Driver distraction: An initial examination of the 'attention diverted by' contributory factor codes from crash reports and focus group research on perceived risks

Craig Gordon
Senior Scientist, Ministry of Transport
c.gordon@transport.govt.nz

Disclaimer:
The views expressed are those of the Author and not official views of the Ministry of Transport. Please note that the crash information presented is based on a provisional analysis of the data for 2002 and 2003. A full analysis is expected to be available in October 2005. This paper was presented at the September 2005 IPENZ Conference in New Zealand.

Driver distraction encompasses a variety of behaviours which can divert the attention of the driver away from the driving task, exacerbating the risk of 'driver error' and adding behavioural complexity to the environment in which they operate. To add to our understanding of driver distraction in New Zealand, this paper summaries results from two research studies conducted by the Ministry of Transport. The first study presents initial results of an examination of the content of police reported crashes and in 2002 and 2003 that included the 'attention diverted by' codes (350-360) as a contributing factor in the crashes. A summary of the different types of inside the vehicle distractions and types of movement classifications involved in these crashes is provided. The second study presents some of the results of focus group research exploring how the public perceive driver distraction risk.

Introduction

This paper aims to outline some of the research outcomes of two research studies conducted as part of a Ministry of Transport project on driver distraction. The first research study is an on-going analysis of information contained within the traffic crash reports in 2002 and 2003 involving inside-the-vehicle driver distraction contributory factors in order to better understand the types of behaviours and objects involved in these crashes. The information presented is based on a provisional analysis. The second research study consisted of focus-group research to begin to understand how the public think about driver distraction issues.

Driver Distraction – What is it?

Researchers usually consider driver distraction to be an aspect of the broader problem of inattention (Stutts et al, 2001; Young, Regan and Hammer, 2003). United States research for example estimates that driver distraction is involved in approximately half of driver inattention related police reported crashes (Stutts et al, 2001). The definition of distraction is evolving but researchers tend to refer to the presence of events, stimuli or activities that divert attention from or interfere with attention relating to the driving task (e.g. Stutts et al 2001, Young et al, 2003). A recent definition provided by Regan (2005) states that distraction "occurs when a driver engages, willingly, or unwillingly, in a secondary activity which interferes with performance of the primary driving task".

A variety of behaviours and activities are included under the phrase driver distraction. For example the United States National Highway Traffic Safety Administration (NHTSA) (Stutts et al, 2001) outlines thirteen sources of driver distraction (see Table 1.). The Crash analysis system (CAS) contributory factor codes used in New Zealand that 'best capture' the NHTSA sources of distraction are the group of ten contributory factor codes (codes 351-360) that are under the general code of 'Attention diverted by' (code 350). Table 1 also provides a

comparison of the CAS contributory factor codes with the thirteen NHTSA driver distraction sources.

Table 1. Comparison of distraction contributory codes in CAS and the thirteen NHTSA driver distraction sources

CAS Contributory Factor Codes	**NHTSA Sources**
General distractions 350: Attention diverted by (general)	*General distractions* Other distraction Unknown distraction
Inside-the-vehicle distractions 351: Passengers 354: Animal or insect inside vehicle 357: Emotionally upset 358: Cigarette, radio, glove box etc 359: Cell-phone or communications device	*Inside-the-vehicle distractions* Eating and drinking Adjusting radio, cassette, or CD Other occupants in vehicle Moving object in vehicle Smoking related Talking or listening on mobile phone Dialling mobile phone Using device/object brought into vehicle Using device/object integral to vehicle Adjusting climate controls
Outside-the-vehicle distractions 352: Scenery or persons outside the vehicle 353: Other traffic 355: Trying to find intersection, house number, destination 356: Advertising or signs 360: Driver dazzled	*Outside-the-vehicle distractions* Outside person, object or event Other distraction

It is worth noting that the NHTSA approach is not exhaustive as it tends to focus on inside-the-vehicle distraction sources rather than outside-the-vehicle distraction sources. In comparison to the NHTSA approach, the New Zealand coding system provides more detail on potential outside-the-vehicle distractions, and less detail on the inside-the-vehicle distraction sources. For example, some codes, such as '358: Cigarette, radio, glove box etc' are used to capture a wide variety of behaviours and objects that are broken up into more detail under the NHTSA system. Cursory examination of the behaviours and objects covered by the CAS contributory factor codes mean that an examination of the content of the traffic crash reports (TCRs) is required in order to provide more detailed understanding of the distraction related behaviours and objects involved in police reported crashes in New Zealand.

