crash speed of the vehicle. The research into the relationship between vehicle speed and injury severity has consistently shown that, as a vehicle's speed increases, its impact speed in a crash increases, which in turn dramatically increases the severity of resulting injury. The injury severity to people in a crash increases exponentially with impact speed, because of the strong, positive relationship between the kinetic energy released in a crash and the pre-impact speed of the vehicle(s) (Elvik 2012).

Fewer New Zealanders would be killed or injured if drivers slowed down: The speed New Zealanders drive on roads is a major public health and safety issue. Crash risk increases with increasing mean traffic speed. Speed variation also has an effect on crash risk (van Nes et al 2010). A lower mean speed is safer than a faster one.

In New Zealand in 2013, the total social cost of crashes where speeding was recorded as a contributing factor was estimated at \$678 million (MoT 2014a). The true cost of speeding may be higher, as the role of speed as a contributing or aggravating factor can be difficult to identify and consequently may be under-reported.

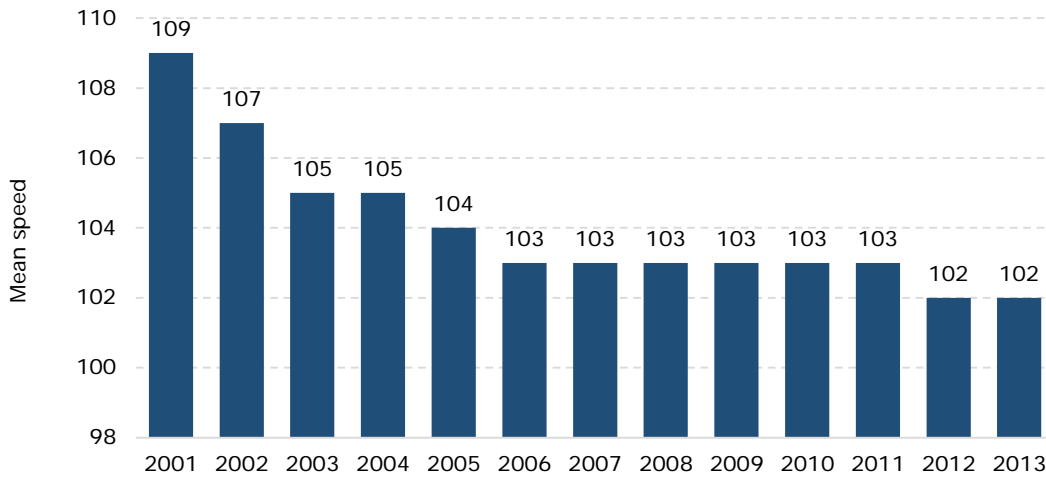
Despite universal recognition that traffic speeds are closely related to an increased crash risk and severity, speeding still remains a common occurrence on roads throughout the world (Liu et al 2012).

Internationally, the Organisation for Economic Cooperation and Development/European Conference of Ministers of Transport (OECD/ECMT) reported in 2006 that more than half of European drivers exceeded the posted speed limit, although the extent of speeding varied with country and road type. In a Canadian study, the average speed reported by drivers was 12km/h over the 100km/h limit on highways, 10km/h on 100km/h two-lane highways/country roads and 7km/h on residential streets with speed limits of 40/50km/h. Seven in 10 Canadian drivers admitted to exceeding the speed limit at least occasionally, particularly on highways (Transport Canada 2007). It is important to note, too, that drivers may not always accurately monitor and report their own speeding behaviour (Feng 2007).

New Zealand is no different from other countries. Each year the Ministry of Transport conducts a survey monitoring the speed of unimpeded vehicles in both 100km/h and 50km/h speed limit areas. Although

the 85th percentile speed of New Zealand drivers in both areas has decreased over the decade between 2001 and 2013, there has been little change in recent years. Despite extensive investment in strategies to reduce speeding, the 85th percentile speed in 2013 was higher than the speed limit on the open road (figure 2.1).

Figure 2.1 85th percentile mean travel speeds of New Zealand drivers on the open road (speed limit 100km/h) (MoT 2014b)



The incidence of crashes is not just related to exceeding the speed limit. In a major study of sections of roads and driver behaviour in the United Kingdom, Taylor et al (2000) analysed the relationship between traffic speed and crash incidence. They found that the faster the traffic moved on average, the more crashes there were and that the crash frequency increased exponentially as the spread of speed increased. Further, the wider the spread of speeds around the average speed, the more accidents there were (Taylor et al 2000).

New Zealand crash statistics support the research findings of Taylor et al. In 2011, ‘travelling too fast for the conditions’ was recorded as a contributing factor in 30% of New Zealand’s fatal crashes, 19% of serious injury crashes and 14% of minor injury crashes. ‘Too fast for conditions’ was listed as a contributing factor for 74 crashes involving a fatality, 421 crashes involving serious injuries and 1,442 crashes involving minor injuries (MoT 2014a). Similarly, Austroads reported that inappropriate speed contributed to approximately 29% of fatal crashes in Australia and 35% of fatal crashes in New Zealand (Cairney et al 2009).

2.1.1 Definition of speeding

The definitions of speeding fall into three categories:

- 1 Technical: Any speed over the posted speed limit (eg 101km/h in a 100km/h zone). This definition was articulated by a few people and was seen as unrealistic but technically correct by most others.
- 2 Relative: Many participants viewed speeding in relative terms, based on factors such as road surface conditions, traffic volumes, vehicle type, weather, and even the skill or experience of the driver. According to this definition, one can safely exceed the speed limit without increasing crash risk.
- 3 Absolute: Many defined speeding in absolute terms – driving at a certain speed in zones with certain speed limits.

New Zealand law has a clear definition of speeding: driving at any speed higher than the posted speed limit is speeding. However, it is a popularly held belief in New Zealand that Police generally tolerate speeds of up to 5km/h to 10km/h in excess of the posted speed limit.

2.1.2 Reasons for speeding

There are a number of models in the literature that seek to categorise speeding drivers based on the extent of their speeding, the type of speeding and the associated demographic characteristics. Such models profile drivers and can be applied to speeding interventions. For example, one group of speeders may be more likely to respond to interventions aiming to increase knowledge of the safety consequences of speeding while others may respond more readily to interventions focusing on the financial cost of the increased fuel consumption resulting from speeding.

The models use different variables to describe speeders and their speeding including:

- Demographic factors: Age, gender
- Driving experience: The amount of time the driver has been driving
- Frequency of speeding: How often the driver speeds
- Degree of speeding: The margin by which the driver exceeds the speed limit
- Reasons for speeding: Speeding behaviour can be attributed to four broad categories: slips (unintentional speeding), lapses (forgetting to check the speed limit for an area), mistakes (incorrect belief as to the speed limit) and violations (intentionally speeding due to a competing motivation) (Duck and Cavallo 2011; Forward 2008).

Theories of crash causation (eg Reason 1990) can be used to interpret speeding behaviour in terms of driver error. Three of the four categories of speeding behaviour, if interpreted as errors, are inadvertent and a result of driver inattention: slips (unintentional speeding), lapses (forgetting to check the speed limit for an area) and mistakes (incorrect belief as to the speed limit). The fourth category of speeding is violations, which are a result of a driver decision to exceed the speed limit (Duck and Cavallo 2011; Forward 2008) and are the focus of this section because these decisions can be influenced by increased understanding of the costs (for example fuel, safety risk) and benefits (for example, time savings) of speeding.

There are many different approaches to understanding the reasons for human behaviours such as speeding. The theory of planned behaviour (Ajzen 1991) has been applied successfully to better understand drivers' reasons for speeding. This framework is also described by Liu et al (2012). According to the theory of planned behaviour, people's decisions to speed are based on their willingness to speed, perceived control over their decision to speed and their subjective norms. These can be broken down into the following components:

- Behavioural beliefs – about the likely consequences of speeding weighted by the evaluation of how good or bad the outcome of speeding would be.
- Normative beliefs – about what important others think about speeding weighted by the motivation to comply with these important others.
- Control beliefs – about factors that facilitate or impede speeding weighted by the perceived power of these factors, to determine people's perceived control over their speeding.

The reasons for speeding, or choosing not to speed, can be examined through this lens. For example, Liu et al (2012) summarised the findings of a Western Australia study conducted by Elliott (2001), which

identified the reasons for widespread speeding. The reasons given for speeding fell across all three domains. They found that drivers who sped:

- felt little or no moral pressure not to speed and had little or no feelings of regret for speeding
- believed it was difficult not to speed and found it difficult to keep to the speed limit especially when the traffic flow was also speeding or if they were late for an appointment
- perceived that most drivers sped
- saw themselves as frequently and safely exceeding the posted speed limit, and while they could easily not speed, they did not believe that positive outcomes of not speeding were likely (for example, relaxed, hassle free driving, lower risk of crashing).

Similarly, Richard et al (2012) monitored the actual driving patterns of 164 participants in the United States through the use of vehicle data loggers. Monitoring was followed by focus groups to discuss driving behaviour. The participants identified factors they believed caused them to drive faster including situational factors (such as being late for work), social pressure from other drivers, inattention to driving, and positive feelings about driving fast. Focus group participants also identified factors that made them less likely to speed, including ticket or crash risks, social pressure and critical events (such as crashes and near-misses) they had experienced in the past. Focus groups indicated that speeding seemed to be a deliberate choice made with consideration of outcomes (for example, tickets, safety, approval of others and thrills).

Transport Canada (2007) conducted a regression analysis to model how well speeding beliefs predicted speeding behaviour. They found that the best predictor of speeding behaviour was the belief that speed limits were set too low, though five other reasons for speeding were also predictive:

- 1 You enjoy the feeling of driving fast (enjoyment and risk taking).
- 2 You don't want to be late (time savings).
- 3 You don't think you will be stopped by the Police.
- 4 You don't know the speed limit.
- 5 Time is more important than speed.

The following sections discuss the reasons for choosing to speed and choosing not to speed most commonly identified in the literature.

2.1.3 Enjoyment and risk taking

Enjoyment from speeding can come in two forms. Some drivers find the act of speeding itself enjoyable, but other drivers take more pleasure from the risk-taking component. Risk is usually defined as a chance of loss (Forward 2008). If drivers speed, despite being aware of the risk of negative consequences, it can be described as risk-taking behaviour. It is worth noting the distinction between subjective and objective risk. While drivers may subjectively be aware that speeding is a risky behaviour, they may not understand objectively the extent of the actual risk (Forward 2008).

Many studies have identified enjoyment, or the positive feelings coming from travelling fast, as reasons for speeding behaviour. For example, Gabany et al (1997) developed the speeding perception inventory and administered it to 817 tertiary students. They identified ego gratification and risk-taking as two of the primary reasons for speeding (Transport Canada 2007).

The survey study by Transport Canada (2007) also found that 20% of drivers considered 'enjoying the feeling of driving fast' as a reason for speeding. While a much lower proportion of drivers gave 'enjoyment' as a reason for speeding rather than other reasons such as time savings, both the qualitative (survey) results and the regression analysis in this study indicated that this factor was linked to the more extreme instances of speeding (Dinh and Kubota 2013). Similarly, in a Norwegian survey study, Elvik (2010) found that, among the fastest drivers identified, 'dullness' was given as an important reason for not driving more slowly.

2.1.4 Time savings

A commonly cited reason for speeding is the driver's desire to arrive at the destination faster:

- 1 Gabany et al (1997) found 'coping with time pressure' was one of the primary reasons identified for people travelling faster than the speed limit.
- 2 In a survey of 2,000 Scottish households, compared with 'how you would normally drive on your own ...' over half of the drivers (58%) said they would drive faster when running behind schedule (58%) or when late for an appointment (57%) (Stradling et al 2003).
- 3 A survey of 367 Japanese drivers found a majority (65%) considered breaking the speed limit a way of reducing their travel time (Dinh and Kubota 2013).
- 4 Those survey respondents who admitted speeding were most likely to have done so because they did not want to be late (57%), because they believed speed limits were set too low (51%) or because they were not paying attention to the speed at which they were driving (51%) (Transport Canada 2007). The most important reason provided by drivers to justify their excessive speeds was 'do not want to be late' (stated by 57% of respondents).

Travelling at a higher speed clearly has the potential to achieve this end. However, studies have found that people are frequently unable to accurately estimate the amount of time they will save by driving faster. Drivers' estimations of time savings from increasing speed are influenced by a time-saving bias (Peer 2010). People overestimate the time saved from increasing a relatively high speed but underestimate the time saved from increasing a relatively low speed (Elvik 2010). One study found that drivers who were more likely to misjudge time savings from increasing speed were also more likely to report speeding themselves (Peer 2010).

Travel time equals distance divided by average speed. However, calculating the travel time that will be saved by increasing speed is difficult as it is a non-linear function. Studies have shown that people are consistently poor in estimating the amount of time that will be saved by increasing travel speed. A series of studies carried out by Svenson (2008; 2009) and Fuller et al (2009) and Elvik (2010) showed that the saving in travel time by small increases from a high speed was overestimated, while the saving in travel time by a small increase in a low speed was underestimated. Elvik (2010) asked drivers to calculate how much faster than 60km/h they would have to drive to save 50 minutes if they were driving a trip of 100km. Most of the respondents could not give a correct estimate.

Svenson (2009) asked participants to make decisions between two road improvements to increase mean speed. Time saved when speed increased from a higher driving speed was overestimated in relation to time saved from increases from lower speeds. The study showed that the relationship between speed and travel time was perceived by drivers to be more linear than it actually is.

Fuller et al (2009) found that survey participants drastically overestimated their time savings for a given distance when increasing their speed from 96km/h to 112km/h (60mph to 70mph). The mean estimate of time savings was 346 seconds, compared with an actual time saving of 86 seconds. Similarly, participants

estimated a mean time loss of 415 seconds when reducing speed from 96km/h to 80km/h (60mph to 50mph), compared with an actual time loss of only 120 seconds.

Conversely, the desire to drive under the speed limit can be attributed to the absence of time pressure. Elvik (2010) describes a study by Rajalin and Summala (1996) where slow drivers were asked why they were driving slowly. The most important reason given for driving slowly was that the driver had plenty of time.

2.1.5 Social pressures

Drivers can feel social pressure to drive both over and under the speed limit. Many drivers may not want to speed because their passengers disapprove of speeding. For example, Stradling et al (2003) found that one in ten drivers reported they drove faster if 'listening to music' while driving. Thirty-six percent of 17 to 20-year-old males, and 18% of 17 to 20-year-old females would drive faster 'with people your own age in the car', but hardly any drivers said they would drive faster with children or older people as passengers (Stradling et al 2003).

Other drivers are one of the most significant sources of social pressure to speed. The perceived pressure to increase speed is affected by drivers' own perceptions of the speed of the cars around them. Canadian drivers perceive themselves to speed much less than other drivers, and their assessments of their own, personal instances of speeding are often relatively benign (Transport Canada 2007). Similarly, Dinh and Kubota (2013) identified a number of studies showing that drivers tended to overestimate the speed of other drivers. For example, Walton and Bathurst (1998) found that more than 85% of drivers claimed their driving speed was lower than that of other drivers, on average. In a study by Åberg et al (1997), survey respondents stated that more than 50% of other people drove faster than 60km/h on 50km/h roads while the actual observed proportions at these speeds ranged between 16% and 25%. In that same study, drivers on average estimated other drivers' speeds to be 8 to 10km/h higher than their actual speeds. The perceived behaviour of others significantly influenced speeding behaviour and inaccurate estimation about others' speeds likely contributed to an individual's own speeding violations. A driver who perceives the drivers around him are speeding is more likely to drive fast than one who perceives others to comply with speed limits (Haglund and Åberg 2000).

Åberg et al (1997) concluded that perceived behaviour of other drivers affected not only a driver's speed choice but also their attitudes towards speeding, regardless of the accuracy of this perception. A study conducted in New Zealand exploring such perceptions found that, in general, drivers accurately reported their own driving speed; however, they often overestimated the average speed of other drivers, and claimed to drive slower than the average driver, while also claiming to be safer than the average driver (Walton and Bathurst 1998). This suggests that drivers inaccurately estimate the speed of others, their own ability and, consequently, the risks of speeding (Liu et al 2012).

Stradling et al (2003) found that 69% of drivers stated they would drive slower if surrounding traffic was travelling slower. Similarly, 30% of drivers stated they would speed up if traffic was moving faster than usual. In one study, the most important reason for speeding given by drivers was that driving slower would impede traffic (Elvik 2010).

A survey of Scottish households found that one-third (33%) of drivers would drive faster if 'the traffic ahead is moving faster than you normally drive', one-fifth (22%) would if 'feeling stressed', and one-seventh (14%) if 'someone is driving close behind you'. Interestingly, over one-third (35%) of drivers in that study said they would slow down if being tailgated (Stradling et al 2003). In a survey of Canadians, one in two drivers (52%) agreed that people should 'keep up with the flow of traffic' regardless of the

speed limit. Most people believed it was just as dangerous to drive 20km/h under the speed limit, as it was to drive 20km/h over it (Transport Canada 2007).

2.1.6 Danger

As discussed earlier, driving faster results in an increased risk of crashing and, if a crash were to occur, an increased risk of injury and death. The relationship between speed and road crashes shows that the risk of an injury increases by relative change in speed squared (Elvik et al 2004).

Risks of crashing and of being injured (or of injuring others) are the main disadvantages drivers weigh against the potential advantages of speeding. Many drivers recognise that exceeding the speed limit results in an increased risk. For example, in the survey of Canadians, 54% of respondents indicated a higher collision risk as a disadvantage of speeding, and 31% indicated a higher risk of injury from a collision (Transport Canada 2007). However, as with time savings, many drivers may not be able to accurately estimate the degree of risk they are taking when they exceed the speed limit. People appear to have greatly varying understandings and assumptions about the increased crash and injury risk from speeding. Some participant drivers in the Transport Canada (2007) study saw each increase in speed as having a corresponding influence on risk: 'For every kilometre you drive faster, your reaction time and braking time are affected. You have less time to react and you need more time to brake. It's not debatable, it's physics'. Others felt their risk of collision did not significantly increase until they reached relatively high speeds (depending on road and other conditions) (Transport Canada 2007). In Elvik's 2010 study, participants underestimated the increase in the risk of a crash with an injury and grossly underestimated the increase in the risk of a fatal crash when speed increased.

Some drivers believe the increase in risk from speeding is mitigated by their superior driving skill. Drivers might be aware of the general connection between speeding and increased risk of crash and injury, but still not believe that they themselves are at risk. Drivers who violate the speed limit are usually aware of risks but do not believe the risks will affect them. They regard themselves as better than other drivers in handling a car and consider their risk taking will result in positive consequences. They exceed the speed limit when they believe it is safe to do so (Forward 2008).

Mannering (2008) analysed how far above the speed limit 988 US drivers thought they could travel before they believed their safety was threatened. The author found that perception of the speed at which they believed they would receive a speeding ticket was a critical determinant of what they believed was a safe speed. Factors such as age, gender, previous tickets and ethnicity were also found to be associated with this perception (Mannering 2008). On the other hand, Richard (2012) found that many US drivers believed they could safely travel faster than the speed limit.

Significant proportions of the New Zealand public believe there is not much chance of a crash when speeding if you are 'careful' (15%) and 'enjoy driving fast on the open road' (36%) (MoT 2012). Young males are most likely to think speeding is not dangerous if they are careful (20%). In Canada, many people believe that while they might be 'technically speeding', they are not driving in a way that endangers either themselves or others (Transport Canada 2007). Similarly, Brown and Cotton (2003) found that drivers who sped believed they could do so and still be safe.

2.1.7 Fuel consumption and pollution

As a general rule, increasing an already fast speed (for example from 100km/h to 110km/h) increases fuel consumption; however, this is not always recognised by drivers. In a survey of Canadians, Transport Canada (2007) found that 86% of participants understood speeding increased fuel consumption. Men were

more likely than women to cite increased fuel consumption as a disadvantage of speeding. Nearly one-fifth (18%) of men said increased fuel consumption was a main disadvantage of speeding.

As a result of increased fuel consumption, speeding contributes to climate change. Few drivers (just 6%) in the Canadian survey (Transport Canada 2007) were likely to recall adverse impacts to the environment (such as climate change and air pollution) as a consequence of driving at high speeds. When prompted, only about one-half of drivers (45%) actually believed that speeding contributed to climate change (Transport Canada 2007).

In a review of the literature, Elvik (2010) concluded that while drivers know speed influences noise and pollution, and regard an increase in noise and pollution as undesirable, consideration of these impacts carries little weight in a person's decision to speed because to a large extent the impacts do not affect the driver directly.

2.1.8 Penalties

Legal penalties are another commonly cited disadvantage of speeding. Further, drivers may drive within the speed limit because they believe they have a moral obligation to obey the law. For example, the belief that speed limits are set too low is strongly predictive of speeding (Transport Canada 2007).

Drivers may drive within the speed limit because they do not want to risk the financial consequences of being caught exceeding it. Canadian drivers were asked to cite what they thought to be the main disadvantages of speeding. Increased risk of collision and injury were most often cited, but the risk of getting a speeding ticket was also a common response (Transport Canada 2007). Those who sped more often were also more likely than others to say that speeding tickets were a main disadvantage of speeding.

2.1.9 Driver education

Driver education around speeding seeks to change people's behaviour by influencing decisions. Education efforts to decrease speeding will be most effective if they focus primarily on the fourth (intentional) category of speeding – violations – as the other three categories of speeding error (lapses, mistakes and slips) are not the result of a conscious decision and are therefore more difficult to influence. Violations have been found to be the main contributor to road crashes (Forward 2008) and are responsible for more incidents of extreme speeding. Interventions, such as intelligent speed adaptation (currently being investigated in New Zealand), can address speeding in the other three categories by preventing drivers from inadvertently exceeding the speed limit. Similarly, Transport Canada (2007) concluded that communications messages regarding speeding should be focused on changing beliefs and behaviour to influence people who choose to speed, rather than on raising the awareness of drivers who inadvertently do not pay attention to speed limits or their own speed (Transport Canada 2007).