When discussing distraction, researchers tend to describe the nature of the distraction in terms of four types involving different sources and sensing modes (for example, Young et al 2003). These four types are:

- Visual distraction: Where the source of the distraction and/or the attention modality involved is related to vision
- Auditory distraction: Where the source of distraction and/or the attention modality involved is related to sound
- Physical distraction: Where the driver performs physical movements, typically removing one or more hands from the control of the vehicle, to manipulate something
- Cognitive or attention distraction: Where the source of the distraction and/or attention modality involved is related to cognitive processes, such as the drivers 'state of mind' being 'absorbed' by something or an activity

Distraction related behaviours tend to involve multiple sources and modes of distraction. For example, the act of answering a mobile phone call (responding to an auditory signal, picking up and manipulating the phone, conversing or reading, and then hanging up and replacing the phone) can involve all four types over the 'whole act' and multiple types at the same time. However it is important to note that distraction is not simply a case of information overload and conflicting demands, but also involves the limits of human cognition and the breakdown of control processes such as feedback, planning and 'event' prediction (Lee, 2005).

The New Zealand coding system and crash data raise two issues that need to be considered when discussing distraction related crashes. The first issue is that road users other than vehicle drivers, such as pedestrians and cyclists can also be distracted. The review of the traffic crash reports (TCRs) showed that pedestrians, cyclists, and other road users were involved in distraction related crashes though the range of distracting behaviours possible to them is more limited. The second issue is that the New Zealand coding approach includes a code called 'emotionally upset'. This includes a wide variety of behaviour that are essentially cognitively distracting, such as thinking, day-dreaming, pre-occupation with something, or being in an emotional-state such as anger (which behaviourally includes thinking about the incident). The issue is whether these behaviours count as distraction.

An important difference between this type of cognitive distraction source and other sources of distraction seems to be with respect to the length of time spent on the behaviour. For example, many distracting behaviours such as moving an object, changing a CD/radio station are very discrete and limited in time and action. Other distracting behaviours such as conversation with a passenger or smoking can take place over a considerable period of time or driving trip, and therefore are less limited in time and action. If someone enters a vehicle after an argument or is stressed out and thinking about the day it is probably fair to say that they are cognitively inattentive, and distracted, but the distraction might be better described as a 'state' that they might be in for the entire driving trip. The definition of distraction provided by Regan (2005) seems to be able to include cognitive distractions such as emotionally upset or pre-occupied, as they could be considered to be secondary activities, which may last for the entire driving trip, which are centred around the driver, and which can certainly interfere with the performance of the primary driving task.

Examination of crashes with 'attention diverted by' contributory factor codes

The CAS contributory factor codes that best capture the sources of distraction proposed by the NHTSA are the group of ten specific contributory factor codes (code 351-360) that are under the general code 'Attention diverted by' (350). These codes include a mix of inside and outside the vehicle distractions. The crash report analysis examined the content of the traffic crash reports in 2002 and 2003 that included these contributory factor codes (350-360). A scheme was developed for classifying behaviour into different sources (see Appendix 1) with additional information on the types of objects or specific types of behaviour involved. The development of the classification scheme was guided by the NHTSA scheme (Stutts et al, 2001), observational work conducted in the United States on frequency and types of driver distraction behaviour that occur (Stutts et al, 2003) and preliminary analysis of samples of the content of the traffic crash reports. This research project is only partially completed as to date only the TCRs that contain contributory factor codes relating to inside-the-vehicle distractions (codes 351, 354, 357, 358 and 359) and general distractions (code 350) have been examined in-depth. This is approximately half of the crashes under the 'attention diverted by' code. The results presented should therefore be considered provisional until the in-depth analysis of outside-the-vehicle distraction related crashes has also been completed.

Summary of provisional findings

In 2002 and 2003 driver distraction was considered to be one of the main contributing factors in 1964[1] police reported casualty crashes in New Zealand (see Table 2). There were also 31 crashes where a cyclist or pedestrian was the person who was distracted in some manner. Table 2 also provides a summary of the number of crashes by worst injury sustained and the number of casualties by severity. Overall, based on the police crash report data, distraction appears to be involved in at least 9.5% of all crashes in 2002 and 2003. Of those distraction involved crashes that contained sufficient information to classify the source, the distraction source was inside-the-vehicle for approximately half (48%) of the crashes. This estimate is similar in size to the United States estimate of overall distraction involvement (13%) in police reported crashes, though the proportion of inside-the-vehicle distraction involvement is lower than the United States estimate of between 60-70% (Stutts et al, 2001).

As noted, thus far, only the crashes that included inside-the-vehicle distraction related contributory factors have been examined in detail for information on the behaviours and objects involved. Table 3 provides a summary of the involvement of different sources of inside-the-vehicle distraction in crashes in 2002 and 2003 and ranks them on the basis of their total crash involvement. Most police reported crashes during this period appear to involve non-technology-based distraction sources. The use of technology (if defined as telecommunications devices, entertainments systems and vehicle controls/devices) appears to be involved in a third (33%) of inside-the-vehicle distraction related police reported crashes.

Gordon (2005) provides more detailed examples of how specific inside-the-vehicle distractions can be further broken down. For example, for telecommunications the type of device (cell-phone, pager or radio-telephone) or the type of behaviour involved (answering, texting, conversation, moving or replacing). It is important to note that these results are based on police reported crashes, and they only provide comment on the frequency of reported involvement as a contributory factor within the context of police reporting of crashes. For example it is likely that overall distraction involvement is underestimated. A limitation of this type of crash-based study, is that it does not provide direct comment on how prevalent or how risky particular distraction related behaviours might be. The crash information presented should be interpreted within the context of other available information on risk and prevalence.

Table 4 and 5 which provide a breakdown of the number of crashes with inside-the-vehicle distraction contributory factors by the crash movements involved in the incident for two speed limit zones (50km/h and 100km/h). The crash movements involved are based on the movement classification system used in CAS (a summary diagram is provided in Appendix 2). These tables also include a comparison with the proportion of involvement of the major categories (A to Q) associated with all crashes, regardless of the contributory factors involved, over the same two year period.

The typical crash movement involved in inside-the-vehicle distraction related crashes in 50km/h speed zones appears to be spread across a variety of categories: loss of control (on straight or cornering), collisions with obstructions, rear-ends and intersections/driveways (turning versus the same direction and crossing) (all between 10-17%). In comparison to the crash movements involved for all crashes, inside-the-vehicle distraction related crashes seem to involve proportionately more loss of control on the straight, collision with obstruction and rear-end crashes. The typical crash movements involved for 100km/h speed zones for inside-the-vehicle distraction related crashes are loss of control (on the straight – 30%, and cornering – 42%). For both speed zones, the proportion of loss of control on the straight type

[1] In 2002 and 2003 there were a total of 2021 crashes under the ‘attention diverted by codes (350-360). Some of these crashes (26) were clearly not distraction related.

Table 2. Number of distraction related crashes by general source of distraction for 2002 and 2003 (Provisional)

	Crashes Worst Injury involved in Crash				Casualties Number by Severity			
Distraction Source (2002-2003)	**Fatal**	**Serious**	**Minor**	**Total**	**Fatal**	**Serious**	**Minor**	**Total**
Driver Distraction								
Inside the Vehicle Distractions	25	157	696	878	31	204	1059	1294
Outside the Vehicle Distractions	16	149	793	958	16	169	1103	1288
Multiple Sources - Outside and Inside the Vehicle Distractions	1	2	8	11	1	3	9	13
General Distraction - Source Not Defined	7	24	86	117	7	31	150	188
Total Driver Distraction Related Crashes	*49*	*332*	*1583*	*1964*	*55*	*407*	*2321*	*2783*
Pedestrian-Cyclist Related Distraction	2	7	22	31	2	7	26	35
Total - All Distractions	*51*	*339*	*1605*	*1995*	*57*	*414*	*2348*	*2819*

Table 3. Crash involvement of inside the vehicle distraction sources for 2002 and 2003 (based on examination of TCRs content) (Provisional)