Education interventions can be targeted at an individual or societal level. Programmes targeted at the individual level can be delivered in different forms, from education to rehabilitation and punishment. They may be used to increase the driver's understanding of risk and travel time, and may comprise both short- and long-term programmes. Intervention on a societal level uses different forms of mass media campaigns and is targeted to a wider audience. It may be used to increase public knowledge of a problem, change social attitudes and reduce the number of violations committed (Forward 2008).

Unfortunately, the effectiveness of behaviour change initiatives and strategies is rarely assessed and there is a clear lack of well-defined, measurable evaluation studies on these countermeasures (Liu et al 2012). Forward (2008) conducted a meta-analysis of road safety campaigns across the world, and found that campaigns could be successful in reducing the number of crashes. The author concluded that the likelihood of success could be enhanced if the methods used to teach awareness were improved. In order

to succeed in persuading the public to adopt safer driving techniques a speed campaign needs to be based on a sound theoretical basis. A systematic summary of 119 individual road safety campaign effects suggests that road safety campaigns have an overall significant crash-reducing effect of only 9%. Meta-regression analysis suggests that campaigns using personal communication, roadside and/or enforcement strategies to deliver their message are associated with greater crash reductions than those that do not use these methods. The authors note that achieving immediacy in the delivery of a campaign message, in terms of proximity in time to the target behaviour, might tend to increase the effectiveness of a campaign in the shorter term, and complement any long-term campaign effects achieved using mass media delivery (Forward 2008).

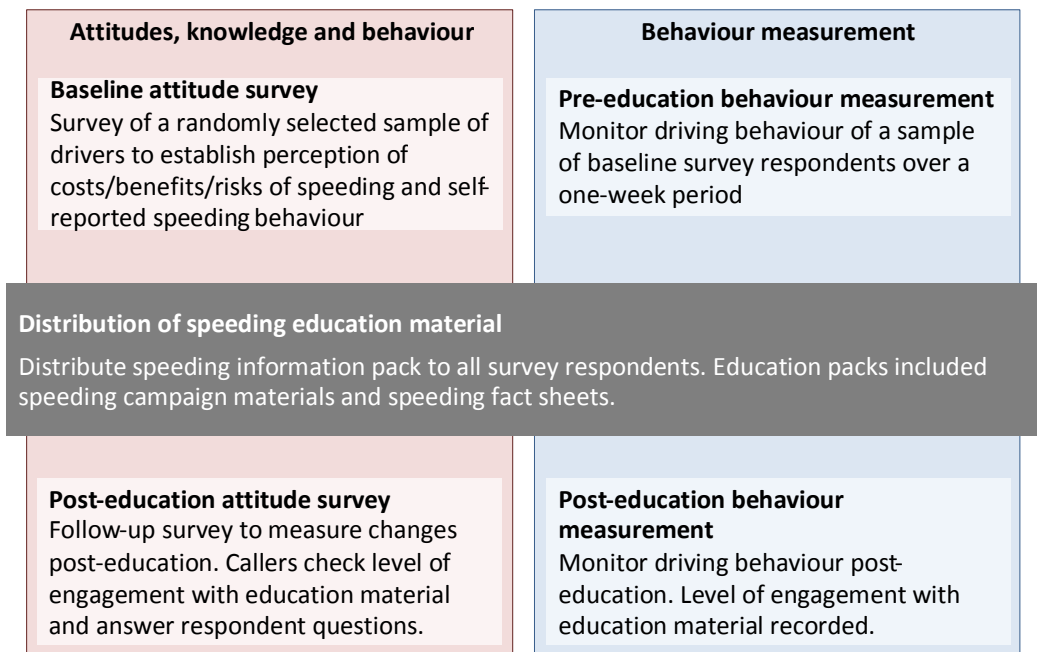
Lewis et al (2008) developed and implemented two online information packages: one that focused on positive emotional messages incorporating humour and pride and a second that focused on negative emotional messages. A total of 205 participants completed an internet-based survey assessing their speeding behaviour before exposure to either a positive or negative emotion-based message. Participants' acceptance of the messages was assessed after exposure and, one month later, participants were asked to report their speeding behaviour during the previous four weeks. Results revealed that message acceptance reported by males after exposure to positive emotional appeals was a more important predictor of subsequent lower speeding behaviour than their past speeding behaviour. For those exposed to negative emotional appeals, such messages appeared to have had limited impact on reducing males' speeding behaviour. The authors concluded that the results highlighted the potential of positive emotional appeals for modifying the behaviour of male road users.

3 Methodology and project participation

3.1 Project approach

Figure 3.1 gives an overview of the project approach, with further detail provided in the following sections.

Figure 3.1 Project method overview



3.1.1 Initial survey

The initial survey provided descriptive information about attitudes to speeding, and knowledge of time savings and fuel consumption associated with speeding. A sample of drivers was sent a letter explaining the study and inviting their participation in an initial survey, an education intervention and a follow-up survey. The sample for this survey came from three sources:

- **Opt-in vehicle owners:** The Transport Agency sent letters inviting 900 drivers to participate in the survey. The researchers did not have the contact details for these individuals because of confidentiality requirements meaning follow up with reminders was not possible.
- **ConsumerBase:** Survey invitations were sent to 2,115 drivers from a commercially sourced sample of vehicle owners aged over 18. The information came from Land Information New Zealand, the WhitePages (New Zealand’s residential phone directory) and Transport Agency records. Each individual who was sent a survey invitation was also called by telephone. The total final sample population was 1,956 (54 numbers were incorrect and 51 people did not qualify as they did not hold a current driver licence valid in New Zealand).
- **Automobile Association (AA) client database:** A survey invitation was emailed to a sample of 6,000 drivers from the AA client data base. The sample was selected to target AA members aged under 40 as respondents in that age group were under-represented in the other two sample sources.

All three samples were balanced between four geographical locations: Auckland and Wellington, other North Island, Dunedin and Christchurch, and other South Island.

Surveys were completed over a four-week period from early November to early December 2013. Survey completions were collected over the phone, online and in hardcopy. All three modes contained the same questions though there were some minor modifications to scripting for the phone survey.

- Phone: Respondents were able to call a toll-free number to arrange a time to be called. However, more often phone surveys were completed when study personnel proactively called respondents. Only those in the ConsumerBase sample were proactively called as privacy concerns meant it was not possible to call the sample sourced from the Transport Agency or the AA.
- Online: The survey was available online for respondents to complete in their own time. All respondents were informed of the online option. Respondents from the AA client database were only offered the online survey option as this approach allowed the survey to be offered to as many people as possible within the project constraints.
- Hardcopy: Respondents in the Transport Agency and ConsumerBase samples were able to request hardcopy versions of the survey.

The profile of drivers responding to the survey was weighted to the New Zealand Census age and gender proportions. Young drivers, particularly young males, have been found to have different speeding attitudes and behaviours (for example, Transport Canada 2007) so the results were weighted to ensure their views were represented.

The questionnaire used in the initial survey is provided in appendix A.

3.1.2 Education material

The education material served as the intervention in this project. The material aimed to provide drivers with information on the costs and benefits of speeding to support informed choices. The complete materials are provided in appendix B.

The approach to designing the material adopted in this project emphasised the importance of clear messages with illustrative examples. The education intervention was:

- Online and paper-based: The education package was developed to be accessed online or in printed format as it was not feasible to deliver the intervention in person for this project.
- Simple and generalised information: The information had to be accessible and relevant for all respondents so was as generalised as possible.
- Not tailored to the individual: All participants received the same intervention and were not able to choose to receive only part of it.

The material followed the general structure of an overall message with illustrative examples followed by a quiz on the key points. The package had four sections with the following key messages:

- 1 Fuel costs: Increasing your speed increases the fuel you use, even if the trip ends up taking less time.
- 2 Travel time: People have difficulty estimating how much time they will save from increasing their speed. Would you still increase your speed if you were saving less time than you thought?
- 3 Risk of penalties: The speed limit is enforced to keep all road users safe. Speeding fines cost you money.

- 4 Safety: The faster you go the more likely you are to crash and crashes are worse when you're speeding. The speed you choose to drive at affects the safety of other drivers on the road.

Although the education intervention was available online, around one-quarter of respondents requested paper copies. These were mailed out and respondents sent back a follow-up survey consent form once they had completed the material.

3.1.3 Follow-up survey

Respondents who notified they had completed the education material (either by completing the material online or by mailing back a completion form) were invited to complete the follow-up survey (see appendix A).

Multiple attempts were made to contact all respondents who completed the education intervention, including phone calls to participants who had requested paper copies of the survey but who had not yet responded. In some cases, it took up to seven weeks after completion of the education material to contact respondents.

The project did not aim to extrapolate any changes following the education intervention to New Zealand drivers as a whole. Instead it aimed to provide pre- and post-intervention measures of attitude changes for a group of respondents comprising the different profiles of New Zealand drivers. Data was not weighted and the comparison included only drivers responding to both the pre- and post-intervention surveys.

3.1.4 Behavioural measurement

Data loggers installed in vehicles can provide accurate, second by second measurements of vehicle speed, position and location alongside a host of other statistics. The purpose of the data logger phase of the project was to explore whether the actual driving behaviour of 25 New Zealand drivers could be effectively measured and to assess changes relating to speed before and after receiving the education intervention.

Respondents were randomly assigned to either group on confirmation of their participation. The sample for participation was drawn from respondents who completed the initial survey and lived in the Wellington region. The Wellington region was chosen as the available global position system (GPS) speed limit maps only covered the Wellington city area.

Participants were divided into two groups (control and education intervention) to understand the effect of the intervention on observable driving performance metrics. Both participant groups were asked to drive for a three-week period with data loggers installed in their vehicles. Participants assigned to the intervention group were sent the education intervention at the two-week point during the data logger driving phase, while control group members received a check-in phone call from the project manager at the same point.

3.2 Project participation

3.2.1 Initial survey

A total of 850 responses were completed through all survey modes and from all survey populations. 297 completions were over the phone with the remainder online or on paper (table 3.1).

Table 3.1 Sample size and sources for the initial survey

Source	Total sample size	Number of completions	Response rate
NZ Transport Agency	900	72	8%
Commercial sample	1,956	554	28%
AA client database	6,000	224	4%
Total responses		850	

Note: The AA client email was sent out just prior to Christmas to a younger sample. No reminders were sent to the Transport Agency or AA samples.

Compared with the New Zealand population described in the 2013 Census, drivers included more New Zealand Europeans (84% compared with 65%) and fewer Māori (5% compared with 14%) and Pacific (2% compared with 8%). Overall, a higher proportion had post-secondary qualifications with just 32% reporting a secondary qualification as their highest education, compared with 36% in the Census.

3.2.2 Education material

The education material was completed by 524 of the 850 initial survey respondents, a conversion rate of 62%. Of those completions, 134 (26%) were on paper and 390 (74%) were online. Nearly half (143, 44%) of the participants who did not complete the education material after taking part in the initial survey refused to participate. The remaining respondents were not reached despite repeated attempts or did not respond.

Table 3.2 Education material completions and refusals

Education material response	Number	Proportion of initial survey responses
Initial survey completions	850	100%
Education material completions	524	62%
<i>Online completions</i>	<i>390</i>	<i>46%</i>
<i>Paper completions</i>	<i>134</i>	<i>16%</i>
Education material refusals	143	17%
Unable to contact	192	23%

3.2.3 Follow-up survey

Overall, 338 respondents completed all three phases of the project: the initial survey, the education material and the follow-up survey. This gave a response rate of 39% for the population that completed the initial survey.

Table 3.3 Final survey response

Final survey response	Number	Proportion of initial survey responses	Proportion of final survey response
Initial survey completions	850	100%	
Education material completions	524	62%	
Final survey completions	338	40%	
<i>Phone</i>	<i>142</i>		<i>42%</i>
<i>Online</i>	<i>118</i>		<i>35%</i>
<i>Paper</i>	<i>78</i>		<i>23%</i>

Comparison of the profile of respondents completing each phase showed some small differences but overall profiles were similar (table 3.4). There was a slight increase in the proportion of respondents in the 60 to 74 age group and decrease in the proportion of those in the younger age groups. The proportion of respondents who identified as New Zealand European increased while there was a reduction in the proportion of people who identified as Pacific or Other ethnic groups. The education attainment of respondents remained consistent.

Table 3.4 Comparison of respondent groups in the initial and follow- up surveys

Comparison measure	Initial survey responses (unweighted)	Final survey responses
Age group		
1-19	0%	0%
20-29	5%	3%
30-39	15%	14%
40-49	17%	17%
50-59	21%	20%
60-74	31%	34%
75+	11%	11%
Gender		
Male	52%	53%
Female	48%	47%
Secondary education only	35%	38%
Duration of licensure group		
0-5	6%	3%
5-10	6%	5%
10-25	22%	22%
25+	65%	70%
New Zealand European	87%	93%

The distribution of the type of driver (defined by the length and frequency of trips) remained consistent with the majority of respondents identifying as frequent drivers of primarily short trips in both surveys.

3.2.4 Behaviour measurement

Twenty-five drivers took part in the behaviour measurement study: 13 participants were assigned to the intervention group and 12 to a control group.

Respondents were randomly assigned to either group on confirmation of their participation. The sample for participation was drawn from respondents who completed the initial survey and who lived in the Wellington region as the speed limit maps available covered Wellington City area.

The response rate of drivers invited to take part in the behaviour measurement phase was 58%.

3.3 Analysis

Data analysis was undertaken in the Statistical Package for the Social Sciences software using the statistical procedure most appropriate for the type, structure and distribution of the variables. Basic descriptive statistics enabled an overview of the data collected. Differences between sub-groups and between initial and final survey results were explored with a variety of different approaches including:

- Independent samples t-test: compared the mean values of scale variables between two groups, for example mean preferred speed for respondents who had or had not received a speeding ticket.
- Paired samples t-test: compared the mean values of a scale variable such as preferred speed and normally distributed ordinal variables before and after the education intervention.
- Mann-Whitney U test: compared the distribution of responses to two ordinal variables (for example, agree to disagree scales), or responses of two groups to an ordinal question, or where the assumption of normality has not been met in the analysis of a scale variable.
- Analysis of variance (ANOVA): compared means of continuous and ordinal variables for three or more groups (for example driver profile clusters).

The data collected was further explored with multiple and logistic regression, factor analysis and two-step cluster analysis. Significant findings and the tests used are noted in the text.

Comparison between the initial and follow-up survey results was limited to paired results from respondents who completed both surveys to limit the effect of non-response bias on comparisons.

3.4 Limitations

The results and findings of this project were primarily drawn from the results of two mixed-mode surveys. Using a survey approach for data collection allowed the project to reach a larger number of people but it carried the usual limitations of non-response bias and self-reported results.

Almost all the survey sample was drawn from a commercial sample rather than through a random selection of vehicle owners. Older respondents were over-represented in the sample. As age is known to have an effect on attitudes towards speed and speeding behaviour, the responses to the initial survey were weighted to age proportions as in the Census 2013 results.

Survey responses reflect self-reported behaviours and attitudes, and are not necessarily representative of participants' actual, real world driving performance. While the limitations of this approach are recognised, it is expected that the same limitations would apply in the initial survey as well as in the follow-up survey, so any observed differences between the two would be indicative of changes in attitudes at the least. It is important to note too that the initial survey response rate was low for some groups which may have created sampling bias.

The additional small sample of drivers driving with the data logger installed in their vehicles pre- and post-intervention provided a more objective assessment of changes in actual driving behaviour but was restricted in size.

Development of the survey tools included a review of a wide range of surveys on driving behaviour. Where possible, the questions used were based on the examples in the literature but refined to suit New Zealand respondents. There was difficulty in developing time savings estimate questions that respondents readily responded to. Early versions, where response options were not offered, caused many respondents to refuse to give an answer. The questions used in the final surveys had correct answers of five minutes and 4.1 minutes respectively, which fell on the margins of the response options given (five to six minutes and two to four minutes respectively). This could have contributed to the small proportion who answered each scenario correctly.

The follow-up survey aimed to test the effect of the education intervention. The number of responses able to be collected over the course of the project was limited by the project budget, so it was not possible to include a control group for comparison. There were two major road safety campaigns that may have had an effect on respondents' attitudes towards speed in the period between the initial survey, intervention and follow-up survey: the Police *Safer Summer* road safety campaign and publication of a new Transport Agency advertisement campaign targeting speed choices. The *Safer Summer* campaign focused on reducing speeding primarily by introducing a lower speed enforcement threshold and increased enforcement intensity over a two-month period. The campaign was widely publicised and included extensive coverage in printed, online and social media. Close to three-quarters (71%) of the initial survey responses were collected before its introduction.

The follow-up survey included questions around respondents' engagement with the other interventions in order to account for their effect in analysis.

While the response rates and retention of respondents between each phase of the project (initial survey, education intervention and follow-up survey) were acceptable, a higher response is always desirable.

4 Initial survey profile of New Zealand drivers and their speeding behaviour

The results reported in this section are based on the survey responses of 850 New Zealand drivers, weighted by age and gender to New Zealand population proportions based on the results of the 2013 Census.

4.1 Profile of drivers

The drivers had held their licence for an average of 27 years. A small proportion (13%) had held their licence for less than five years (table 4.1). Almost all (97%) held full licences and the remainder held restricted licences (3%) or full overseas driver licences (1%). More than one-fifth (21%) of the drivers held additional endorsements on their licences – most commonly motorcycle licences (14%), medium rigid vehicle (9%) or heavy rigid vehicle (9%).

Table 4.1 Distribution of duration of licensure of drivers (*N* = 850)

Duration of licensure	Number of respondents	Proportion of respondents
Less than 5 years	113	13%
5–10 years	119	14%
11–25 years	200	24%
26+ years	418	49%
Total	850	100%

More than half of the respondents had not completed any driving instruction courses, but one-third (33%) had completed defensive driving courses and a smaller proportion (9%) had completed other driving courses. Examples included courses on track driving, commercial driving, ambulance driver courses and AA driver training.

4.1.1 Driving profile

The largest groups of respondents drove mainly short trips every day (37%) or a few times a week (35%). Just under one-fifth (19%) drove short and long trips in about equal proportions and only 8% of respondents mainly drove long trips of 30 minutes or more (table 4.2).

Table 4.2 Respondents' frequency of driving (*N* = 850)

Frequency of driving and most common trip length	Frequent driver (drive every day)	Medium frequency driver (drive a few times a week)	Infrequent driver (drive a few times a month)
Short trips (30 minutes or less)	37%	35%	2%
Long trips (30 minutes+)	1%	5%	2%
Both about the same.	9%	5%	5%
Total	47%	45%	9%

4.2 Speeding

4.2.1 Past speeding behaviour

Drivers ranged from those who had never received a ticket for speeding in their lifetime (27%) to those who had received six or more (10%). Large groups of respondents reported one (21%) or two (18%) speeding tickets in their lifetimes.

In the year preceding the survey, 13% of drivers reported they had received a speeding ticket. A small group of respondents (4%) reported receiving a ticket between the initial and follow-up surveys. This finding is similar to that of the MoT (2012) survey which found that 15% of drivers had received a ticket in the 12 months prior to the survey.

4.3 Attitudes towards speeding

4.3.1 Speed limits

Most respondents considered speed limits were 'about right' in the 50km/h zones and 100km/h zones they normally drove in (83% and 77% respectively). However, substantial proportions considered the limits were too low (15% in 50km/h zones and 17% in 100km/h zones). A Mann-Whitney test showed that males ($n = 475$) were significantly more likely than females ($n = 474$) to believe the speed limits were too low in 100km/h zones ($U = 93245$, $z = -6.43$, $p < .001$). Drivers who reported the speed limits were too high in 100km/h zones had a mean age of 53.5 years, significantly higher than the mean age of 44.1 years for those who felt speed limits were too low ($F(2,829) = 5.48$, $p = .004$).

4.3.2 Definition of speeding

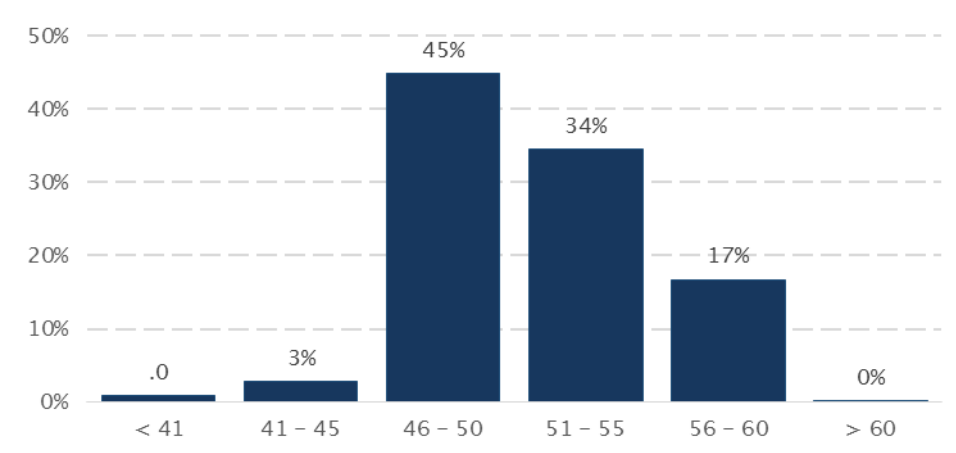
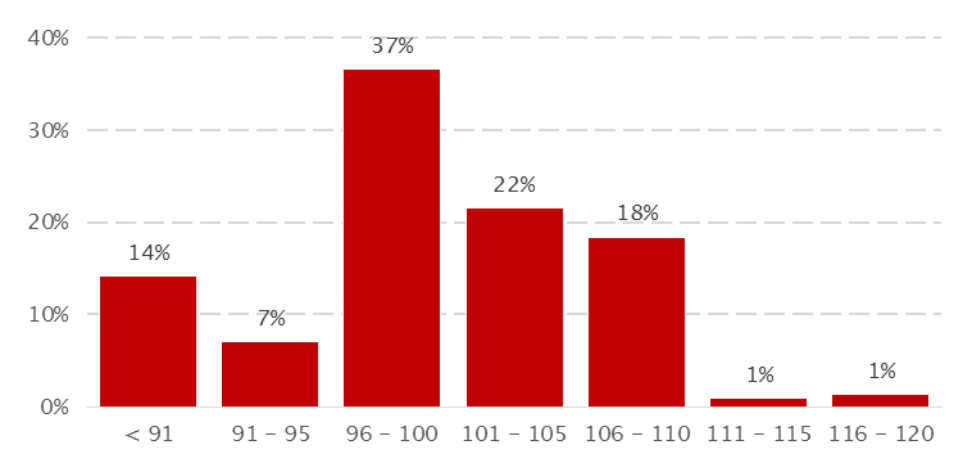
Respondents were asked: 'What speed would you need to be travelling in a (50km/h or 100km/h) zone before you considered yourself to be speeding?' Few respondents gave absolute definitions, that any speed greater than the speed limit is speeding. Only 8% of respondents considered themselves to be speeding at 51km/h or slower in 50km/h zones. Similarly, only 11% of respondents considered themselves to be speeding at 101km/h in 100km/h zones. Respondents tended to identify speeds at 5km/h intervals above the speed limit, for example 55km/h (30%) or 60km/h (33%) in 50km/h zones, and 105km/h (18%), 110km/h (36%) and 120km/h (12%) in 100km/h zones (table 4.3).