	Number of crashes involving the source by worst injury sustained in the crash					Number of casualties by injury severity involved in the crash by distraction source				
Inside the Vehicle Distraction (IVD) Source	**Fatal**	**Serious**	**Minor**	**Total**	**% involvement in IVD crashes**	**Fatal**	**Serious**	**Minor**	**Total**	**% involvement in IVD crashes**
Passenger/s	8	53	162	223	25%	11	83	300	394	30%
Telecommunications	7	14	87	108	12%	9	20	129	158	12%
Entertainment Systems		15	88	103	12%		17	125	142	11%
Emotionally Upset or Preoccupied	6	19	75	100	11%	6	21	94	121	9%
Personal Effects		13	71	84	10%		14	93	107	8%
Vehicle Controls-Devices	2	18	56	76	9%	2	22	92	116	9%
Food-Drink	3	8	53	64	7%	4	10	72	86	7%
Smoking		10	36	46	5%		12	57	69	5%
Animal-Insect Inside Vehicle		3	33	36	4%		3	48	51	4%
Sneezing-Coughing-Itching		1	11	12	1%		1	14	15	1%
General Distraction - Inside	1	7	40	48	5%	2	8	56	66	5%
Total Inside the Vehicle Involvement	27	161	712	900		34	211	1080	1325	
Total Crashes – Inside the Vehicle	*25*	*157*	*696*	*878*		*31*	*204*	*1059*	*1294*	

Note: Because more than one inside the vehicle distraction can be involved as a contributing factor in the same crash the total number of crashes involving inside the vehicle distractions is higher than the total number of crashes that involved one or more inside the vehicle distractions as a contributing factor.

Table 4. Summary of in-vehicle distraction related crashes in 50km/h speed zones by movement classification (2002 and 2003) (provisional)

Movement Classification	A	B	C	D	E	F	G	O	Total	% of Total	Comparison with % of all 50km zone crashes
A: Overtaking and lane change	1		1	1					3	1%	2%
B: Head-on	9	3	6	1	5	5			29	6%	4%
C: Lost control or off-road (straight)		42	18					1	61	13%	6%
D: Cornering	33	30	9						72	15%	11%
E: Collision with obstruction	62		2	1				1	66	14%	4%
F: Rear-end	1	4	16	43	8	3		2	77	17%	10%
G: Turning versus same direction	6	1		38	1				46	10%	5%
H: Crossing (no turns)	51								51	11%	12%
J: Crossing (vehicle turning)	14		1						15	3%	9%
K: Merging	1								1	0%	3%
L: Right turn against	1	5							6	1%	10%
M: Manoeuvring	2		5		1		1	1	10	2%	6%
N: Pedestrians crossing road	8	5		1				1	15	3%	14%
P: Pedestrians other			1	1		1		6	9	2%	2%
Q: Miscellaneous	1		1					2	4	1%	1%
Total									465		

Table 5. Summary of in-vehicle distraction related crashes in 100km/h speed zones by movement classification (2002 and 2003) (provisional)

Movement Classification	A	B	C	D	E	F	G	O	Total	% of Total	Comparison with % of all 100km zone crashes
A: Overtaking and lane change		1	1	1		1			4	1%	5%
B: Head-on	10	9	11		4	2			36	10%	13%
C: Lost control or off-road (straight)	6	68	33						107	30%	16%
D: Cornering	74	67	5						146	42%	38%
E: Collision with obstruction	3								3	1%	2%
F: Rear-end	5			24	1	1		1	32	9%	9%
G: Turning versus same direction	2			7	1				10	3%	4%
H: Crossing (no turns)	3								3	1%	2%
J: Crossing (vehicle turning)	2								2	1%	4%
K: Merging		1							1	0%	1%
L: Right turn against		3							3	1%	3%
M: Manoeuvring	1	1						1	3	1%	2%
N: Pedestrians crossing road	1								1	0%	1%
P: Pedestrians other									0	0%	1%
Q: Miscellaneous									0	0%	1%
Total									351		

crashes is considerably higher for inside-the-vehicle driver distraction related crashes than for all crashes over the same period regardless of the contributing factors involved. These results are summarised in

The involvement of other key contributing factors to crashes such as alcohol, travelling too fast for the conditions and fatigue was also investigated for inside-the-vehicle related driver distraction crashes (Table 6.). Overall, approximately one quarter (23%) of the inside-the-vehicle distraction related crashes did not involve other contributory factors. Alcohol (defined as 101:suspected or 103: test above the limit) was also involved in 11% of inside-the-vehicle distraction crashes, roughly equivalent to the involvement rate in all crashes (13%). Travelling too fast for the conditions (codes 110-117) was also involved in 9% of inside-the-vehicle distraction crashes, somewhat below the involvement rate of all crashes (16%). Fatigue was also involved in only 4% of inside-the-vehicle distraction related crashes.