Table 4.3 Definitions of speeding compared with speed limits in 50km/h and 100km/h zones ($N = 827$)

Would consider themselves to be speeding at...	50km/h zones	100km/h zones
Speed limit or lower	4%	8%
+1-5km/h	42%	25%
+6-10km/h	42%	41%
+ <10km/h	12%	27%

4.3.3 Preferred travel speed

Respondents were asked the speed they preferred to travel at when not limited by the conditions or by other vehicles on the road in both 50km/h and 100km/h zones. While most respondents (83%) considered that speed limits in 50km/h zones were 'about right', many aimed to travel at speeds higher than the speed limit in 50km/h zones (52%) (figure 4.1) and 100km/h zones (44%) (figure 4.2).

Figure 4.1 Drivers' preferred speeds in 50km/h zones (N = 832)**Figure 4.2 Drivers' preferred speeds in 100km/h zones (N = 832)**

Large groups of respondents identified 55km/h (24%) or 60km/h (11%) as their preferred speeds in 50km/h zones, and 105km/h (15%), 110km/h (14%) and 120km/h (1%) in 100km/h zones.

Respondent definitions of speeding were moderately correlated with the speeds they aimed to travel at in 50km/h ($r_s = .55, p < .001$) and 100km/h zones ($r_s = 0.55, p < 0.001$). Although high proportions of respondents aimed to travel faster than the speed limit, only small proportions would consider themselves to be speeding when travelling at their preferred speed in 50km/h (5%) and 100km/h (3%) zones. Speed choice was also weakly negatively correlated with age in both 50km/h ($r_s = -.31, p < .001$) and 100km/h ($r_s = -.32, p < .001$) zones.

Respondents who had received more tickets had higher mean preferred travel speeds than those who had received fewer speeding tickets. One-way ANOVA showed that the number of tickets in the respondents' lifetimes had a significant effect on preferred speed ($F(4,824) = 8.95, p < .001$). Table 4.4 shows the differences.

Table 4.4 Mean preferred speed by lifetime ticket receipt (N = 828)

Number of tickets	Mean preferred speed (km/h)	Significantly different to:
No tickets (<i>n</i> = 220)	100.02	People with 6+ tickets
One ticket (<i>n</i> = 173)	98.94	All but those with no tickets
Two tickets (<i>n</i> = 150)	101.53	Those with one ticket and 6+ tickets
3-5 tickets (<i>n</i> = 206)	101.59	Those with one ticket or 6+ tickets
6+ tickets (<i>n</i> = 81)	104.33	All other groups

Note: Differences noted were significant at $p < .05$ and were identified using the Tukey post-hoc test.

4.4 Motivations for speed choices

The survey included a series of 26 questions asking respondents to agree or disagree with statements about the reasons they chose for speeding or not speeding. The questions used a seven point scale (from 1 = strongly disagree to 7 = strongly agree). Questions have been coded in two ways:

- For clarity in charts describing individual questions, 1 = strongly disagree, 2-3 disagree, 4 neither agree nor disagree, 5-6 agree, 7 strongly agree.
- For factor analysis, answers for the questions included in each factor were combined to generate a score between 0 and 100 for each of the five factors for each individual. Respondents who strongly agreed with most questions within a factor scored closer to 100 while respondents who strongly disagreed with most questions scored closer to 0.

Factor analysis was adopted to identify which of these variables were related to each other, and to reduce the number of variables used in regression and other analysis. Five significant factors emerged from the responses to the questions on reasons for speed choices. Overall, of the factors for reasons not to speed (risk of crashing, penalties, financial costs), risk of crashing received the highest score, showing strongest agreement that risk of crashing was a reason not to speed (table 4.5).

Table 4.5 Factors associated with the reasons for speeding

Factor	Average score	Survey items
Risk of crashing	82	I choose not to speed because: <ul style="list-style-type: none"> • a crash at 70km/h will be a lot more severe than one at 60km/h • driving over the speed limit increases the risk of a crash.
Penalties	67	I choose not to speed because: <ul style="list-style-type: none"> • of the risk of being fined • of the risk of receiving demerit points • it is a criminal offence.
Safe to speed	66	Choose to speed because: <ul style="list-style-type: none"> • you think that your car is safe to drive at those speeds • you are travelling on familiar roads.
Other traffic	59	I choose to speed because: <ul style="list-style-type: none"> • there are few or no other cars around • I want to keep up with the traffic flow • the cars around me are speeding.
Financial	55	I choose not to speed because: <ul style="list-style-type: none"> • of the extra wear and tear on the car.

A series of t-tests showed that male and female respondents had significant differences in their scores for all factors except for choosing not to speed due to financial costs (table 4.6). Males were more likely to choose to speed because of other drivers and because they felt it was safe to do so. Females were more likely to choose not to speed due to the risk of crashing and penalties.

Table 4.6 Effect of gender on scores for reasons to speed or not to speed

Factor	Male mean	Female mean	Significant?
Risk of crashing	78.5	86	Yes ($t = -5.8, p < 0.001$)
Penalties	65	69	Yes ($t = -2.7, p = 0.006$)
Safe to speed	69	62	Yes ($t = -4.2, p < 0.001$)
Other traffic	61	56	Yes ($t = -4.0, p < 0.001$)
Financial	55	56	No ($t = -0.5, p = 0.595$)

Similarly, younger drivers (under 40) scored differently from older drivers. They were more likely to choose to speed because of other traffic. While they were more likely to choose not to speed because of the risk of crashing, they were also more likely to choose to speed because they believed it was safe to do so (table 4.7).

Table 4.7 Effect of being aged under 40 on scores for reasons to speed or not to speed

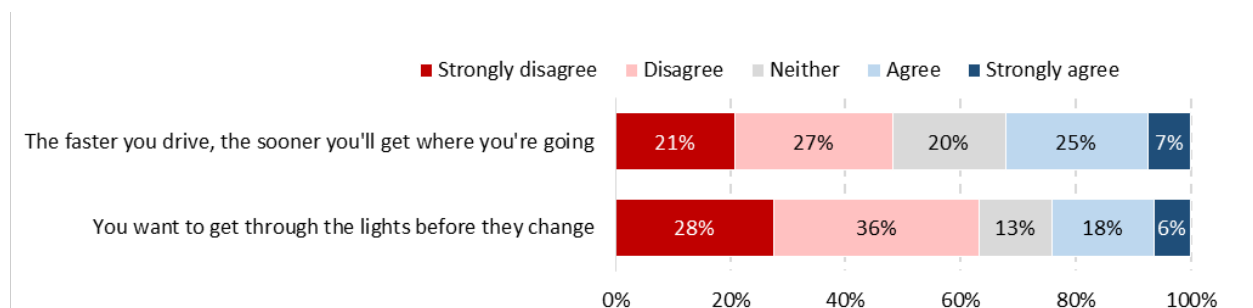
Factor	Aged under 40	Aged 40+	Significant?
Risk of crashing	84	81	Yes ($t = 2.3, p = 0.02$)
Penalties	67	67	No ($t = 4.5, p = 0.9$)
Safe to speed	71	62	Yes ($t = 5.3, p < 0.001$)
Other traffic	62	57	Yes ($t = 4.4, p < 0.001$)
Financial	58	54	No ($t = 2.3, p = 0.02$)

4.4.1 Speeding to save time

When asked about saving time from speeding, nearly one-third (32%) of respondents agreed or strongly agreed that when they chose to speed, it was because they would arrive at their destination sooner. However, a larger proportion (48%) disagreed or strongly disagreed. The mean score for speeding to get to their destination sooner, on the scale from one to seven, was 3.5 (standard deviation 1.86).

Similarly, nearly two-thirds (64%) disagreed that they chose to speed to get through traffic lights before they changed.

Figure 4.3 Drivers' agreement with statements about when they choose to speed (N = 827- 833)



Differences between respondent groups were investigated using Mann Whitney tests as the data was not normally distributed. Results showed that drivers were more likely to agree they chose to speed to get to their destinations sooner if they:

- **Aimed to speed:** Drivers who aimed to travel over the speed limit in 50km/h ($n = 433$) and 100km/h ($n = 366$) zones were more likely to agree that they chose to speed because they would get to their destination sooner. On a scale of 1 (strongly disagree) to 7 (strongly agree), drivers who aimed to travel over the speed limit in 100km/h zones had a mean score of 3.7 compared with 2.8 for those who did not ($U = 58080, z = -6.47, p < .001$). Results were similar for those who aimed to travel over the speed limit in 50km/h zones; these had a median of 3.9 compared with 3.1 for those who did not ($U = 82280, z = -6.91, p < .001$).
- **Felt speed limits were too low:** Drivers who felt the speed limits were too low in 100km/h zones were more likely to agree they chose to speed to get to their destinations sooner than drivers who felt speed limits were too high ($U = 2504, z = -5.16, p < .001$). Drivers who felt the speed limits were too low had a mean score of 4.0 compared with 2.42 for those who felt they were too high.
- **Were younger:** Drivers under 40 years of age were more likely to agree they chose to speed to get to their destination sooner ($U = 70316, z = -7.52, p < .001$). Younger drivers had a mean agreement score of 4.7 out of 7 while older drivers had a mean score of 4.0.

Respondents were asked to estimate how much time a driver would save in two hypothetical scenarios. The response categories were given in two-minute intervals and the drivers were asked to provide an estimate, not attempt to calculate the correct answer. The majority of respondents underestimated time savings in the lower speed scenario (72%) and overestimated time savings in the higher-speed scenario (59%) (figure 4.5).

Figure 4.4 Responses to the time savings question: ‘Imagine Bob is travelling on a trip through town. It usually takes about 30 minutes if he sticks to the speed limit of 50 km/h. How many minutes do you think Bob will save if he drives 60km/h instead?’ (The correct answer is 5-7 minutes) (N = 846)

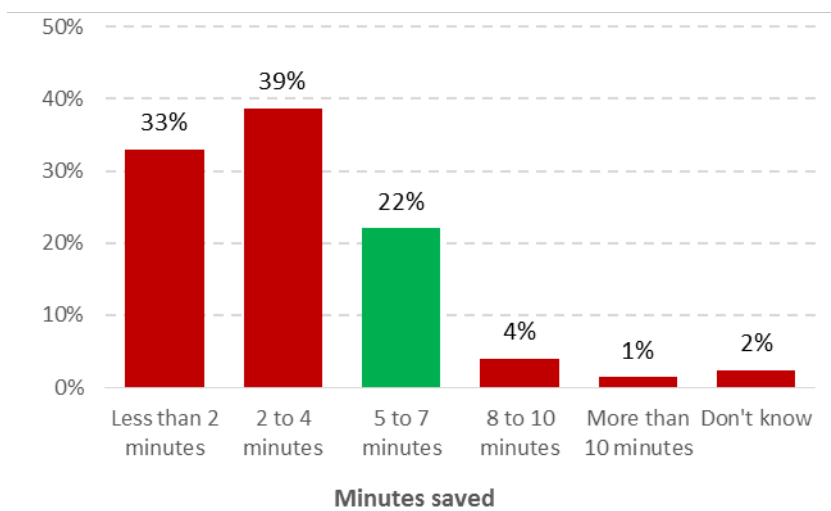
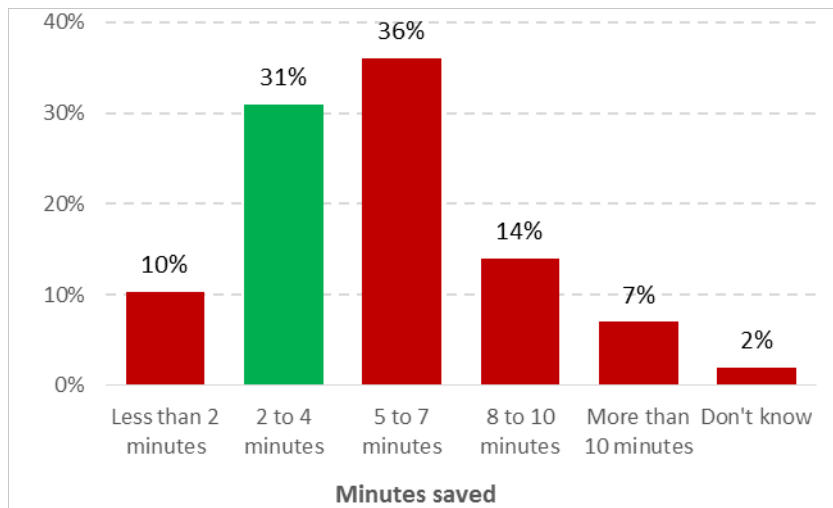


Figure 4.5 Responses to the time savings question: 'Now imagine Bob is driving a trip that normally takes him about 30 minutes at 95km/h. How many minutes do you think Bob will save if he drives at 110km/h instead?' (The correct answer is 2-4 minutes) (N = 846)



As drivers' level of agreement that they sped to save time increased, they gave higher time savings estimates for both the low speed ($r_s = .17, p < .001$) and high-speed scenarios ($r_s = .22, p < .001$). Drivers who agreed they sped to save time gave slightly higher time saving estimates. The mean answer for those who agreed they sped to save time was 2.2 for the low-speed scenario, significantly higher than 1.9 for those who did not ($t(820) = 4.01, p < .001$). Similarly drivers who agreed they sped to save time had a mean answer of 3.1 for the high-speed scenario, significantly higher than 2.6 for those who did not ($t(553.86) = 6.60, p < .001$).

4.4.2 Safety risk

Compared with other reasons for choosing to speed or not to speed, high proportions of respondents agreed or strongly agreed they chose not to speed because of the safety risk. Higher proportions of respondents (86% to 87%) agreed or strongly agreed they chose not to speed because of speed's influence on the severity of crashes than those who agreed with the statement that speeding increased the chance of crashing (73%).

Only 25% of respondents agreed or strongly agreed they chose not to drive faster than the speed limit because their car was not safe at those speeds. Similarly, many respondents agreed or strongly agreed that when they sped it was because they were travelling on familiar roads (66%) or because they knew they could drive at that speed safely (63%).

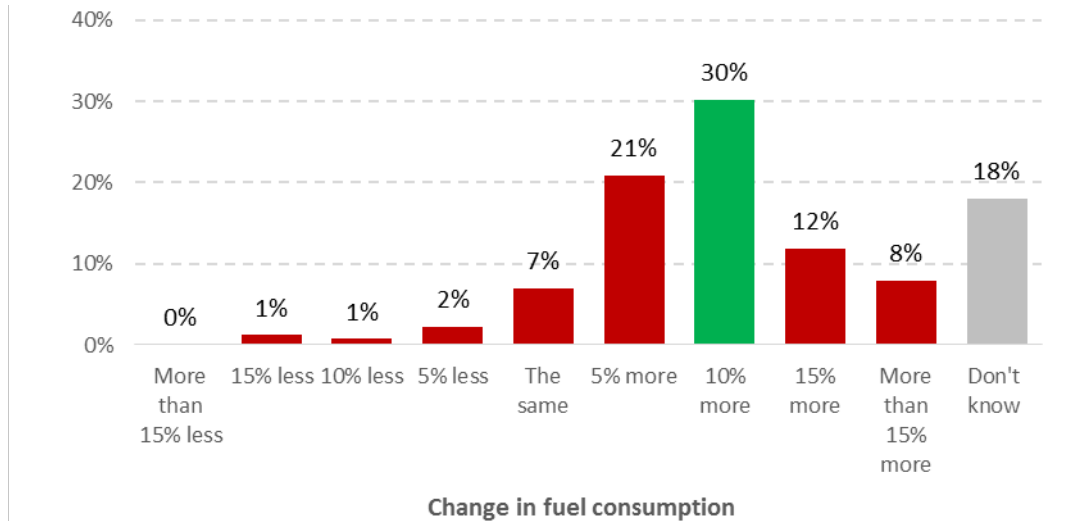
4.4.3 Fuel costs and wear and tear

Nearly half (46%) of survey respondents agreed or strongly agreed that they chose not to speed because of the fuel costs of driving faster or the extra wear and tear on the car (36% of participants). More than one-third of drivers agreed or strongly agreed they chose not to speed because of the cost of the extra wear and tear on the car (36%). Younger drivers (under 40) had higher agreement that they chose not to speed because of the fuel cost, with a mean score of 4.3 compared with 3.9 for older drivers (over 40) ($t(804) = 2.17, p = .03$). Results were similar for the costs of wear and tear on the car. Younger drivers had a mean score of 4.0 compared with 3.6 for older drivers ($t(804) = 2.38, p = 0.018$).

Respondents were asked to give their best estimate, without calculating an answer, for how increasing speed affects fuel consumption. Many respondents (71%) reported that speeding increased fuel

consumption. A smaller proportion (30%) correctly estimated how much extra fuel the average vehicle consumed by travelling at a higher speed; however, a further 33% gave estimates within five percentage points of the correct answer (figure 4.6). This suggests that many people choose not to speed because of fuel costs and understand that increasing speed increases fuel consumption.

Figure 4.6 Responses to the question: ‘Does an average car use more, the same or less fuel travelling when travelling at 120km/h compared to 100km/h?’ (The correct answer is 10% more) (N = 846)



4.4.4 Penalties

A higher proportion (70%) of respondents agreed or strongly agreed that they chose not to speed because of the risk of a fine rather than because of the risk of demerit points (56%) or because they thought speeding was a criminal offence (59%). Lifetime ticket receipt had a significant effect on whether drivers chose not to speed because it is a criminal offence ($F(4,814) = 16.11, p < .001$). Drivers' agreement decreased as the number of lifetime tickets increased. Drivers with no ticket and one ticket in their lifetimes had agreement of 5.2 and 5.3 out of 7 respectively, significantly higher than those who had received two tickets (4.5), three to five tickets (4.3) or six or more tickets (3.7) in their lifetime.

Lifetime ticket receipt did not have a significant effect on choosing not to speed because of the risk of demerit points or speeding tickets.

4.4.5 Other reasons

Few respondents in the survey agreed or strongly agreed they chose not to speed because of the effect on climate change (15%) or noise pollution (15%).

Many drivers agreed or strongly agreed that they chose to speed because of the behaviour of other cars around them. Nearly two-thirds (63%) agreed or strongly agreed they sped because they wanted to 'keep up with the traffic flow' and nearly half (45%) agreed or strongly agreed that they sped because the cars around them were speeding.

4.5 Driver clusters

Cluster analysis was run to identify groups of respondents with similar attitudes towards speeding. The clusters of drivers can be used to quickly identify respondents with common attitudes and behaviours, who may have similar responses to the education material. The analysis identified three groups among the drivers which have been classified as young (aged <40), risk averse and aggressive. Their characteristics are detailed in table 4.8.

Drivers in the young cluster reported that when they sped it was because they wanted to save time, because of other cars around them and it was safe for them to speed. But they also agreed that they chose not to speed because of the risk of crashing. They had the highest mean scores for choosing not to speed because of the financial costs and the penalties for being caught.

Drivers in the risk-averse cluster were older on average and the least likely to have received a ticket in the past year. They had the lowest preferred travel speeds in 50km/h and 100km/h zones. While they were more likely to have received a ticket in their lifetime, this may in part be accounted for by their age. They were least likely to agree that they sped for any of the reasons available and strongly agreed they chose not to speed because of the risk of crashing.