When specific sources of inside-the-vehicle distraction are considered crashes related to being emotionally-upset or preoccupied distractions also involved higher levels of alcohol, speed and fatigue as contributing factors. Alcohol was also involved more often with smoking related distraction crashes. Given the context of the behaviours and emotional state associated with crashes involving the emotionally upset or preoccupied code this finding is not surprising. For example, a large number of these crashes involved people getting into a vehicle after a period where they were drinking/socialising and had a recent argument, often with a partner.

Table 6. Involvement of other contributing factors with inside-the-vehicle distractions

	Involvement in crashes (proportion)			
Inside-the-vehicle distraction	**Single Factor**	**Alcohol**	**Speed**	**Fatigue**
Passenger/s	17%	13%	8%	1%
Telecommunications	25%	13%	7%	0%
Entertainment Systems	22%	8%	12%	4%
Emotionally Upset or Preoccupied	5%	27%	25%	7%
Personal Effects	32%	4%	2%	2%
Vehicle Controls-Devices	22%	0%	11%	0%
Food-Drink	34%	5%	5%	5%
Smoking	35%	20%	4%	2%
Animal-Insect Inside Vehicle	42%	3%	3%	0%
Sneezing-Coughing-Itching	Too few numbers			
General Distraction - Inside	33%	8%	10%	4%

Note: Alcohol was defined as code 101: suspected or 103: tested above the limit or refused

Focus group research

The purpose of the focus group research was to develop an initial understanding of driver perceptions and attitudes to inside-the-vehicle distractions. A total of six focus groups (five in the Auckland region and one in Morrinsville) were facilitated by Research International. The total number of participants involved was 37 (21 males and 16 females). Six categories of drivers were of interest when recruiting participants, teenagers (16-19 years), young adults (20-24 years), parents or caregivers, business people, and general drivers (urban or rural). The participants were randomly recruited by telephone, screened on the basis of the groups of interest and a spread of demographic criteria, and they had to agree that they performed some potentially distracting behaviours while driving at least some of the time. The summary of some of the findings provided below is based on Barker (2005).

The drivers interviewed considered inside-the-vehicle distractions as part of a larger set of distractions that drivers have to contend with everyday (including difficult weather and other

traffic etc.), and they were accepted as a normal part of driving. The participants did not consider inside-the-vehicle distractions to be a significant road safety issue. The reasons for this were because they had engaged in these activities many times and believed they had not suffered any serious negative consequences as a result. In addition, although many participants could describe near misses and situations where their driving performance was negatively affected by distracting activities, they expected any consequences of a crash to be more of a 'hassle' than a danger to their well-being.

Overall these behaviours were considered to be within the driver's control, that is, they believed they could stop the behaviour when necessary to deal with a traffic situation that they recognised as posing more risk. They recognised that some activities such as eating and drinking, smoking a cigarette and changing a CD could be distracting if something went wrong, for example, if the food being eaten spilled on the driver while driving or if another driver made a bad driving decision and they could not react to that decision in time as a result. The participants considered some distractions to be outside of a driver's control, for example, the behaviour of a passenger (young adult/adult), pet or child, and for these distractions they believed the driver often did not have a choice but to respond immediately to the situation.

The facilitators asked the participants to rank the distractions by risk (between low and high risk) and frequency (between less and more frequent) (summarised in Figure 1.).