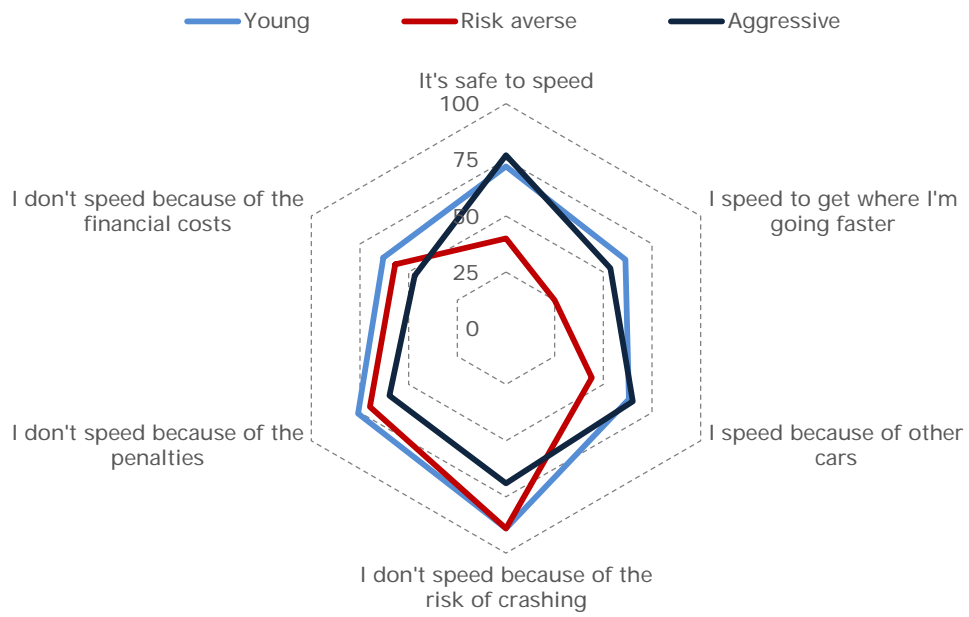
Drivers in the aggressive cluster tended to have received higher numbers of tickets in their lifetime and were more likely to have received a ticket in the last year. Almost all had received speeding tickets at some point in their driving career. They had higher scores than the risk-averse cluster for the three reasons for speeding (saving time, the behaviour of other cars and safety of their speeding). They were also less likely to agree with the reasons for not speeding (penalties, risk of crashing and the financial costs). They were more often frequent drivers and more likely to aim to drive above the speed limit in both 50km/h and 100km/h zones.

Table 4.8 Cluster characteristics

Characteristic	Young 39% of drivers	Risk averse 25% of drivers	Aggressive 36% of drivers
Age (mean)	46	60	55
Proportion aged under 30 years	42%	5%	7%
Proportion of frequent drivers	46%	40%	54%
Proportion with no lifetime tickets	42%	32%	1%
Proportion with 4+ lifetime tickets	7%	14%	50%
Proportion with no ticket in the last year	87%	90%	76%
Mean ideal speed (50km/h zone)	53km/h	51km/h	54km/h
Mean ideal speed (100km/h zone)	100km/h	97km/h	103km/h
Aims to travel above the limit in 50km/h zones	51%	25%	64%
Aims to travel above the limit in 100km/h zones	72%	57%	89%

The chart below shows their scoring for five different reasons for speeding based on the factor variables and individual question for saving time (figure 4.7).

Figure 4.7 Reasons for speeding for each respondent cluster



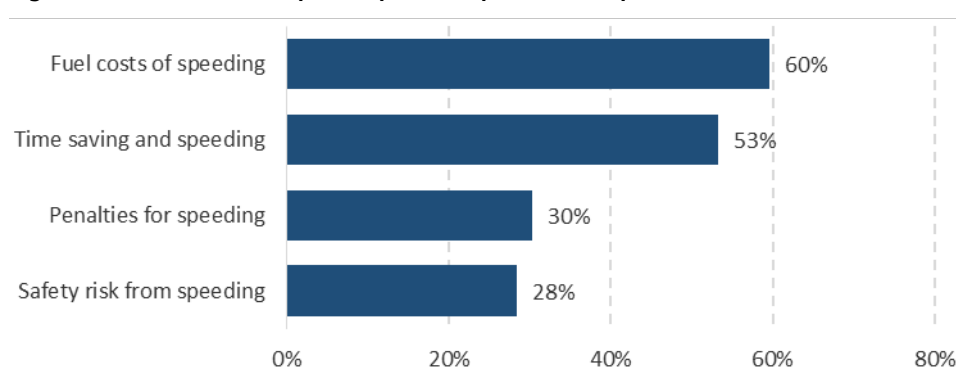
5 The education intervention

The education intervention was designed to provide drivers with accurate information about the potential costs and benefits of speeding to assist them in making better-informed decisions regarding how fast to drive.

5.1 Engagement

One-third (32%) of respondents who completed the education materials reported they learned something new and two-thirds reported they did not. Those who said they learned something new most often said it was about the fuel costs and time savings of speeding. Fewer respondents learned something new on safety risk and penalties (figure 5.1).

Figure 5.1 Information pack topics that provided respondents with new information ($n = 106$)



In the follow-up survey, respondents were asked what they remembered most from the information package. Some examples are provided in table 5.1.

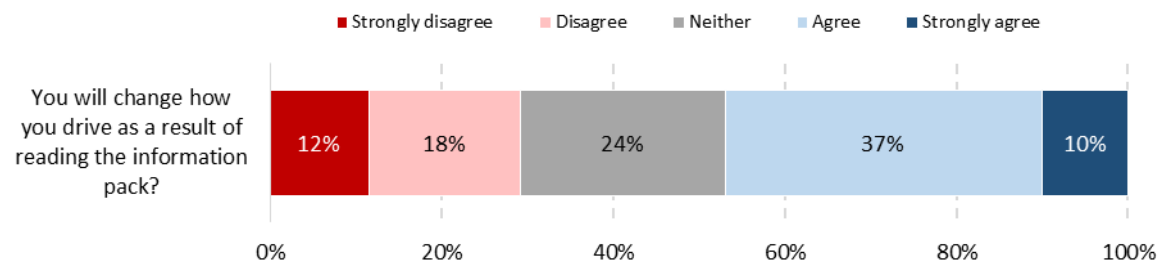
Table 5.1 Examples of what respondents remembered most from the information package

Area of information	Examples respondents gave of what stood out most for them
Fuel costs	You use a ridiculous amount of fuel by the end of the year from speeding. The faster you go the more petrol the car consumes then the trip will be more expensive. I travel about once a month out of Auckland and it showed me that if I keep my speed down a bit I will use less fuel.
Time saving	You save a lot less time than you think speeding around town. You do not really save much time when speeding and your risk of getting into an accident is much higher. The little bit of time you would save by going so much faster, you only save such a minimal amount of time it wasn't worth it. Reaffirms when you see crazy drivers speeding you catch up to them at the next traffic light.
Penalties	Wasn't aware of the severity of the penalties. If you go over the limits there are penalties at a scale where the faster you drive the more penalties you receive. I did not know the specific penalties for speeding prior to reading this so the specific penalties stood out for me.
Safety risk	You can't stop as easily when you're speeding. The rise of risk of danger is more than the amount of change in speed, it is not a linear relationship. The damage caused by a crash increases significantly even with a relatively small increase in speed.

Responses were consistent with the messages in the education material, though a small proportion of respondents (less than 5% for each area) reported they did not agree with comments in the material or did not remember anything.

Overall, nearly half (47%) of respondents agreed or strongly agreed they thought they would change their driving in response to the education material (figure 5.2); this was a higher proportion than for those who agreed they had learned something new. Respondents who said they learned something new were more likely to agree they would change how they drove as a result of reading the information pack, with a mean score of 4.7 out of 7 compared with 4.0 for those who did not learn anything new ($F(307) = 2.12, p < .001$).

Figure 5.2 Respondents' reported likelihood to change their driving as a result of the information pack (n = 319)



Of the respondents who completed the initial survey and refused to complete the education material (143 respondents out of 850) a small but untracked number gave negative feedback verbally. Those comments generally argued that some of the generalised statements in the material did not apply to their vehicle or their driving, or that the information was too simplistic.

6 Follow-up survey results

The following section presents the results for respondents who completed the initial and follow-up surveys, a total of 338 respondents. They have not been weighted to the New Zealand population. Note that the changes discussed in this section are self-reported.

6.1 Other interventions

In the follow-up survey, respondents were asked whether they had seen the other two major road safety campaigns that targeted speed between the completion of the initial survey and the follow-up survey. Almost all respondents (99%) had heard about the Police *Safer Summer* campaign over the Christmas holiday period at the end of 2013. One-third (33%) said the campaign had made them more aware of their speed, made them pay more attention to their speedometer and reported they drove more slowly over the holiday period as a result.

Compared with drivers who did not change their driving in response to the Police campaign, drivers who reported that they drove more slowly had significantly higher travel speeds in the initial survey in 50km/h zones (51.3km/h compared with 53.5km/h, $t(312.1) = -5.64$, $p < .001$) and 100km/h zones (99.1km/h compared with 101.5km/h, $t(318.5) = -2.78$, $p = .006$).

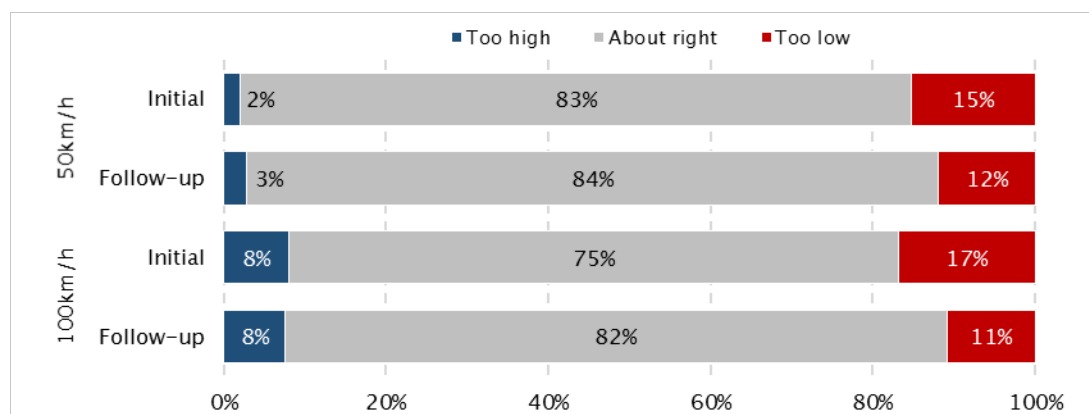
A high proportion of respondents (89%) also reported they had seen the Transport Agency's 'Choices' advertising campaign which began in December 2013. Most had seen it on television (83%). One-fifth (20%) said that seeing the advertisement had made them drive more slowly, while nearly one-quarter (24%) said it had changed their driving in another way, for example by increasing their awareness of other drivers and making them more wary of intersections on the open road as well as in urban areas.

6.2 Attitudes to speed

6.2.1 Views on speed limits

The proportion who believed the speed limits of the 50km/h roads they normally drive on were too low decreased significantly from 15% to 12%. The distribution of answers was substantially different from that in the initial survey ($z = -2.06$, $p = .039$). Similarly, the proportion who believed the speed limits on the 100km/h roads they normally drive on were too low decreased from 17% to 11% ($z = -2.250$, $p = .024$) (figure 6.1).

Figure 6.1 Respondent views on the speed limits of the 50km/h ($N = 329$) and 100km/h ($N = 328$) roads they normally drive on



6.2.2 Change in definition of speeding

More than one-third (41%) of respondents decreased the speed they defined as speeding in 50km/h zones between the initial and the follow-up survey. The proportion that provided an absolute definition of speeding (51km/h or lower speed) increased from 9% in the initial survey to 14% in the follow-up survey.

The largest groupings of respondents felt they would be speeding at 55km/h or 60km/h in both the initial and follow-up surveys. Nearly one-half (47%) of the respondents who defined speeding as 55km/h reported a lower definition on the follow-up survey. Overall, the mean speed definition in 50km/h zones decreased significantly from 56.9km/h to 56.0km/h ($t(330) = 4.75, p < .001$) (table 6.1).

Table 6.1 Distribution of definitions of speeding in 50km/h zones in the initial and follow- up surveys ($N = 331$)

Definition of speeding in 50km/h zones (km/h)	Initial survey	Follow- up survey
50 or slower	5%	5%
51-55	48%	58%
56-60	37%	29%
61 or faster	10%	6%

Similarly, 42% of respondents decreased the speed they defined as speeding in 100km/h zones. As in 50km/h zones, few gave an absolute definition (any speed over 50km/h) of speeding in the initial (14%) or follow-up (15%) surveys. Overall the mean speed definition for 100km/h zones decreased from 108.9km/h to 107.6km/h ($t(326) = 4.13, p < .001$) (table 6.2).

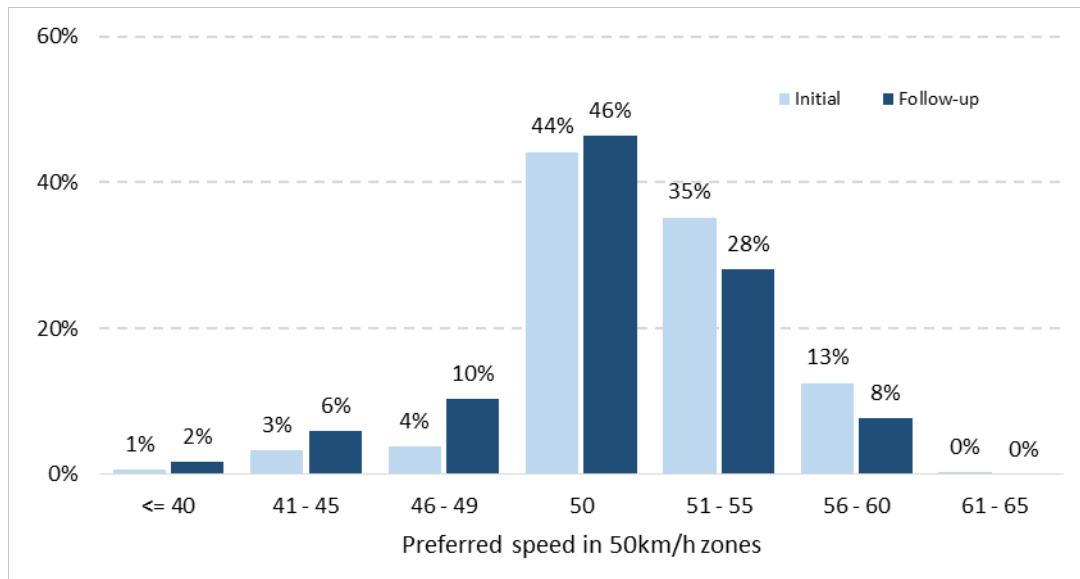
Table 6.2 Distribution of definitions of speeding in 100km/h zones in the initial and follow- up surveys ($N = 327$)

Definition of speeding in 100km/h zones (km/h)	Initial survey	Follow- up survey
100 or slower	10%	6%
101 - 105	28%	43%
106 - 110	41%	36%
111 or faster	22%	14%

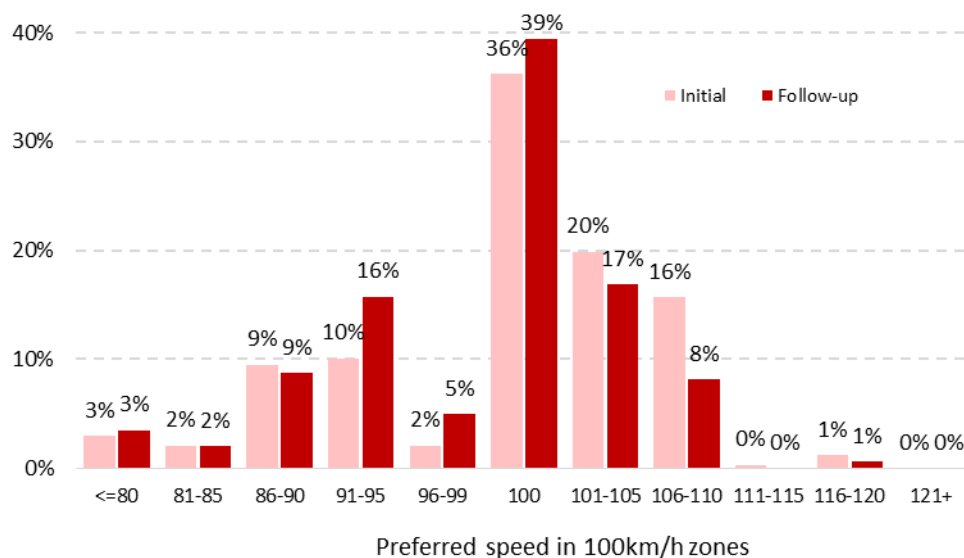
6.2.3 Speed choices

Respondents' preferred speeds in 50km/h and 100km/h zones decreased. While the majority of drivers thought the speed limits were 'about right' in 50km/h and 100km/h zones, even after the education material a much smaller proportion actually aimed to drive at or under those speed limits.

Nearly one-half (48%) of respondents reported that they aimed to travel over the 50km/h speed limit in the initial survey compared with 36% in the final survey (figure 6.2). Overall, 40% of respondents reported that their preferred travel speed was lower in the follow-up survey compared with the initial survey. A paired samples t-test showed the mean preferred speed decreased significantly from 52.3km/h to 51.2km/h ($t(323) = 7.18, p < .001$) (figure 6.2).

Figure 6.2 Respondents' preferred speeds in 50km/h zones (N = 324)

The same pattern is evident in the results for 100km/h zones. More than one-third (37%) of respondents reported they preferred to travel over the speed limit in the initial survey and this decreased to 26% in the follow-up survey (figure 6.3). Overall, nearly one-half of drivers (41%) reported that their preferred travel speed was lower in the follow-up survey compared with the initial survey. A paired samples t-test showed the mean preferred speed in 100km/h zones decreased significantly from 100.1km/h to 98.9km/h ($t(329) = 4.26, p < .001$).

Figure 6.3 Respondents' preferred speeds in 100km/h zones (N = 330)

As in the initial survey, drivers' definitions of speeding and preferred speeds were moderately correlated (table 6.3). While many drivers aimed to travel over the speed limit, very few aimed to travel at a speed they considered to be speeding. Between the initial and follow-up surveys the proportion decreased from 3% to 2% in 50km/h zones and from 5% to 2% in 100km/h zones.

Table 6.3 Correlation between respondents' definitions and speeding and preferred speeds

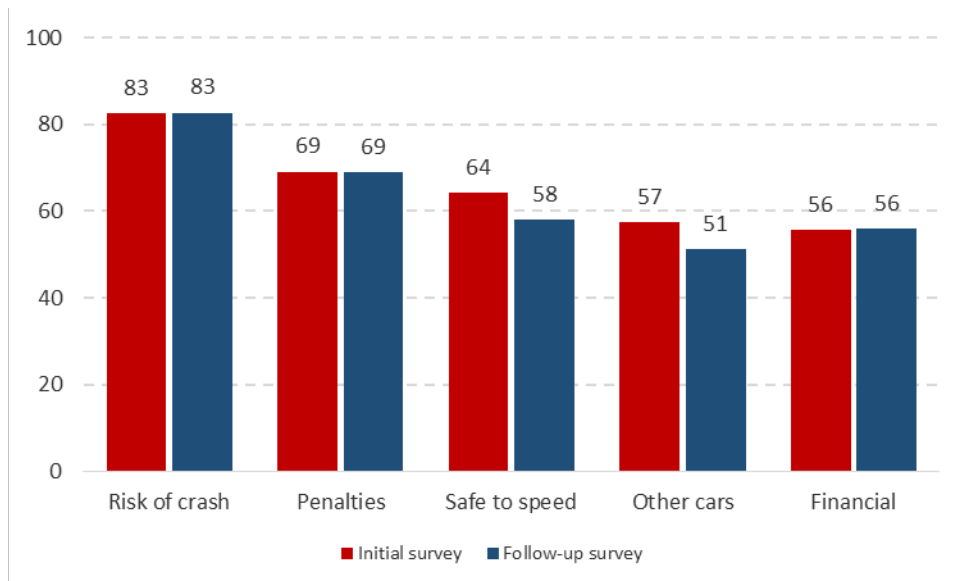
Definition of speeding and preferred speed in:	Correlation
Initial: 50km/h zones	Initial: moderate ($r_s = 0.60, p < .001$) Follow-up: moderate ($r_s = 0.55, p < .001$)
Initial: 100km/h zones	Initial: moderate ($r_s = 0.600, p < .001$) Follow-up: moderate ($r_s = 0.445, p < .001$)

Cluster membership (young, aggressive or risk averse) did not have a significant effect on change in preferred speed in a 50km/h zone.

6.3 Reasons for speeding

The scores for thinking it was safe to speed ($t(331) = 4.13, p < .001$) and speeding due to the behaviour of other cars ($t(332) = 6.83, p < .001$) significantly decreased. This result suggests that, after the intervention, fewer respondents chose to speed because of the influence of other cars or because they believed it was safe to drive at those faster speeds. Respondents' scores did not change significantly in three of the five factors relating to reasons for speeding or not speeding (figure 6.4).

Figure 6.4 Reasons for speeding



There was no significant difference in change to reasons for speeding between respondents who did and did not learn something new from the education material; younger and older respondents; or males or females.

However, one-way ANOVA examining the difference between initial and follow-up survey scores found some differences in how the three clusters of driver profiles (discussed in section 4.5) changed their responses differently. The cluster membership had a significant effect on change in drivers' scores for:

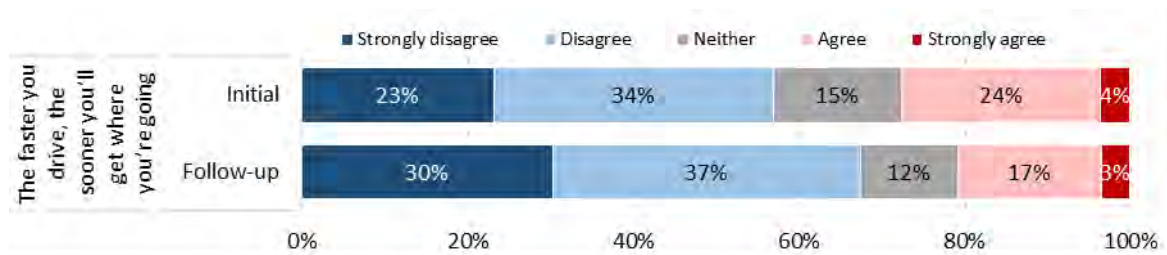
- Belief that it was safe to speed ($F(2,298) = 6.11, p < .01$): Drivers in the young and aggressive clusters decreased their scores by 10 each, showing lower agreement that they chose to speed because they believed it was safe to do so. They decreased by significantly more than drivers in the risk-averse cluster, whose mean score did not change significantly.