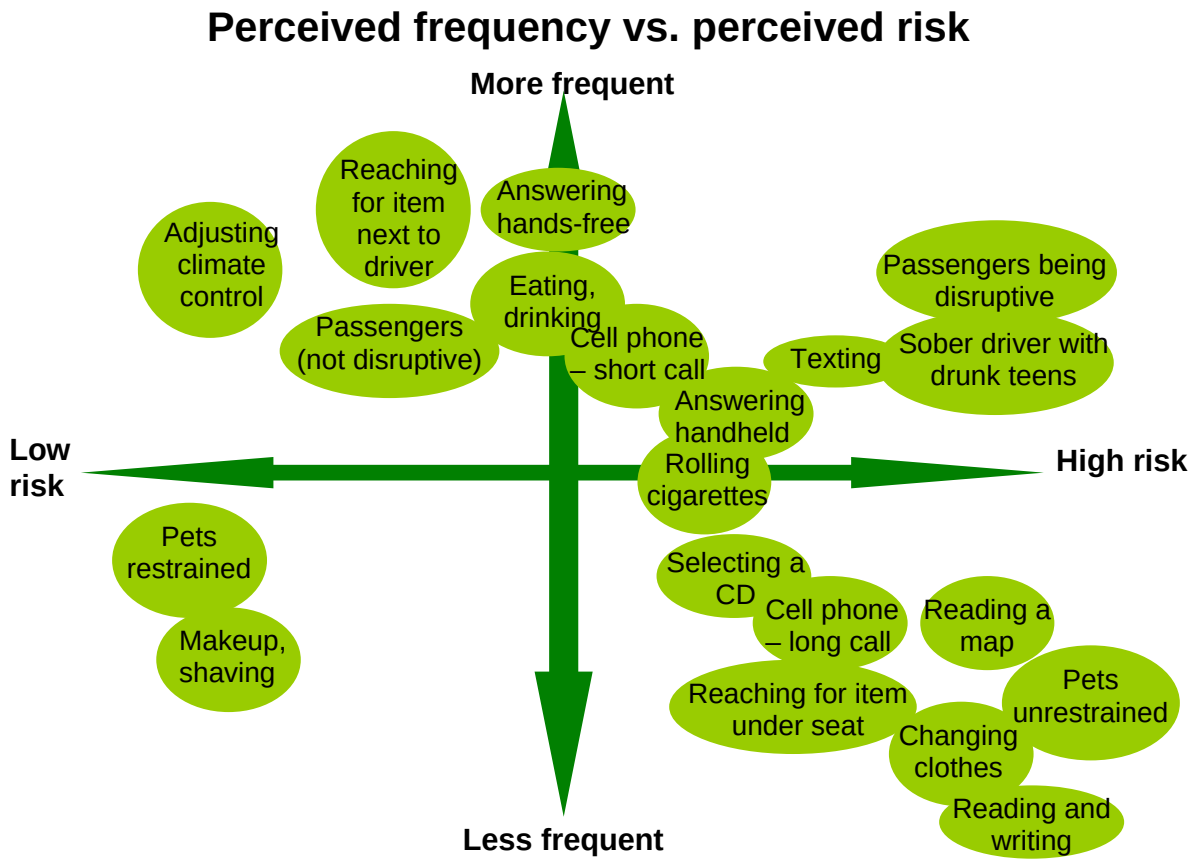

Figure 1. Perceived risk and frequency diagram for different distractions (focus groups)

These results provide assistance in understanding the police reported crash picture in Table 3. For example, passenger distractions (whether disruptive, drunk teens, non disruptive) were generally rated as being relatively frequent events, though the level of risk varied with the passenger behaviour. This fits with passengers being involved with the highest number of inside-the-vehicle crashes, though it suggests that passengers may not be the most risky

distracting behaviour if exposure (time spent performing the behaviour while driving) is considered.

In terms of the different types of distraction involved, the participants considered safety issues to be related to the driver having their eyes off the road and/or only one hand (or no hands) on the steering wheel. There was limited understanding of the role of cognition in being able to complete tasks. For example, the participants were able to discuss examples of 'looking but not seeing' incidences, driving on 'autopilot' and being delayed in their reaction when they had their eyes on the road. The participants also acknowledged that there are occasions when distractions posed more of a risk and reduced their ability to concentrate on driving. In particular when they are feeling emotional (when distressed or angry) or when they were overloaded (having to deal with too many tasks at once). They believed that both of these occasions were exacerbated if the driving was in an unfamiliar environment because they believed the situation did not require as much attention when driving on familiar roads as compared to unfamiliar roads. They felt comfortable completing multiple tasks at once providing they believed there were adequate spare attention resources.