- Speeding because of other drivers ($F(2,296) = 8.06, p < .001$): Drivers in the young cluster decreased their scores by 11 points and drivers in the aggressive cluster decreased by 7 points, showing lower agreement that they chose to speed because of other drivers. Both decreased significantly more than drivers in the risk-averse cluster (1.5 points).
- Not speeding because of the risk ($F(2,297) = 5.12, p < .01$): Drivers in the young cluster decreased their scores by 5 points, showing reduced agreement that they chose not to speed because of the risk of doing so. The change was significantly different from that of drivers in the aggressive cluster who increased their scores by 5 points, showing increased agreement with choosing not to speed because of the risk of doing so.

6.3.1 Saving time

The proportion of respondents who agreed or strongly agreed that when they sped, it was because ‘the faster you drive, the sooner you’ll get where you’re going.’ decreased from 28% to 20%, while the proportion that disagreed or strongly disagreed increased from 57% to 67% (figure 6.5). The mean score out of seven decreased significantly from 3.21 to 2.85 between the two surveys ($t(333) = 3.36, p = .001$).

Figure 6.5 Respondents’ level of agreement with: ‘The faster you drive, the sooner you’ll get where you’re going’ (N = 336)



Respondents were asked to estimate how much time a driver would save in the same two hypothetical scenarios used in the initial survey. In both surveys, they tended to underestimate the amount of time that would be saved by increasing from a relatively low speed (50km/h to 60km/h) (figure 6.6) and overestimate the time saved by increasing from a relatively high speed (95km/h to 110km/h) (figure 6.7).

Figure 6.6 Responses to the time savings question: ‘Imagine Bob is travelling on a trip through town. It usually takes about 30 minutes if he sticks to the speed limit of 50km/h. How many minutes do you think Bob will save if he drives 60km/h instead?’ (The correct answer is 5 minutes and is coloured green) (N = 331)

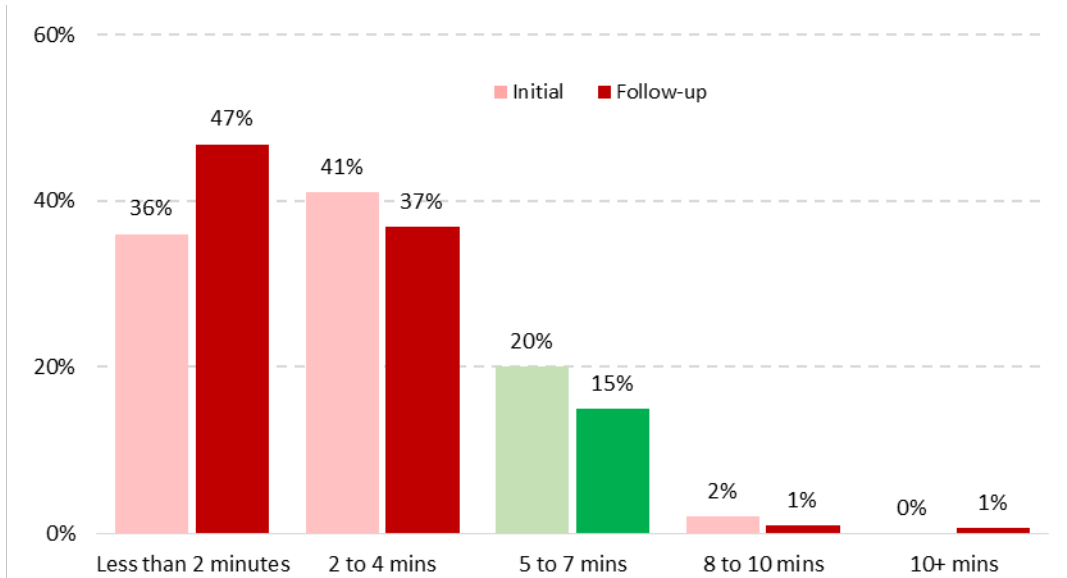
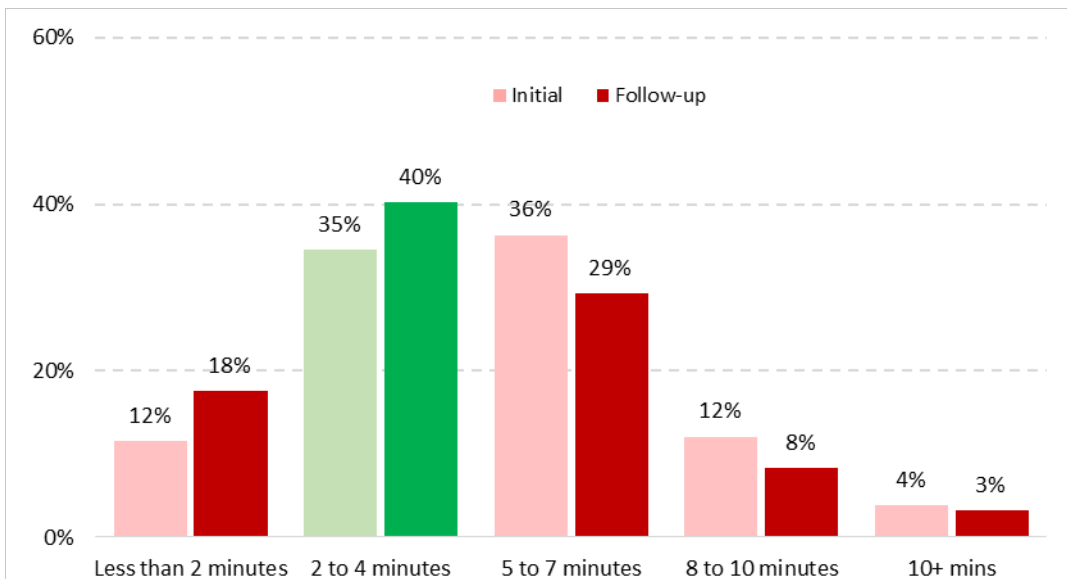


Figure 6.7 Responses to the time savings question: ‘Now imagine Bob is driving a trip that normally takes him about 30 minutes at 95km/h. How many minutes do you think Bob will save if he drives at 110km/h instead?’ (The correct answer is 4.1 minutes, coloured green) (N = 337)



A paired samples t-test showed that the mean estimates significantly decreased from 1.9 to 1.7 in the first scenario ($t(330) = 3.95, p < .001$) and 2.7 to 2.4 in the second scenario ($t(336) = 3.63, p < .001$).

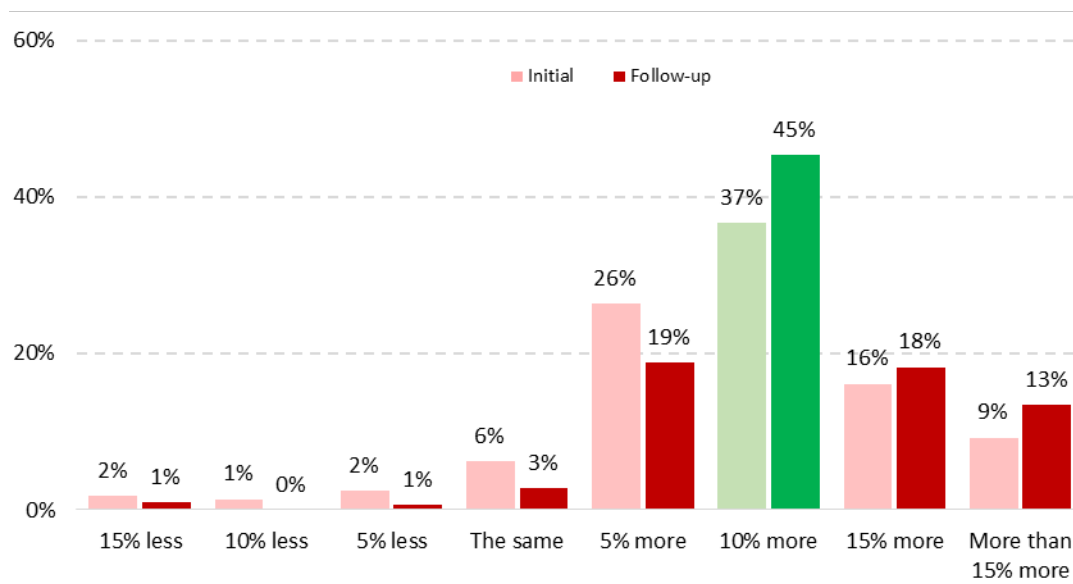
Respondents’ answers shifted in a direction consistent with the content of the education material. The messaging emphasised the fact that time savings were often not as great as might be estimated in city driving conditions. Nearly one-third (31%) of respondents lowered their estimate for the time saving in scenario one and more than one-third (38%) gave a lower estimate for scenario two.

6.3.2 Fuel consumption

There was no change in the proportion of respondents who agreed they chose not to speed because of the fuel costs of driving faster between the initial and the follow-up survey (48% in both).

However, the proportion of respondents who answered the fuel saving scenario correctly increased from 37% to 45% in the follow-up survey (figure 6.8). Just under half (47%) of the respondents increased their estimates of the amount of fuel that would be saved, consistent with the message in the education material that travelling faster uses more fuel.

Figure 6.8 Responses to: ‘Does an average car use more, the same or less fuel travelling when travelling at 120km/h as compared to 100km/h?’ The estimate for the correct answer is shaded green (N = 331)



6.3.3 Choosing not to speed because of safety risk

There was no significant change in the proportion of respondents that agreed they chose not to speed because of the safety risk. In both surveys, almost all respondents agreed they chose not to speed because crashes were more severe at higher speeds (86% in both) and because driving over the speed limit increased the chances of someone being killed or injured in a crash (89% in both).

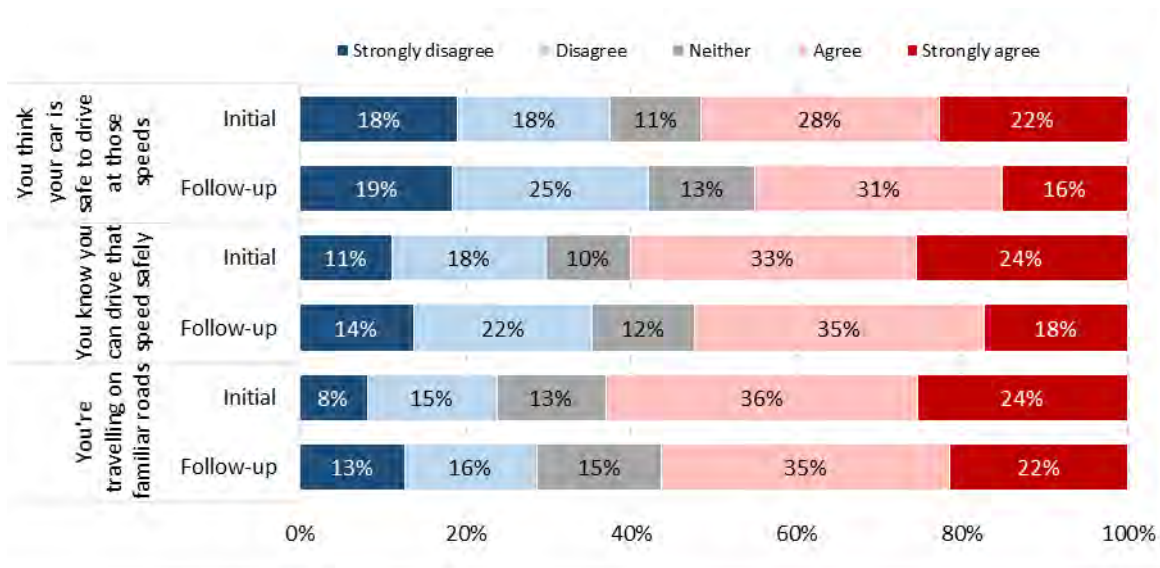
6.3.4 Choosing to speed because it is safe

Paired samples t-tests showed there were significant decreases in respondents' agreement that they chose to speed because they could do so safely. In the follow-up survey, respondents' mean scores for their agreement, from one (strongly disagree) to seven (strongly agree) decreased from:

- 4.2 to 3.8 for thinking their car was safe at that speed ($t(321) = 3.45, p = .001$)
- 4.6 to 4.2 for thinking they could travel safely at that speed ($t(325) = 3.50, p = .001$)
- 4.8 to 4.4 for travelling on familiar roads ($t(327) = 3.45, p = .002$).

Figure 6.9 shows responses to these questions in the two surveys.

Figure 6.9 Reasons for speeding (N = 330 - 338)



6.3.5 Penalties

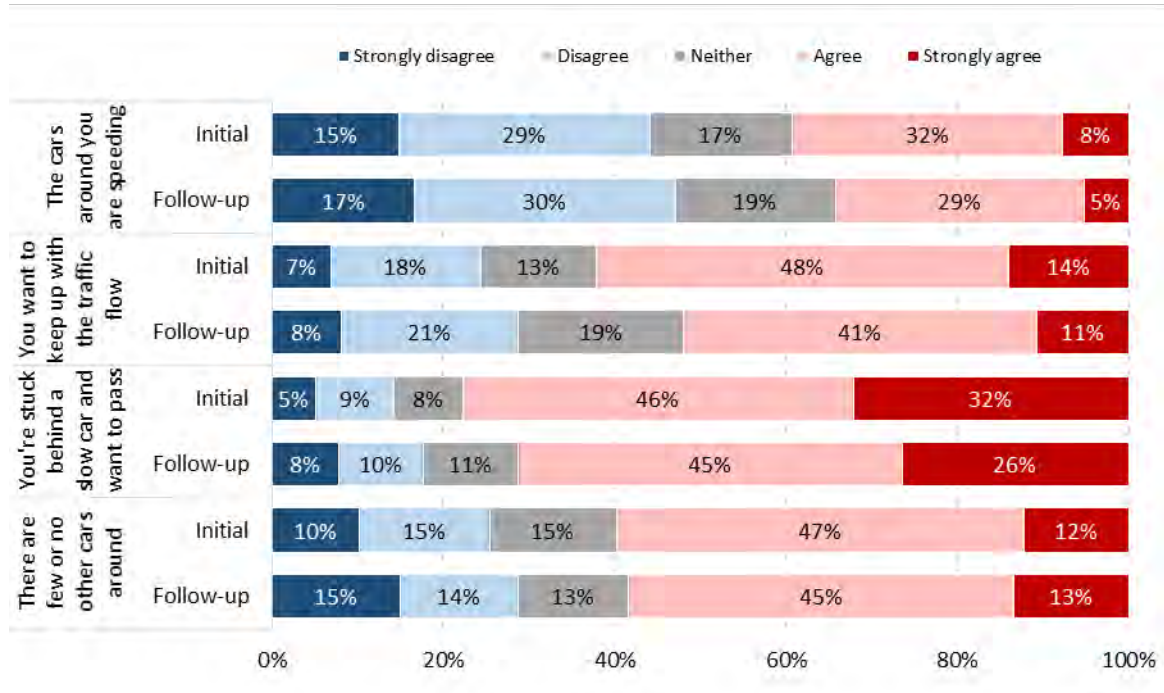
While the education intervention material contained information on penalties, there was no significant change between the initial and follow-up surveys in respondents' agreement with statements about choosing not to speed due to penalties. Many respondents reported in both surveys that they chose not to speed because of the risk of penalties. The responses did not change following the education intervention. More respondents in both the initial and the follow-up surveys (74% and 73% respectively) agreed or strongly agreed they chose not to speed because of the risk of a fine than because of the risk of demerit points (61% and 62% respectively). The proportion who reported they chose not to speed because they thought speeding was a criminal offence stayed the same (61%) across both surveys.

6.3.6 Other reasons for speeding

Respondents were asked about other reasons for speeding or choosing not to speed. In both surveys, just under half of respondents (39% in the initial and 44% in the follow-up) agreed they sped because they did not realise what the speed limit was. A much larger proportion agreed they sometimes sped because they edged over the speed limit accidentally before reducing their speed: 86% in the initial survey and 83% in the follow-up. Few respondents, only 8% in both surveys, agreed they sped for enjoyment.

Respondents' agreement that they chose to speed for reasons relating to other traffic on the roads changed between the initial and the follow-up surveys. Agreement with speeding because "there are few cars around" or 'because the cars around you are speeding' did not change. However, there was a significant decrease in agreement with 'driving faster than the speed limit to get past a slow car' (mean score decreased from 5.4 to 5.2, $t(330) = 2.16, p = .031$) and 'to keep up with traffic flow' (mean score decreased from 4.7 to 4.4, $t(330) = 2.58, p = .011$). Figure 6.10 shows responses to these questions in the initial and follow-up surveys.

Figure 6.10 Other reasons for speeding (N = 330 - 338)



6.3.7 Motivators of change

A series of regression analyses was conducted to investigate the effect of driver profiles, engagement with the education material and other interventions (Police *Safer Summer* low enforcement threshold campaign and Transport Agency advertisement) on drivers' preferred speeds, change in preferred speeds and intent to change driving behaviour. An overview of the findings is presented below, and full findings can be found in appendix C.

- **Preferred speed in 50km/h zones:** Higher preferred speeds in 50km/h zones after the intervention were associated with drivers who:
 - chose to speed due to other cars
 - reported they changed their driving in response to the Police low enforcement threshold *Safer Summer* campaign.

Lower preferred speeds were associated with choosing not to speed due to penalties for doing so.

- **Preferred speed in 100km/h zones:** Higher preferred speeds in 100km/h zones were associated with drivers who:
 - chose to speed due to other cars
 - reported their driving changed in the Police low enforcement threshold *Safer Summer* campaign.

Lower preferred speeds were associated with older drivers.

- **Learning something new from the education material:** Not learning anything new from the education material was associated with:
 - choosing to speed because it was safe
 - not changing driving in response to the Police low enforcement threshold *Safer Summer* campaign or the Transport Agency advertisement

- belonging to the risk averse cluster of drivers (older drivers who were less likely to travel over the speed limit).

Learning something new was associated with:

- choosing not to speed because of the risk of crashing
 - receiving a ticket in the last year or having received a ticket before.
- **Reporting intention to change driving in response to the education material:** Intention to change driving in response to the education material was associated with:
 - choosing not to speed because of the penalties for speeding
 - choosing to speed because of the behaviour of other cars.

Not changing driving was associated with reporting no change in driving as a result of the Transport Agency advertisement.

- **Change in preferred speed in 50km/h zones between initial and follow- up surveys:** A decrease in preferred speed between surveys was associated with:
 - a preferred speed over the limit in 50km/h zones before the intervention
 - higher scores for choosing not to speed due to the risk of crashing.
- **Change in preferred speed in 100km/h zones between initial and follow- up surveys:** A preference to speed in 100km/h zones before the intervention was associated with:
 - a decrease in preferred speed in the follow-up survey
 - receiving between three and five tickets in their lifetime.

7 Changes in driving behaviour

This section outlines the results from data collected using data-loggers from 25 participants.

7.1 Capture of driving data

The following results document the periods before and after the intervention. In those two weeks of data:

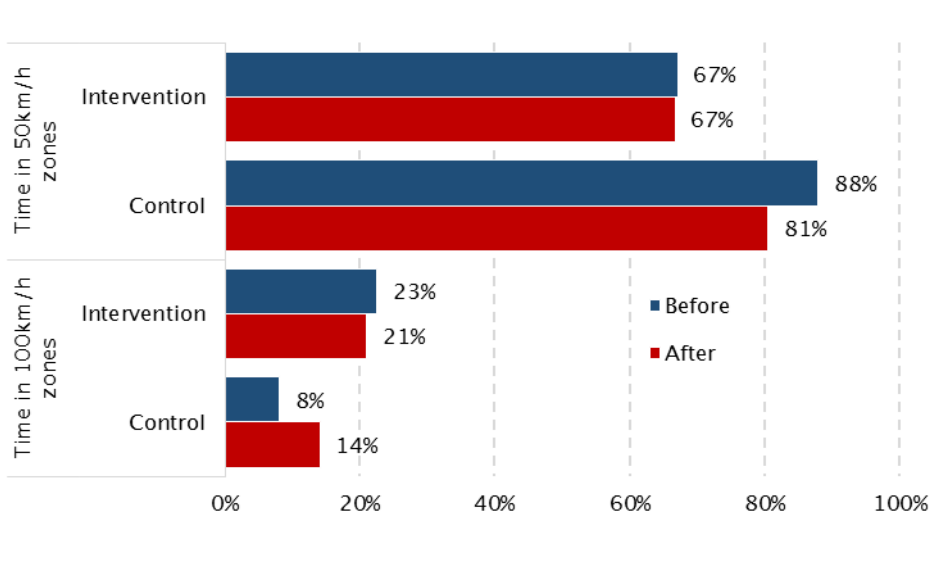
- The average number of trips per person for the control group was 25 with a range from 9 to 100 trips. The average number of trips per person for the intervention group was 23 with a range from 8 to 94 trips.
- The average trip duration was 10.15 minutes for the control group and 12.37 minutes for the intervention group. The average total duration per person was 15 hours for the control group and 15.1 hours for the intervention group.
- Speed limit information was only collected when the participant was driving in the Wellington region.
- 23 of the 25 participants had at least one trip with speed limit information recorded. Both of the participants without speed limit information were from the intervention group.
- An average of 12.3 hours and 7.8 hours per person was collected with speed limit information for the control and intervention groups, respectively.

7.2 Speed selection

7.2.1 Time in different speed zones

Analysis of the participants' driving in the week before the education intervention identified differences between the intervention and the control groups. The intervention group spent more time in 100km/h zones and less time in 50km/h zones than the control group in both the week before and the week after the intervention (figure 7.1). This finding suggests the groups may have different driving patterns in the type of driving they do.

Figure 7.1 Time spent in different speed zones in the pre- and post- intervention periods by both control and intervention groups (N = 23)



Looking at just the time spent in each speed band in 50km/h zones, there was little difference for either the control or the intervention groups. Both spent 5% to 6% of their time in 50km/h zones travelling between 51km/h and 60km/h (figures 7.2 and 7.3).