Risk and exposure (time spent) estimates for different distraction behaviours

While the body of research concerning specific driver distraction behaviour such as telecommunications is developing, because of the different definitions and methodologies used, it is difficult to provide a definitive comparison of the relative risk associated with different sources of distraction. As a starting point for discussion, Regan (2005) based upon the literature to date, has suggested an ordinal ranking of different distraction sources in terms of risks associated with driving (in order of most to least distracting). Regan's ranking has been provided in Table 7 with a basic summary of the behaviours from the focus group research from Figure 1, ordered by relative risk. While not directly comparable because of difference in the behaviours considered and scales, the focus group ratings are not widely divergent from the research guided ranking.

Table 7. Risk rankings from Regan (2005) and the Focus Group research

Regan (2005)	**Focus Group**
1. E-mail/internet (when available/used)	1. Disruptive passengers, sober driver with drunk teens, reading a map, pets unrestrained, changing clothes, reading and writing
2. Mobile phone – text messaging	2. Texting, cell phone – long call, answering hand-held, rolling cigarettes, selecting a CD, reaching for item under seat
3. Mobile phone – conversation/talking (hands-free and hand-held)	3. Answering hands-free, eating-drinking, cell phone – short call
4. DVD player (if portable and poorly located)	4. Reaching for item next to driver, non-disruptive passengers
5. Conversation with passengers (if driver is young or old)	5. Adjusting climate control, restrained pets, doing makeup or shaving
6. Route navigation (if poorly designed)	
7. Cassette player/CD player	
8. Radio	
9. Climate controls	
10. Eating/drinking	
11. Smoking-related	

Research investigating how often and for how long drivers engage in potentially distracting behaviours is also becoming available. Detailed observational research on exposure has been conducted by Stutts et al (2003) in the United States. They observed the actual driving and distraction related behaviours of 70 participants that occurred inside a vehicle during a three hour driving period. They found the following with respect to the involvement of different distraction behaviours and the proportion of the time spent on it in the trip:

Behaviour	*Time spent*
• Conversing	15.0%
• Preparing to eat/drink and eating/drinking (or spilling)	4.6%
• Reaching, leaning, manipulating vehicle controls	3.8%
• External distraction	1.6%
• Smoking (includes lighting and extinguishing)	1.6%
• Manipulating music/audio controls	1.4%
• Answering, talking on or dialing a cell-phone	1.3%
• Distracting passengers (baby/child/adult)	0.9%
• Reading or writing	0.7%
• Grooming	0.3%

The focus group research, while acknowledging the small sample size provides an tentative indication of the perceived frequency of different behaviours as New Zealanders see them (Figure 1.). When compared to Stutts et al (2003) research, the focus group participants seem to suggest that some types of telecommunications related behaviour may be quite frequent. However the degree to which the frequency perception of the focus group participants is accurate with respect to actual time spent is a matter of debate.

Both the risk information and the exposure information is needed to assist in interpreting the crash picture in Tables 2 and 3. If we assume that the US study is roughly applicable to New Zealand, conversing with passengers is rated in the middle in terms of risk when performed while driving, it is the most frequently engaged in activity, and it is therefore not surprising that passenger related distractions turn up a lot in the crash analysis. Use of mobile phones on the other-hand is one of the higher risk behaviours that can be performed while driving, though it occurs relatively infrequently as a proportion of time spent, yet in the crash analysis telecommunications related distraction is second equal in terms of crash involvement. At present, a key gap in our knowledge for New Zealand is in terms of exposure information. While some information on exposure is available in a limited way for some distraction related behaviours (for example, Sullman and Baas (2004) or LTSA (2003) with respect to surveys of reported frequency of cell-phone use) a study or series of studies similar in nature, detail and scope of the Stutts et al (2003) study has not been conducted.

Summary

Distraction encompasses a wide range of behaviours and objects, and is not just restricted to the drivers of vehicles, as pedestrians and cyclists and other road users can also be distracted. Based on the police reported crash analysis completed to date, and noting that the analysis research phase for outside-the-vehicle distractions has not yet been completed, driver distraction appears to be involved in approximately 10% of police reported crashes, with approximately a 50-50 split for the source of the distraction being inside-the-vehicle or outside-the-vehicle. Based on the preliminary analysis of police reported crashes, the top three sources of inside-the-vehicle distraction (in terms of crash involvement for 2002 and 2003) were passengers (25%), telecommunications and entertainment systems (equal at 12% each) and emotionally upset or preoccupied (10%).