Figure 7.2 Proportion of time the control group spent in each speed band in 50km/h zones (*n* = 12)

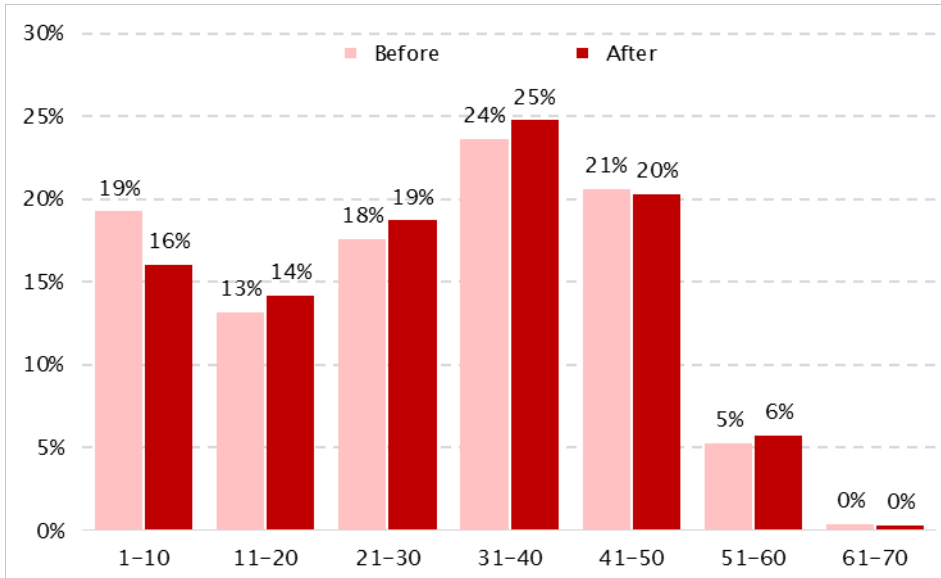
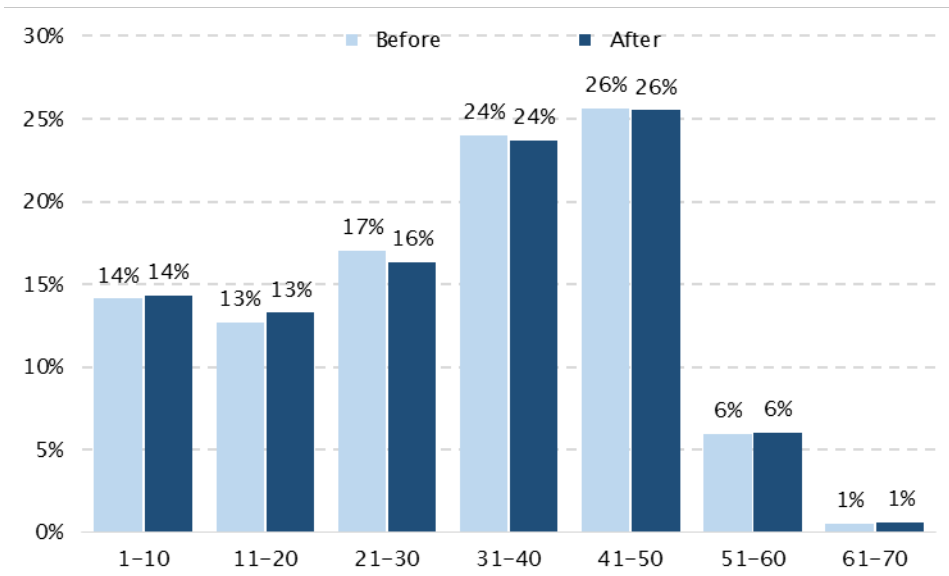
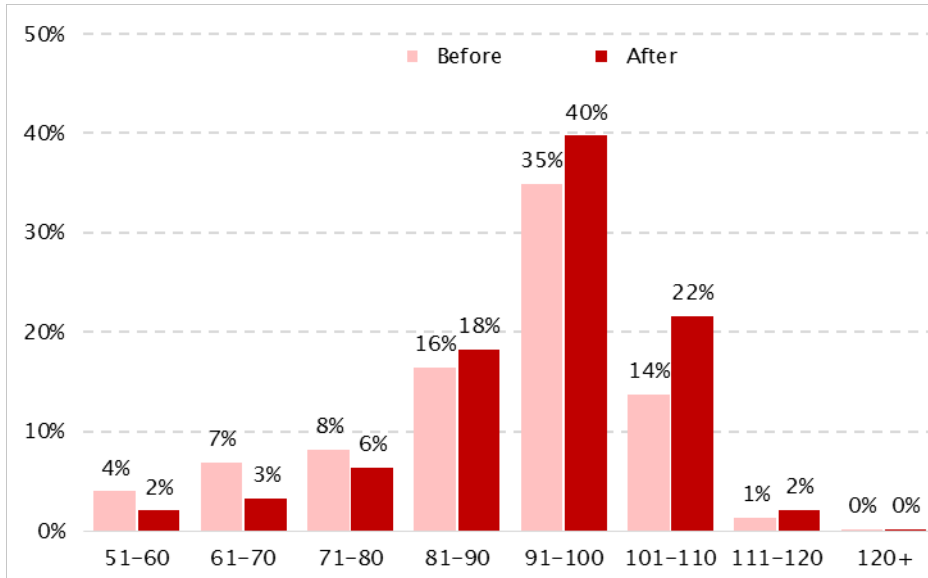
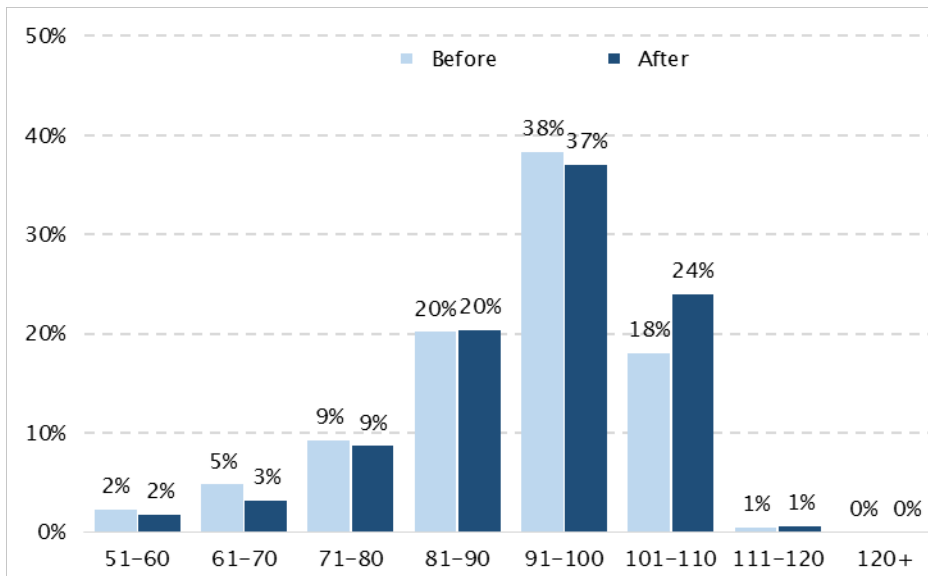


Figure 7.3 Proportion of time the intervention group spent in each speed band in 50km/h zones (*n* = 11)



Driving patterns in 100km/h zones were similar though both groups appeared to show an increase in the proportion of time drivers spent in the speed bands over the speed limit following the intervention. This pattern is apparent in both the control and the intervention groups but was not statistically significant (figures 7.4 and 7.5).

Figure 7.4 Proportion of time the control group spent in each speed band in 100km/h zones ($n = 12$)**Figure 7.5** Proportion of time the intervention group spent in each speed band in 100km/h zone ($n = 11$)

Speeding

A separate analysis was carried out to determine the proportion of time drivers spent over the speed limit while travelling at a constant speed (where acceleration was almost constant ($0 \pm 0.5\text{m/s}^2$).

In 50km/h zones, neither group changed the proportion of time they spent above the speed limit at a constant speed. Both spent 3% of their time at constant speeds above the speed limit.

In 100km/h zones, drivers in both groups increased the proportion of time they spent at constant speeds above 100km/h between the first and second weeks. On average, the intervention group spent 12% of their time speeding at a constant speed in 100km/h zones prior to receiving the education intervention. This proportion increased to 18% after the intervention. The control group showed a similar pattern despite not receiving the intervention, increasing the proportion of their time at constant speeds above the speed limit from 9% to 17% (figure 7.6).

Figure 7.6 Proportion of time drivers in the control group spent above the speed limit in 100km/h and 50km/h zones before and after the intervention ($n = 12$)

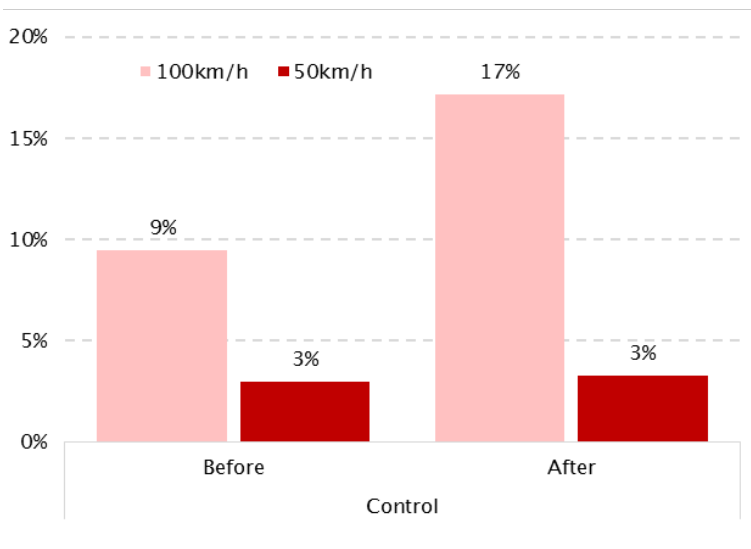
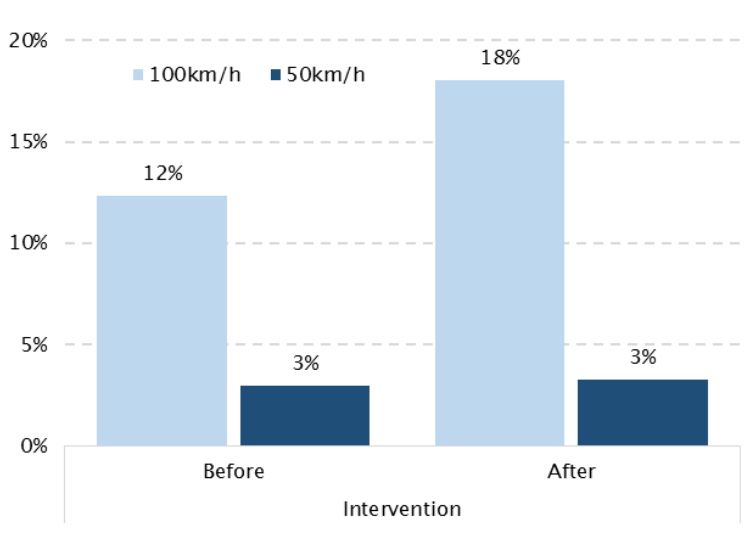


Figure 7.7 Proportion of time drivers in the intervention group spent above the speed limit in 100km/h and 50km/h zones before and after the intervention ($n = 11$)



7.3 Acceleration

The time drivers spent driving was categorised into three categories based on their acceleration:

- notable deceleration: $< -0.55\text{m/sec}^2$
- speed almost constant: -0.55 to 0.55m/sec^2
- acceleration: 0.55 - 1.05m/sec^2
- significant acceleration: $> 1.05\text{m/sec}^2$.

Drivers in both groups spent the majority of their time at constant speeds both before and after the education intervention. There were no significant differences in the proportion of their time spent decelerating and accelerating.

8 Discussion of findings

8.1 The New Zealand context

The costs of speeding, especially in terms of safety, are well established in the New Zealand and international literature. Speed is a key risk factor in road traffic injuries throughout the world in two ways: higher speeds lead to a greater risk of a crash, and to a greater risk of serious injury if a crash occurs (Liu et al 2012).

New Zealand roads are different from those in many other countries. Most open-road driving in New Zealand is done on roads with one lane for traffic in either direction. Even when open-road distances are short, hilly or winding terrain or narrow secondary roads can slow journeys. The few New Zealand motorways (multi-lane divided highways) are found within three cities (Auckland, Wellington and Dunedin, with one planned for Christchurch).

New Zealand Police, the Transport Agency and other government agencies have long histories of public campaigns to lower speeds to improve road safety. Penalties are used as deterrents to limit speeding, including speed cameras for detection and the use of fines and demerit points and possible licence suspension as penalties. The maximum fine for exceeding a speed limit is \$1,000, which applies to serious speeding offences dealt with in court, but high-level offences can carry additional penalties including disqualification and other court-imposed sanctions.

8.2 Defining speeding

A literature review found that definitions of speeding varied, from technical (any speed over the limit is speeding), relative (definition of speeding relates to the conditions and other factors) to absolute (driving at a certain speed in zones with certain speed limits). In the initial survey, respondents' definitions of speeding clustered around the speed limit and speeds at 5km/h intervals above and below the limit. Thinking of speed in 5km/h intervals could be a result of the way speed is displayed on most speedometers. Few respondents gave absolute definitions of speeding (any speed over the speed limit is speeding). About half (48%) of respondents thought they were speeding at a speed between 51 and 55km/h or lower in 50km/h zones and only a quarter (28%) of respondents thought they were speeding at a speed between 101 and 105km/h in 100km/h zones.

More commonly, respondents gave answers matching the popular understanding of Police enforcement thresholds. In 50km/h zones, nearly one-third (30%) considered that they would be speeding at 55km/h and a further one-third (33%), at 60km/h. In 100km/h zones, large proportions considered themselves to be speeding at 105km/h (18%) or 110km/h (36%). This suggests Police enforcement thresholds may be an important factor driving people's definition of speeding. If enforcement thresholds change, as they did in the *Safer Summer* campaign, then people's definitions of speeding may also change.

8.3 Speeding to save time

8.3.1 Prevalence of speeding to save time

In the literature, a commonly cited reason for speeding is the driver's desire to arrive at the destination sooner. Drivers who choose to speed to save time are those whose speeding behaviour falls into the violation category. They make a conscious decision that the benefit of increasing speed (arriving at their

destination sooner) outweighs the costs of speeding (financial, safety, possible penalties). If that cost-benefit decision is based on incorrect information, providing correct information may result in a different outcome. For example, the driver's decision to speed may be based on an inflated estimate of the time they may save and an underestimate of the increased safety risk of increased speed. If the driver instead has correct information about time saving and risk they may make a different speed choice.

The initial survey of respondents in the present study found that choosing to speed to save time was not a motivation for all drivers. Just under one-third (32%) of drivers agreed when they chose to speed it was to arrive at their destination sooner, while nearly half (48%) disagreed.

Drivers who aimed to travel over the speed limit in both 50km/h and 100km/h zones, felt the speed limits were too low and/or were younger, were more likely to agree they chose to speed because they would get to their destination sooner.

8.3.2 Estimating time savings from increasing speed

Studies have shown people are consistently poor in estimating the amount of time that will be saved by increasing travel speed. While calculating travel time from distance and average speed is straightforward, calculating the proportion of time, or the amount of time, that will be saved by increasing speed is more difficult. Increasing speed by a set margin from a lower speed will generate higher percentage savings in travel time than increasing an already high speed by the same margin.

Both the initial and follow-up surveys showed similar results to earlier studies as reported by Peer (2010), Svenson (2008; 2009) and Fuller et al (2009). In the low speed scenario, with a speed change from 50km/h to 60km/h, three-quarters (72%) of drivers underestimated the time they would save. In the higher-speed scenario, more than half (60%) overestimated the time they would save.

Peer (2010) found that drivers who were more likely to misjudge time savings from increasing speed were also more likely to report speeding themselves, suggesting that increasing drivers' ability to accurately estimate the amount of time they would save from increasing speed could reduce their speeding behaviour. This finding was consistent with the results of the time saving estimate scenarios tested in this study. In both scenarios, drivers who gave higher estimates for the time savings from increasing speed were more likely to say they chose to speed to get to their destinations sooner. Drivers who provided a correct estimate of time savings in the 100km/h scenario were less likely to report they chose to speed to reach their destination sooner.

8.4 Speeding and fuel consumption

As a general rule, driving at higher speeds increases fuel consumption; however, this is not always recognised by drivers. In the initial survey, the majority of drivers (71%) recognised that increasing speed increased fuel consumption and most estimated the degree of the increase within five percentage points. However, under one-third (30%) of respondents estimated the fuel saving correctly. Nearly half (46%) of the drivers reported they chose not to speed because of the increased fuel costs. Increasing understanding of the extent of those costs could change the way the remaining drivers evaluate the costs and benefits of speeding.

Other studies have found similar results. For example, Transport Canada (2007) found that 86% of participants understood speeding increases fuel consumption.

8.4.1 Awareness of increased crash risk from higher speeds

Of all the reasons to choose not to speed included in the initial survey, drivers most strongly agreed they chose not to speed due to safety concerns. More drivers agreed they chose not to speed due to the increased severity of a crash rather than the increased likelihood of a crash. This finding was consistent with the results of similar studies in other countries. For example, in a survey of Canadians, 54% of respondents indicated a 'higher collision risk' as a disadvantage of speeding, and 31% indicated a 'higher risk of injury from a collision' (Transport Canada 2007).

However, as with time savings, many drivers may not be able to accurately estimate the degree of risk they are taking when they exceed the speed limit. People appear to have varying understandings and assumptions about the increased crash and injury risk associated with speeding.

In the initial survey, younger drivers and male drivers were different from older drivers and female drivers respectively. There were also gender differences in agreement with all reasons for choosing to speed or not speed except for choosing not to speed due to financial costs.

Similarly, younger drivers were more likely to choose to speed because of other traffic or because they believed it was safe to do so. They were more likely to choose not to speed because of the risk of crashing and because of the financial cost of fuel and the extra wear and tear on the vehicle.

8.5 Effect of the education intervention

8.5.1 Time savings estimates

Providing education material to drivers had little effect on their ability to estimate time savings correctly. However, overall, drivers provided more conservative estimates of time savings for both scenarios after having experienced the educational intervention. As the education material focused on informing drivers that other factors (for example, traffic lights, controlled intersections, other traffic) reduce the potential time savings from increasing speed, the downward shift in estimates could be a reflection of the material's effectiveness.

Calculating the increase or decrease in travel time savings when increasing or decreasing speed is difficult as it is a non-linear function. It is therefore unsurprising that respondents were not able to calculate time savings correctly. As noted in the limitations section, the exact correct answers for the scenarios fell on the margins of the categories used, which may have contributed to respondents' difficulty in selecting the correct answer.

Further investigation of the methods drivers use to estimate the time that may be saved by increasing speed may assist in targeting future education interventions.

8.5.2 Definitions of speeding and preferred travel speeds

In both surveys, respondents were asked what speeds they preferred to travel at and what speeds they considered to be speeding in both 50km/h and 100km/h zones. The initial survey showed there was a correlation between drivers' preferred speed and their definition of speeding, with their preferred speed almost always falling below their definition of speeding.

The information in the education material included a section on the penalties for speeding and may have impacted on some respondents' understanding of speeding. The Police *Safer Summer* campaign over the holiday period may also have impacted on respondents' definitions of speeding.

Definitions of speeding and preferred speeds decreased following the education intervention. The changes in preferred speeds correlated with changes in definitions and drivers who decreased the speed they considered to be speeding were more likely to report a lower preferred speed in the follow up survey.

Drivers were more likely to report a decrease in their preferred speed if they had:

- said they aimed to travel over the speed limit in the initial survey
- received between three and five speeding tickets in their lifetime (100km/h zones)
- higher levels of agreement that they chose not to speed because of the increased risk and severity of crashing.

Overall, the changes observed in respondents' preferred speeds and definitions of speeding suggest the education intervention was successful in changing respondents' attitudes to speed. Further, these changes were more likely to be observed in those drivers who had histories of speeding and preferred to travel faster than the speed limit.

The association between preferred speeds and definitions of speeding suggest there is an opportunity to influence the public's preferred speed by influencing their definitions of speeding.

8.5.3 Reasons for speeding

Looking at the respondent group as a whole there was little shift in drivers' views on the reasons for speeding in most areas investigated in the follow-up survey. Fewer drivers agreed they chose to speed because of the behaviour of other drivers and because they believed it was safe to do so.

Drivers belonging to the different profiles established in the initial survey had some differences in their response to the education intervention. Drivers whose profiles placed them in the young and aggressive clusters showed more change in their reasons for speeding than drivers in the risk-averse cluster. These two groups showed the highest preferred speeds and had more speeding in their driving histories and were more likely to fall into the target group for speeding interventions.

8.5.4 Changes in actual driving behaviour

Data loggers were trialled in an attempt to measure behaviour change as a result of the education for drivers. Driving behaviour measured through the use of the data loggers by 25 drivers did not identify any significant changes before and after the education. Where changes were observed they were not significant and they did not move in the direction that might have been anticipated. Both the control group and the intervention group increased the time they spent over the speed limit in 100km/h zones in the period after the education intervention.

A possible explanation for this observation is that the data loggers themselves acted as an intervention that altered participants' driving behaviour. The loggers were installed in participants' cars for approximately one week before the pre-intervention measurement period to minimise the effect of the loggers as an intervention. However, it may be that in-car devices to record drivers' speeding behaviour have strong, temporary, effects on driving behaviour with the effects diminishing as drivers become used to the presence of the device.

The study did demonstrate that some New Zealand drivers are willing to take part in studies using data loggers. This provides the opportunity to develop and evaluate education interventions based on individual data from loggers that may have the potential to change attitudes and (more importantly) behaviour.

8.5.5 Reasons for change

The changes in attitudes observed after drivers experienced the education intervention suggest the education material may have had some effect on drivers' attitudes towards speed. It is expected the education material may have contributed to those changes, though other interventions such as the Police low enforcement threshold *Safer Summer* campaign and the Transport Agency's advertising campaign may have also contributed to any changes.

The observed changes in drivers' attitudes were not concentrated in the drivers who learned something new from the education material. For example, the proportion of drivers who decreased their preferred speed between the initial and follow-up surveys (40% in 50km/h zones and 41% in 100km/h zones) was larger than the proportion who said they learned something new from the education material (32%). Drivers who fell into the young and aggressive profiles showed more change in their reasons for speeding; however, cluster membership had no effect on changes in preferred travel speed.

8.5.6 Differing response to the education material

Many of the respondents who engaged with the education material reported they did not learn anything new from it. The material was developed with the aim that it would be appropriate for the average reading age of the New Zealand population.

The population of respondents to the survey had a higher level of education than the New Zealand public as a whole and the content of the education material may have been too simplistic. Some respondents had knowledge of the costs and benefits of speeding beyond what was included in the education, for example through their profession or through the documentation for their own vehicles. The Transport Agency and other organisations have also conducted many public information campaigns with messages consistent with those in the education material.

Learning something new was not a requirement for a change in attitude. The education material may have acted as a refresher or prompt for respondents who did not learn anything new but reported a change in behaviour. This effect, if it does indeed lead to a change in attitudes, is still of value.

Caution should be exercised in generalising about the effectiveness of education interventions as a whole based on the results of this project. The relative lack of change in the accuracy of estimates of time savings in the tested scenarios, for example, should not lead to the conclusion that education is ineffective in such areas. It may be that an intervention targeting those areas, if tailored to individual drivers and/or delivered in a different way, may contribute to greater change. Whether or not adopting an individualised intervention would have had a stronger effect may be an area to explore in future work.

9 Conclusions and recommendations

9.1 Conclusions

New Zealand drivers' attitudes to speeding are consistent with those of drivers internationally previously described in the literature. The increased risk of crashing and the increased severity of crashes, should they occur, is well understood and drivers most commonly choose not to speed because of those risks. Drivers' definitions of speeding and preferred travel speeds were closely linked to each other and appeared to be linked to enforcement thresholds, suggesting that influencing definitions of speeding may be a way to influence drivers' speed choices.

There is less understanding of the extent of time saving from speeding. Some drivers choose to speed because they want to save time, but generally underestimate time savings from increasing low speeds and overestimate time savings from increasing high speeds. The education material appears to have contributed to a change in some attitudes towards speeding including self-reported preferred speeds and definitions of speeding. The findings support the conclusion that drivers' attitudes towards speeding may be changed through provision of information on the costs and benefits of speeding.

The extent to which changes in attitudes translate to changes in speeding behaviour is not well known. Data loggers were used with a small sample of drivers to explore behaviour change. While analysis of the logs of actual driver behaviour did not identify any significant changes, the sample size was small and the effect of the loggers themselves on driver behaviour was not well understood. Further research using larger samples and longer driving periods could more closely examine the effects of similar interventions on actual behaviour as well as the link between attitudes and actual behaviour.

9.2 Recommendations

The researchers recommend exploring further:

- opportunities to change drivers' definitions of speeding and the effect of changes in the definition of speeding on preferred travel speed
- education interventions targeting individuals' differing levels of knowledge of the costs and benefits of speeding
- methods drivers use to calculate time savings may assist in targeting the content of education interventions
- driver behaviour through larger scale data logger studies to identify changes in driving behaviour that are not significant in smaller samples.

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Appendix A: Survey tools

Initial Survey

1. Introduction

We'd like to ask you a few questions today about your thoughts on the speeds people drive at on New Zealand roads. It will take 10 to 15 minutes. Then we'll send you some information about driving speeds and ask you some more questions early next year. If you're able to do this, you'll be entered into a draw for a \$150 prezzie card in recognition of your time. You will also help the Transport Agency to improve the safety of New Zealand roads.

Everything you say is anonymous – no one will be able to identify what you have said.

1.1 Driving

- 1) To be eligible for the survey, you have to be at least 18 years old. How old are you now?
- 2) Do you have a current full New Zealand driver license? [Yes (skip to Q4)] or No]
- 3) [If Q1 = No] What level of driver license do you hold? [Select one]
 - a. Learners
 - b. Restricted
 - c. Overseas
 - d. Suspended or cancelled [thank and end the survey]
 - e. None [Skip to non-qualifier page asking to speak with the main driver]
- 4) And how many years have you held that licence for? [Numeric] [*Round down to nearest full year*]
- 5) Do you just have a car licence? [Yes/No]
- 6) [If No to Q5)] What class of licence do you hold? [*Select as many as apply*]
 - a. Class 1 - Car
 - b. Class 2 - Medium rigid vehicle licence
 - c. Class 3 - Medium combination vehicle licence
 - d. Class 4 - Heavy rigid vehicle licence
 - e. Class 5 - Heavy combination vehicle licence
 - f. Class 6 - Motorcycle
- 7) Have you completed any driver training courses?
 - a. No
 - b. Defensive driving
 - c. Other [*free text field – record type of course*]
- 8) Typically, how often in a normal month do you drive trips where you drive for 30 minutes or less? [*select one*]
 - a. Every day
 - b. Almost every day
 - c. A few days a week
 - d. A few days a month
 - e. Less often
- 9) And typically, how often in a normal month do you drive trips where you drive for more than 30 minutes? [*select one*]
 - a. Every day
 - b. Almost every day

- c. A few days a week
 - d. A few days a month
 - e. Less often
- 10) Is most of your driving: *[Select one]*
- a. On roads where the speed limit is mostly 50km/h or less; or
 - b. On roads where the speed limit is mostly between 80 and 100 km/h?
 - c. About the same.
- 11) Do you drive as part of your job? *[Select one]*
- a. Yes
 - b. No

2. Your driving

I'd now like to ask you some questions about the speed you drive. I just want to mention again that all of your responses are anonymous – what you say will not be linked to your personal information.

2.1 50km/h roads

Thinking about your driving on roads with a 50km/h speed limit:

- 12) On those roads, what speed do you normally like to travel at? [Numeric]
- a. [Numeric]
 - b. Don't know
- 13) In your opinion, for the 50km/h roads you normally travel on, are the speed limits: *[Select one]*
- a. Too high
 - b. Too low
 - c. About right
 - d. Don't know / Other.
- 14) On roads with a 50km/h speed limit, how fast do you think you have to be going before you think of yourself as speeding?
- a. [Numeric] km/h
 - b. Don't know
- 15) When your car speedometer says you're travelling at 50km/h, how fast do you think your vehicle is actually moving?
- a. [Numeric] km/h
 - b. Don't know

2.2 100km/h roads

Now I'd like you to think about your driving on roads with a 100km/h speed limit, not including motorways.

- 16) On those roads, what speed do you normally like to travel at? [Numeric]
- a. [Numeric] km/h
 - b. Don't know
- 17) In your opinion, for the 100km/h roads you normally drive on, are the speed limits: *[Select one]*
- a. Too high

- b. Too low
- c. About right
- d. Don't know.

18) On roads with a 100km/h speed limit, how fast do you think you have to be going before you think of yourself as speeding on those roads? [Numeric]

- a. [Numeric] km/h
- b. Don't know

19) And what about when your car speedometer says you're travelling at 100km/h, how fast do you think your vehicle is actually moving?

- a. [Numeric] km/h
- b. Don't know

3. Reasons for speeding

3.1 Saving time

Can you indicate the extent to which you agree with each of these statements, by giving us a number between 1 and 7 where 1 is strongly disagree and 7 is strongly agree.

When you drive faster than the speed limit, it is because ... [include a don't know option]		1 Strongly disagree	7 Strongly agree
20)	The faster you drive, the sooner you'll get where you're going		
21)	You want to get through the lights before they change		

22) I'm going to describe a scenario and ask you to estimate how much time the driver will save by travelling at different speeds. I don't need you to calculate the answer, I'd just like you to guess.

- a. Imagine Bob is travelling a trip through town. It usually takes about 30 minutes if he sticks to the speed limit of 50km/h. How many minutes do you think Bob will save if he drives 60km/h instead?

[Select one]

- i. Less than 2 minutes
- ii. 2 to 4 minutes
- iii. 5 to 7 minutes
- iv. 8 to 10 minutes
- v. More than 10 minutes
- vi. Don't know

23) Now imagine Bob is driving a trip that normally takes him about 30 minutes at 95km/h. How many minutes do you think Bob will save if he drives at 110km/h instead? [Select one]

- i. Less than 2 minutes
- ii. 2 to 4 minutes
- iii. 5 to 7 minutes
- iv. 8 to 10 minutes
- v. More than 10 minutes
- vi. Don't know

3.2 Safety

Now I just want to ask about safety. To what extent do you agree with the following statements using that same scale by giving us a number between 1 and 7 where 1 is strongly disagree and 7 is strongly agree.

When you drive faster than the speed limit, it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
24) You think your car is safe to drive at those speeds		
25) You know you can drive that speed safely		
26) You're travelling on familiar roads		
27) That road is safe at higher speeds		

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
28) Driving over the speed limit increases the chances of getting into a crash		
29) In the event of a crash, driving over the speed limit significantly increases the chances of someone being injured or killed		
30) A crash at 70km/h will be a lot more severe than one at 60km/h		
31) Your car is not safe to drive at those speeds		

3.3 Fuel costs

Now a few questions about the costs of your driving. To what extent do you agree with the following statements using that same scale by giving us a number between 1 and 7 where 1 is strongly disagree and 7 is strongly agree.

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
32) Of the fuel costs of driving faster		
33) The extra wear and tear on the car		

34) Does an average car use more, the same or less fuel travelling when travelling at 120km/h as compared to 100km/h? [Select one]

35) [If more] Approximately how much more

- a. 5% more
 - b. 10% more
 - c. 15% more
 - d. more than 15% more
 - e. Don't know
- 36) [If less] Approximately how much less
- a. 5% less
 - b. 10% less
 - c. 15% less
 - d. More than 15% less
 - e. Don't know

3.4 Penalties

The next few questions are about the penalties for driving faster than the speed limit.

- 37) Have you ever had a speeding ticket? [Yes/No/Don't know]
- a. [If yes to 37)] Approximately how many speeding tickets have you received in the past year? [Numeric]
 - b. [If yes to 37)] And approximately how many have you had in your life time? [Numeric]
- 38) Do you think you'll receive a speeding ticket in the next year? [Yes/No/Don't know]

I'd like you to answer using that one to seven scale again, where 1 is strongly disagree and 7 is strongly agree.

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option]		1 Strongly disagree	7 Strongly agree
39)	Of the risk of a fine		
40)	Of the risk of demerit points		
41)	Speeding is a criminal offence		

3.5 Other reasons

Sometimes people choose to speed for other reasons. Again using a scale from 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate to what extent you agree or disagree with each statement.

When you drive faster than the speed limit, it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
42) There are few or no other cars around		
43) You aim to travel at the speed limit but occasionally edge over before reducing your speed again		
44) You're stuck behind a slow car and want to pass		
45) You want to keep up with the traffic flow		
46) The cars around you are speeding		
47) You didn't realise what the speed limit was		
48) It's fun to speed		
49) There is some kind of emergency situation		

50) Are there any other reasons you drive faster than the speed limit that we haven't asked about? [Free text, not mandatory]

I also want to ask you about when you choose not to speed for other reasons. Again using a scale from 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate to what extent you agree or disagree with each statement.

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
51) Driving over the speed limit increases noise pollution		
52) Driving over the speed limit contributes to climate change		
53) Driving at the speed limit is more relaxing or enjoyable		

54) Are there any other reasons you don't speed when you are not limited by traffic or road conditions that we haven't already talked about? [Free text, not mandatory]

3.6 About you

Finally, a few quick questions about you.

- 55) In addition to a speedometer, does your car have: [Select multiple]
- A GPS device that shows your speed
 - A speed limiter
 - Cruise control
 - Other devices that show your speed or warn you when you are speeding [Free text]

- 56) [If yes to Q55)] Which of those devices do you use regularly to check your speed or help manage your speed?
- [Only if selected in Q55)] A GPS speed device
 - [Only if selected in Q55)] Speed limiter
 - [Only if selected in Q55)] Cruise control
 - [Only if selected in Q55)] Other [Free text]
 - None of them.
- 57) I am going to read out a list of ethnic groups. Can you tell me which ethnic group or groups you belong to: [Select multiple]
- New Zealand European
 - Maori
 - Samoan
 - Cook Islands Maori
 - Tongan
 - Niuean
 - Chinese
 - Indian
 - Another ethnic group, such as Dutch, Japanese or Tokelauan? Please say what it is. [Text box]
 - Refused / don't know
- 58) Which of the following best describes you: [Select one]
- Employed Full-time
 - Employed Part-time
 - Unemployed
 - Retired
 - At home
 - Student
 - Refused / don't know
- 59) What year were you born in? [Numeric]
- 60) What is your highest qualification? [Select one]
- Secondary
 - Bachelor degree
 - Postgraduate degree
 - Other tertiary
 - Other
 - Refused / don't know
- 61) What is your gender? [Select one]
- Male
 - Female
 - Other
 - Refused / don't know

The rest of this project includes sending an info pack about speeding either in hard copy or electronically. After you've had time to look at it, we'd like to ask you a few more questions similar to the ones we asked you today, but it will be quite a bit shorter. Are you OK to complete the project? If necessary: There are incentives and we would really like to talk to you again.

- 62) Would you like to receive the information in the mail, or by email?
- Record email address
 - Record postal address
 - Refused to participate [Phone version only]

63) When we call you again, what is the best number to reach you on?

- a. Numeric

That's all of the questions I have. Is there anything you would like to ask about the project? If you need to contact us you can reach us on 0800 002 577.

Thank you very much for participating and we will be in touch if you have won one of the prizes.
Have a great day.

Follow- up Survey

1. Introduction

Project Summary:

Before Christmas we asked a sample of 600 New Zealanders about their thoughts on the speeds they drive, then we distributed a speeding information pack. We're now just asking some follow up questions of people who have read through the information.

Do you have any questions before we start?

For all before proceeding to questions:

Everything you say is anonymous – no one will be able to identify what you have said.

2. The information about speeding

First I'd like to ask you some questions about the information we sent you about speeding.

- 1) Did the information pack tell you anything you didn't already know? [Yes/no/don't know]
- 2) [If Yes to Q1]] Was that information about: (select all that apply) [select multiple]:
 - a. Time saving and speeding
 - b. Safety risk from speeding
 - c. Fuel costs of speeding
 - d. The penalties for speeding
- 3) What do you most remember from the information we sent you? Is it information about: (select all that apply) [select multiple]
 - a. Time saving and speeding? What stood out most:[free text field, record what]
 - b. Safety risk from speeding? What stood out most: [free text field, record what]
 - c. Fuel costs of speeding? What stood out most: [free text field, record what]
 - d. The penalties for speeding? What stood out most: [free text field, record what]
 - e. Other: [Free text record]
- 4) Using a 1 to 7 scale, where 1 is strongly disagree and 7 is strongly agree, how strongly do you agree that you will change how you drive as a result of reading the information pack? [Radio buttons, 1 to 7 plus don't know]

3. Your driving

I'd now like to ask you some questions about your driving. I just want to mention again that all of your responses are anonymous – what you say will not be linked to your personal information.

3.1 Driver profile

- 5) Are you a:
 - a. Frequent driver
 - b. Medium frequency driver
 - c. Infrequent driver
- 6) Which do you drive more often:
 - a. Short trips (30 minutes or less)

- b. Long trips (more than 30 minutes)
 - c. Both about the same.
- 7) Is driving a part of what you do at work?
- a. No
 - b. Yes, I drive for up to one hour per day during my work hours
 - c. Yes, I drive for between one and three hours per day during my work hours
 - d. Yes, I drive for more than three hours per day during my work hours

3.2 50km/h roads

Thinking about your driving on roads with a 50km/h speed limit:

- 8) On those roads, what speed do you normally like to travel at? [Numeric]
- a. [Numeric]
 - b. Don't know
- 9) In your opinion, for the 50km/h roads you normally travel on, are the speed limits: [Select one]
- a. Too high
 - b. Too low
 - c. About right
 - d. Don't know / Other.
- 10) On roads with a 50km/h speed limit, how fast do you think you have to be going before you think of yourself as speeding?
- a. [Numeric] km/h
 - b. Don't know

3.3 100km/h roads

Now I'd like you to think about your driving on roads with a 100km/h speed limit, not including motorways.

- 11) On those roads, what speed do you normally like to travel at? [Numeric]
- a. [Numeric] km/h
 - b. Don't know
- 12) In your opinion, for the 100km/h roads you normally drive on, are the speed limits: [Select one]
- a. Too high
 - b. Too low
 - c. About right
 - d. Don't know.
- 13) On roads with a 100km/h speed limit, how fast do you think you have to be going before you think of yourself as speeding on those roads? [Numeric]
- a. [Numeric] km/h
 - b. Don't know

4. Reasons for speeding

I'd like to ask you the questions about reasons for speeding again. When you answer, I'd like you to think about your recent driving. That is, driving since you read the information we sent you about speeding.

4.1 Saving time

Can you indicate the extent to which you agree with each of these statements about your recent driving, by giving us a number between 1 and 7 where 1 is strongly disagree and 7 is strongly agree.

How strongly do you agree that...	1 Strongly disagree	7 Strongly agree
14) When you drive faster than the speed limit, it is because the faster you drive, the sooner you'll get where you're going		

15) I'm going to describe a scenario and ask you to estimate how much time the driver will save by travelling at different speeds. I don't need you to calculate the answer, I'd just like you to guess.

- a. Imagine Bob is travelling a trip through town. It usually takes about 30 minutes if he sticks to the speed limit of 50km/h. How many minutes do you think Bob will save if he drives 60km/h instead?

[Select one]

- i. Less than 2 minutes
- ii. 2 to 4 minutes
- iii. 5 to 7 minutes
- iv. 8 to 10 minutes
- v. More than 10 minutes
- vi. Don't know

16) Now imagine Bob is driving a trip that normally takes him about 30 minutes at 95km/h. How many minutes do you think Bob will save if he drives at 110km/h instead? [Select one]

- i. Less than 2 minutes
- ii. 2 to 4 minutes
- iii. 5 to 7 minutes
- iv. 8 to 10 minutes
- v. More than 10 minutes
- vi. Don't know

4.2 Safety

Now I just want to ask about safety and your recent driving. To what extent do you agree with the following statements using that same scale by giving us a number between 1 and 7 where 1 is strongly disagree and 7 is strongly agree.

When you drive faster than the speed limit, it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
17) You think your car is safe to drive at those speeds		
18) You know you can drive that speed safely		
19) You're travelling on familiar roads		
20) That road is safe at higher speeds		

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option] [Surveyor note: Ideal road conditions means your speed is not limited by factors such as traffic or weather]	1 Strongly disagree	7 Strongly agree
21) Driving over the speed limit increases the chances of getting into a crash		
22) In the event of a crash, driving over the speed limit significantly increases the chances of someone being injured or killed		
23) A crash at 70km/h will be a lot more severe than one at 60km/h		
24) Your car is not safe to drive at those speeds		

4.3 Fuel costs

Now a few questions about the costs of your driving. To what extent do you agree with the following statements using that same scale by giving us a number between 1 and 7 where 1 is strongly disagree and 7 is strongly agree.

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option] [Surveyor note: Ideal road conditions means your speed is not limited by factors such as traffic or weather]	1 Strongly disagree	7 Strongly agree
25) Of the fuel costs of driving faster		
26) Of the extra wear and tear on the car		

27) Does an average car use more, the same or less fuel travelling when travelling at 120km/h as compared to 100km/h? [Select one]

- 28) [If more] Approximately how much more
- a. 5% more
 - b. 10% more
 - c. 15% more
 - d. more than 15% more
 - e. Don't know
- 29) [If less] Approximately how much less
- a. 5% less
 - b. 10% less
 - c. 15% less
 - d. More than 15% less
 - e. Don't know

4.4 Penalties

The next few questions are about the penalties for driving faster than the speed limit.

30) Have you received a speeding ticket since you completed last survey before Christmas?
[Yes/No]

31) Do you think you'll receive a speeding ticket in the next year? [Yes/No/Don't know]

I'd like you to answer using that one to seven scale again, where 1 is strongly disagree and 7 is strongly agree.

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option] [Surveyor note: Ideal road conditions means your speed is not limited by factors such as traffic or weather]	1 Strongly disagree	7 Strongly agree
32) Of the risk of a fine		
33) Of the risk of demerit points		
34) Speeding is a criminal offence		

4.5 Other reasons

Sometimes people choose to speed for other reasons. Again using a scale from 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate to what extent you agree or disagree with each statement.

When you drive faster than the speed limit, it is because ... [include a don't know option]	1 Strongly disagree	7 Strongly agree
35) There are few or no other cars around		
36) You aim to travel at the speed limit but occasionally edge over before reducing your speed again		
37) You're stuck behind a slow car and want to pass		
38) You want to keep up with the traffic flow		
39) The cars around you are speeding		
40) You didn't realise what the speed limit was		
41) It's fun to speed		
42) There is some kind of emergency situation		

I also want to ask you about when you choose not to speed for other reasons. Again using a scale from 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate to what extent you agree or disagree with each statement.

Assuming ideal road conditions, when you choose not to speed it is because ... [include a don't know option] [Surveyor note: Ideal road conditions means your speed is not limited by factors such as traffic or weather]	1 Strongly disagree	7 Strongly agree
43) Driving at the speed limit is more relaxing or enjoyable		

4.6 Updates about your vehicle

- 44) Have you changed your car since the last survey? [Yes/no]
- 45) Have you begun using any other devices to check your speed or help manage your speed? [Yes/no]
- 46) [If yes to Q45)] In addition to a speedometer, does your car have: [Select multiple]
- A GPS device that shows your speed
 - A speed limiter
 - Cruise control
 - Other devices that show your speed or warn you when you are speeding [Free text]
- 47) [If yes to Q45)] Which of those devices do you use regularly to check your speed or help manage your speed?
- [Only if selected in Q55)] A GPS speed device
 - [Only if selected in Q55)] Speed limiter
 - [Only if selected in Q55)] Cruise control
 - [Only if selected in Q55)] Other [Free text]
 - None of them.

4.7 Other questions

- 48) Did you hear about the lower Police speed tolerance over the Christmas and New Years period? [Yes/no/don't know]
- 49) [If yes to Q48)] Did that change your driving over that time period?
- No, I didn't change my driving
 - Yes, I drove slower
 - Yes, it changed my driving in another way [record other text]
- 50) Where have you seen the new NZTA advertisement about speed and choices? The NZTA advertisement has two people suspended in time before a crash, talking to each other about their choices:
- In the speed choice information pack
 - On TV
 - Online
 - I haven't seen the video [*skip Q54*]
- 51) [If yes to Q50)48)] How did that change your driving?
- I didn't change my driving
 - I drove slower
 - It changed in another way [record other text]

Thank you for your time and contribution to this project. Is there anything you would like to ask about?

If you need to contact us you can reach us on 0800 002 577.

Thank you very much for participating and we will be in touch if you have won one of the prizes.

Have a great day.

Appendix B: Education material



Malatest International

Speed choice information pack

PO Box 5584, Wellington 6145
0800 002 577



Speed choice costs and benefits

How do you choose what speed to drive at?

Are you making that choice on accurate information?

Continue to find out more about how increasing speed affects:

Fuel costs



Travel time



Risk of penalties

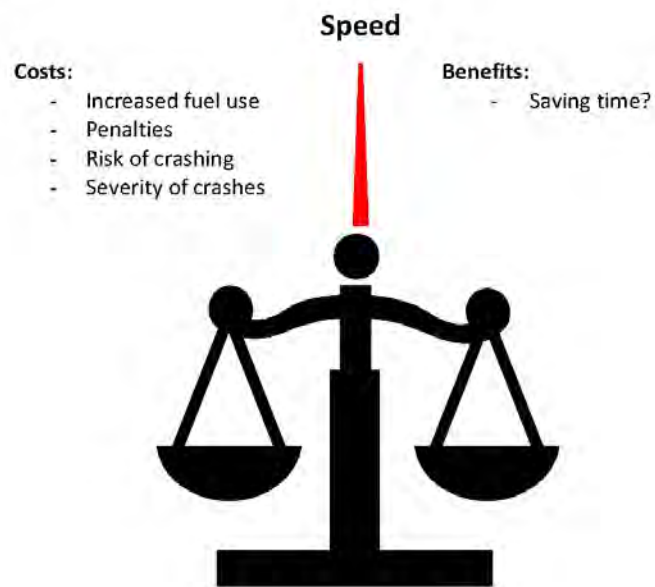


Safety



Weighing up your choice

When you decide to drive faster, you are making the decision that the benefits of speed outweigh the costs



Fuel costs and speed choice

Increasing your speed increases the fuel you use, even if the trip ends up taking less time

The speed that you drive can have a **large** effect on the amount of fuel your car uses

Travelling faster increases the fuel you use and increases the cost of driving

Driving at slower speeds could decrease the cost of each trip you drive – and may save you hundreds of dollars each year

How much would you pay to save a small amount of time?

How much more does driving faster cost?

Driving faster means you pay for more fuel even if you travel the same distance

The average New Zealand driver travels 14,000 km in a year. In a 4-star fuel efficiency car (for example, a 2014 Holden Commodore), the average fuel bill per year is \$2,320.

The average New Zealand driver could **reduce their annual fuel bill by \$116 - \$232** by reducing their speed from 100km/h to 90km/h – or they could drive 700-1,400 more km for the same price – that's enough to drive all the way from Dunedin to Auckland!

If driving faster increased your fuel bill by hundreds of dollars per year, would it still be worth it?

How much more does driving faster cost you?

If you are interested in finding out how much you're spending on fuel each year, visit <http://www.energywise.govt.nz/fuel-economy-tool> and enter your information

You could potentially save 5-10% of your fuel bill simply by slowing down on the motorway

Fuel use quiz

Answer the questions below and see how many you can get correct:

- 1) How many extra km per year could the average New Zealand driver travel if they reduced their speed from 100 km/h to 90 km/h?
a) 100 km b) 500 km c) 1,400 km

- 2) Travelling the same distance at a faster speed means you're driving for less time so you save money on fuel. True or false?
a) True b) False

- 3) What can **you** do to save on fuel costs?

Turn the page to find out!

Fuel use answers

- 1) How many extra km per year could the average New Zealand driver travel if they reduced their speed from 100 km/h to 90 km/h?

a) 100 km b) 500 km c) 1,400 km

c): Correct! The average New Zealand driver could travel an extra 700-1,400 km per year

- 2) Travelling the same distance at a faster speed means you're driving for less time so you save money on fuel. True or false?

a) True b) False

False: Correct! Travelling the same distance will increase fuel costs, even if you spend less time driving

- 3) What can **you** do to save on fuel costs?

Slow down! By reducing your average speed on motorways from 100km/h to 90km/h, you could save up to \$232 per year

Time savings and speed choice

People have difficulty estimating how much time they will save from increasing their speed

Trying to save time (for example when you're running late) is often one of the main reasons people give for their speeding

Many people assume that the faster you drive, the sooner you'll get where you're going

How much time does speeding really save you?

Time savings and speed choice

Would you still increase your speed if you were saving less time than you thought?

When driving in town and around the city, you often have to stop for:

- Traffic lights
- The cars in front
- Give way signs
- Roundabouts

In our survey, **only 3% of people** correctly estimated the time saved by travelling at a faster speed

Most people also over-estimate the time they will save from increasing from a high speed (for example, 95km/h)

Town and city driving and speed choice

Aggressive driving with hard acceleration and braking can increase fuel costs by up to a massive 39% while only reducing trip time by 4%!

Increasing your speed may just mean you get to the next stopping point faster and need to brake harder to slow down



Increasing your speed may not mean you get to where you're going faster

Time savings quiz

Answer the questions below and see how many you can get correct:

- 1) Does increasing your average speed from 95km/h to 110km/h for a 60 minute trip save you?
a) Under 10 minutes b) 10-15 minutes c) Over 15 minutes

- 2) Does increasing your speed always mean you get to your destination quicker?
a) Yes
b) No

- 3) What can **you** do to save time without driving faster?
a) Remember that you save less time than you think by speeding – there are more effective ways of saving time
b) Plan your trips in advance and combine multiple short trips
c) Try to maintain a steady speed so that you don't have to accelerate and brake hard
d) All of the above

Turn the page to find out!

Time savings answers

- 1) Does increasing your average speed from 95km/h to 110km/h for a 60 minute trip save you?
 - a) Under 10 minutes
 - b) 10-15 minutes
 - c) Over 15 minutes

a): **Correct! You would only save just over 8 minutes**
- 2) Does increasing your speed always mean you get to your destination quicker?
 - a) Yes
 - b) No

No: **Correct! Often, especially when driving in the city, the time it takes to get to your destination is as much dictated by the incidence of delays (for example traffic lights) as by your speed**
- 3) What can **you** do to save time without driving faster?
 - a) Remember that you save less time than you think by speeding – there are more effective ways of saving time
 - b) Plan your trips in advance and combine multiple short trips
 - c) Try to maintain a steady speed so that you don't have to accelerate and brake hard
 - d) All of the above

d): **Correct! These are all ways that you can save time without driving faster**

Speeding penalties

The speed limit is enforced to keep all road users safe

Police officers enforce the speed limit by giving traffic fines and demerit points to drivers who drive faster than the limit

Enforcing the speed limit is a fundamental way to improve safety on our roads

"Traffic fines and penalties help make our roads safer. On the one hand, they deter drivers from breaking road rules but most importantly they get dangerous drivers who commit serious or repeat offences off the road."

- The NZ AA

Thousands of people are caught speeding each year

What are the penalties for speeding?

Speeding fines cost you money

Penalties include both fines and demerit points.

Exceeding the speed limit by:	Will cost you:	And will earn you:
Up to 10km/h	\$30	10 demerit points
Between 11km/h and 20km/h	\$80 to \$120	20 demerit points
Between 21km/h and 30km/h	\$170 to \$230	35 demerit points
Between 31km/h and 35km/h	\$300	40 demerit points
More than 35km/h	\$400 to \$630	50 demerit points

Is speeding worth it?

Speeding penalties quiz

Answer the questions below and see how many you can get correct:

- You can be fined for driving any speed over the speed limit. True or false?
 - True
 - False
- The maximum fine for speeding is:
 - \$200
 - \$400
 - \$600
 - More than \$600
- How can **you** avoid getting speeding tickets and demerit points?

Turn the page to find out!

Speeding penalties answers

- 1) You can be fined for driving any speed over the speed limit. True or false?
a) True b) False

True: Correct! If you exceed the speed limit – even if it is by a small number of km/h – police officers are able to give you a ticket

- 2) The maximum fine for speeding is:
b) \$200 b) \$400 c) \$600 d) More than \$600

d): Correct! You can be issued a ticket for up to \$630, although if summoned to appear in court fines can be up to \$1000

- 3) How can **you** avoid getting speeding tickets and demerit points?

Slow down! Maintain a speed that is at, or below, the posted speed limit at all times.

Safety and speed choice

The faster you go the more likely you are to crash

The speed you drive affects your safety because speed increases the risk of crashing by:

- **Increasing stopping distance:** The distance your car moves before you can hit the brakes, and the distance you travel after hitting the brakes, increases as speed increases
- **Increasing cornering speed:** The probability of exceeding the critical speed (maximum speed to safely corner) increases as your car's speed increases
- **Affecting other road users:** Other road users are more likely to misjudge the speed you're travelling at and to make mistakes if you're moving faster than the speed limit

"Speed affects all crashes. It can be a factor in causing them and it has a direct effect on the damage done in a crash."

- Safer Journeys Plan

Safety and speed choice

Choosing to drive faster increases your chances of crashing

In 2012 in New Zealand, driving too fast for the conditions was a contributing factor in:

1,049 minor injury crashes and 1,493 minor injuries

307 serious injury crashes and 405 serious injuries

68 fatal crashes and 85 deaths

New Zealand crash statistics show that:

The more serious the crash, the more likely that speed was a contributing factor

Safety and speed choice

Crashes are worse when you're speeding

Every K over does more damage

NI Transport Agency and NI Police
www.nzta.govt.nz

Slow Down

No matter what the cause of a crash is, the speed the drivers are travelling determines the severity of the crash

Safety and speed choice

Crashes are worse when you're speeding



Between 2010 and 2012, speed was a contributing factor in more than one-third (35%) of urban fatal crashes and more than one-quarter (27%) of open road fatal crashes

Safety and speed choice

The speed you choose to drive at affects the safety of other drivers on the road

Increasing your speed increases the speed of traffic as a whole, which increases the risk of crashing for all road users

Increasing the average speed of traffic by 5% increases the risk of serious crashes by 10% and increases the risk of fatal crashes by 20%

Speed puts more than just the driver at risk

Safety quiz

Answer the questions below and see how many you can get correct:

- 1) In 2012, how many fatal crashes involved speeding as a contributing factor?
a) Less than 40 b) 40-60 c) More than 60

- 2) Decreasing the speed you drive at makes it easier to respond to other people's mistakes. True or false?
a) True b) False

- 3) Increasing the average speed of traffic by 5% makes fatal crashes how much more likely?
a) 5% more likely b) 10% more likely c) 20% more likely

- 4) How can **you** avoid being injured in a crash?

Turn the page to find out!

Safety answers

- 1) In 2012, how many fatal crashes involved speeding as a contributing factor?
- a) Less than 40 b) 40-60 c) More than 60

c): Correct! In 2012, speed was a contributing factor in 68 fatal crashes

- 2) Decreasing the speed you drive at makes it easier to respond to other people's mistakes. True or false?
- b) True b) False

True: Correct! When you speed, it's harder to respond to other people's mistakes

- 3) Increasing the average speed of traffic by 5% makes fatal crashes how much more likely?
- b) 5% more likely b) 10% more likely c) 20% more likely

c): Correct! Increasing the speed of traffic by 5% increase the risk of fatal crashes by 20%

- 4) How can **you** avoid being injured in a crash?

Slow down! Crashes are more severe – causing more damage – when you're speeding

Five tips to improve speed choice

Here's what you can do to improve your speed choice:

Consider the fuel costs! By reducing your average speed on motorways from 100km/h to 90km/h, you could save up to \$232 per year

Remember that you save less time than you think by speeding!

There are more effective ways of saving time, for example:

- by planning your trips in advance and combining multiple short trips, and
- by maintaining a steady speed so that you don't have to accelerate and brake hard.

Avoid penalties! By maintaining a speed that is at, or below, the posted speed limit at all times, you can avoid speeding tickets and demerit points (and save money!)

Remember that speeding increases the risk of crashing! It does so by increasing your stopping distance and cornering speed, and by affecting other road users so that they misjudge your speed

Remember that speeding increases the severity of a crash! Crashes are more damaging if you're speeding than if you're not speeding



Thank you!

Please return the completed information package to us and you will be entered into the draw for the \$150 prezy card!



Let us know when you've finished

Let us know when you've finished and how you would like to be contacted for the final survey:

You can text us (021 545 325), email us (Hamish.Grant@Malatest-intl.com), call us (0800 002 577) or you can just send the introduction letter back to us.

If you text, email or call us, please also indicate how you would like us to contact you for the final survey (email, phone or paper copy).

Appendix C: Regression analysis details

A multiple regression was run to predict preferred speed for 50km/h zones in the follow-up survey from reasons for speeding factors, intention to change driving as a result of the education intervention, age, speeding ticket history and other interventions. The model statistically significantly predicted preferred speed ($F(14, 262) = 5.952, p > 0.001, \text{adj. } R^2 = 0.20$).

Of the input variables, the only significant predictors were reporting that their driving changed in the Police low enforcement threshold *Safer Summer* campaign and scores for choosing not to speed due to penalties and choosing to speed due to other cars. See table C.1.

Higher preferred speeds in 50km/h zones after the intervention were associated with drivers who chose to speed due to other cars and reported they changed their driving in response to the Police low enforcement threshold *Safer Summer* campaign. Lower preferred speeds were associated with choosing not to speed due to penalties for doing so.

Table C.1 Significant predictors for preferred speed in 50km/h zones (N = 262)

Variable	B	SE _B	Beta
Choosing to speed because of other cars	0.046	0.015	0.210
Choosing not to speed because of penalties	-0.031	0.010	-0.186
Reported they changed their driving over the Police low enforcement threshold <i>Safer Summer</i> campaign	1.125	0.484	0.153

A multiple regression was run to predict preferred speed for 100km/h zones in the follow-up survey from reasons for speeding factors, intention to change driving as a result of the education intervention, age, speeding ticket history and other interventions. Statistically, the model significantly predicted preferred speed ($F(14, 265) = 5.944, p > 0.001, \text{adj. } R^2 = 0.20$).

Of the input variables, cluster, age, those who reported they changed their driving over the Police low enforcement threshold *Safer Summer* campaign and scores for choosing to speed due to other cars were significant predictors as shown in the table below.

Higher preferred speeds in 100km/h zones were associated with drivers who chose to speed due to other cars and reported that their driving changed in the Police low enforcement threshold *Safer Summer* campaign. Older drivers were associated with lower preferred speeds.

Table C.2 Significant predictors for preferred speed in 100km/h zones (N = 265)

Variable	B	SE _B	Beta
Choosing to speed because of other cars	0.075	0.026	0.192
Driver cluster (1 – young, 2 – risk averse, 3 – aggressive)	1.353	0.565	0.172
Age group	-0.965	0.270	-0.206
Reported they changed their driving over the Police low enforcement threshold <i>Safer Summer</i> campaign	1.843	0.837	0.144

A logistic regression was performed to examine the effects of participant profiles on whether their preferred speed in 50km/h and 100km/h zones decreased between the initial and follow-up surveys.

For change in 50km/h zones, the logistic regression model was significant ($X^2(17) = 67.184, p < 0.001$). The model explained 30% (Nagelkerke R^2) of the variance in whether respondents changed their preferred speed and correctly classified 71% of cases. Sensitivity was 58%, specificity was 80%, positive predictive value was 64% and negative predictive value was 75%. Of the 16 predictor variables, only three were significant. Drivers who reported in the initial survey that they chose not to speed due to the risk of crashing were more likely to decrease their speed after the education intervention.

A decrease in preferred speed between surveys was associated with a preferred speed over the limit in 50km/h zones before the intervention. It was also associated with higher scores for choosing not to speed due to the risk of crashing.

Table C.3 Significant predictors for decrease in participants' preferred speed between the initial and follow-up surveys in 50km/h zones (N = 265)

Variable	B	SE _B	Wald	df	Odds ratio	95% CI lower	95% upper
Chose not to speed because of the risk of crashing	.020	.009	4.739	1	1.021	1.002	1.039
Did not aim to speed in 50km/h zones	-2.306	.375	37.850	1	.100	.048	.208

For a change in 100km/h zones, the logistic regression model was significant ($X^2(18) = 54.511, p < 0.001$). The model explained 24% (Nagelkerke R^2) of the variance in whether respondents changed their preferred speed and correctly classified 71% of cases. Sensitivity was 58%, specificity was 80%, positive predictive value was 66% and negative predictive value was 73%. Of the 16 predictor variables, only two were significant.

A preference to speed in 100km/h zones before the intervention was associated with a decrease in preferred speed in the follow-up survey. Receiving between three and five tickets in their lifetime was also associated with a decrease in the preferred speed.

Table C.4 Significant predictors for decrease in participants' preferred speed between the initial and follow-up surveys in 100km/h zones (N = 265)

Variable	B	SE _B	Wald	df	Odds ratio	95% CI lower	95% upper
Did not aim to speed in 100km/h zones	-2.039	.403	25.548	1	.130	.059	.287
Received 3–5 tickets in their lifetime	1.228	.601	4.172	1	3.416	1.051	11.103

A logistic regression was performed to examine the effects of participant profiles on whether they would report that the education material did not teach them anything new.

The logistic regression model was significant ($X^2(17) = 73.214, p < 0.001$). The model explained 32% (Nagelkerke R^2) of the variance in whether respondents changed their preferred speed and correctly classified 73% of cases. Sensitivity was 43%, specificity was 88%, positive predictive value was 75% and negative predictive value was 65%. Of the 16 predictor variables, 10 were significant.

Not learning anything new from the education material was associated with choosing to speed because it was safe, not changing driving in response to the Police low enforcement threshold *Safer Summer* campaign or the Transport Agency advertisement and belonging to the second cluster of drivers (older drivers who were less likely to travel over the speed limit).

Learning something new was associated with choosing not to speed because of the risk of crashing, receiving a ticket in the last year or having received a ticket before.

Table C.5 Significant predictors for whether participants would report the education material did not teach them anything new ($N = 265$)

Variable	B	SE _B	Wald	df	Odds ratio	95% CI lower	95% upper
Choosing to speed because it is safe	.022	.009	5.763	1	1.022	1.004	1.041
Membership of the second cluster of drivers	1.878	.610	9.485	1	6.539	1.979	21.602
Chose not to change driving due to the Police low enforcement threshold <i>Safer Summer</i> campaign	.779	.367	4.513	1	2.179	1.062	4.471
Chose not to change driving due to the Transport Agency advertisement	1.324	.416	10.121	1	3.758	1.662	8.496
Choosing not to speed because of the risk of crashing	-.021	.010	4.495	1	.979	.960	.998
Received a ticket in the last year	-2.332	.683	11.655	1	.097	.025	.370
Received one ticket in lifetime	-2.752	.961	8.196	1	.064	.010	.420
Received 2 tickets in lifetime	-2.735	.961	8.092	1	.065	.010	.427
Received 3–5 tickets in lifetime	-2.487	.908	7.502	1	.083	.014	.493
Received 6+ tickets in lifetime	-1.820	.880	4.277	1	.162	.029	.909

A logistic regression was performed to examine the effects of participant profiles on whether they would report they changed their driving in response to the education material.

The logistic regression model was significant ($X^2(17) = 72.078$, $p < 0.001$). The model explained 31% (Nagelkerke R^2) of the variance in whether respondents changed their preferred speed and correctly classified 75% of cases. Sensitivity was 60%, specificity was 87%, positive predictive value was 77% and negative predictive value was 74%. Of the 16 predictor variables, four were significant.

Intention to change driving in response to the education material was associated with choosing not to speed because of the penalties for speeding, or choosing to speed because of the behaviour of other cars. Not changing driving was associated with reporting no change in driving as a result of the Transport Agency advertisement.

Table C.6 Significant predictors of whether participants would report they changed their driving in response to the education material ($N = 265$)

Variable	B	SE _B	Wald	df	Odds ratio	95% CI lower	95% upper
Choosing to speed because of other cars	.026	.012	4.878	1	1.027	1.003	1.051
Choosing not to speed because of penalties	.018	.007	6.478	1	1.018	1.004	1.032
Did not change their driving as a result of the Transport Agency advertisement	-1.851	.392	22.237	1	.157	.073	.339

Respondents who reported they learned something new through the education material were more likely to agree they would change their driving. A Mann-Whitney U test was run to determine if there were differences in intention to change driving scores between respondents who learned something new in the education material and those who did not. Distributions of the scores were similar, as assessed by visual inspection. The median score was statistically significantly different between the groups ($U = 8115$, $z = -3.482$, $p < 0.001$).