The majority (66%) of the crashes involved non-technology based distractions that were related to everyday objects (personal effects, food and drink, cigarettes, reading material) or people (passengers) that come into the vehicle or emotional/cognitive ‘issues’ that the driver brought into the vehicle. The pattern of crash movements varied with the speed zone and was different to the patterns involved for all contributory factors. In 50km/h zones the type of crash was spread reasonably evenly over crash types including loss of control, collisions with obstructions, rear-ends, and intersection/driveway movements. In 100km/h zones the typical movement involved was loss of control (off the straight or off a corner). While inside-

the-vehicle distraction related crashes often involved other contributory factors as well, two sources, emotionally upset or preoccupied and smoking also appeared to involve a higher level of alcohol involvement. The usual limitations of police reported crash based studies are applicable to this study, and care should be exercised in attributing comments on the risk associated with specific behaviours and/or exposure related issues from this data.

The focus group research provides some indications on how the drivers think about driver distraction issues, and other strategies that they believe they can use to mitigate potential risk. In relation to the research on how distraction affects driving and the limitations of human attention the research suggests that drivers may only be aware of some of the issues involved. The participants were able to provide an indication of how they ranked different behaviours in terms of perceived frequency of occurrence and perceived risk involved in performance. This kind of information can provide some insights when combined with the analysis of police reported crashes, other research on the risks involved in different distraction related behaviours and research on the amount of time spent on different activities when driving. The focus group participants understanding of the risk involved in different behaviours does not appear to be completely out of step with the current research understanding. The focus group research also provides some indications of how often people perceive different behaviours being performed inside vehicles, however the sample size is small. If more detailed exposure information is desired for New Zealand, then more observational research relating to driving behaviours performed in the vehicle is required.

The focus group research suggests that the public have a partial understanding of how distraction influences driving, and that they expect to be able to perform many of these actions as a normal part of driving. There are also a wide variety of distracting behaviours involved which makes it impractical to address as a single issue or with a single approach. Further, in many cases we do not necessarily want to stop the behaviours involved being performed, rather we are trying to improve the decisions about when and how they are performed while driving. With this in mind, providing information on the how distraction works, and the risk of different distracting behaviours could at least raise awareness and advice and guidance on workable behavioural solutions could be also provided. For example, some distractions could be prevented through better planning i.e. restrain animals when in the vehicle or secure items on seats before driving. Others through behavioural strategies, such as don’t answer the phone when it rings in the vehicle as a message will be taken, but rather pull-over when it is safe to do so and then devote your entire attention to the phone conversation. In the end however, this requires encouraging people to alter their habits and behaviour, which could include a mix of training, educational, awareness raising initiatives and/or environmental encouragement (such as legislation or enforcement).

The information on the types of typical crash movements involved could assist road and vehicle design. For example on the open road, the crashes involved tend to be loss of control – drifting to the left or right – crashes. Therefore for example, engineering solutions that reduce the potential crash impact of such crashes (such as removing roadside hazards or improved vehicle crash worthiness), or measures that indicate or prevent lane drifting would be likely to assist. Telematic-based solutions are also being developed to assist drivers, and if well designed could very well assist with minimising the occurrence of or the consequences of some driver distraction issues. However, these solutions themselves need to be minimally distracting to the driver.

It is also important to remember that many distractions are related to events/objects outside-the-vehicle such as scenery, and other people, and that many inside-the-vehicle distractions are not technology based, such as objects the driver or passengers bring into the vehicle (cigarettes, pets, personal items and so on). Furthermore there are also technological devices that we bring into the vehicle, such as telecommunications equipment, portable computers or entertainment systems that have not been designed with the task of driving

while in use in mind. As a driver of a vehicle perhaps we need reminding of what the primary task involved is? When we add tasks to the primary driving task we add complexity, and sometimes it catches us out.

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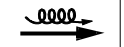
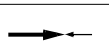
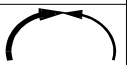
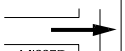
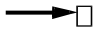
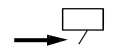
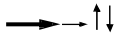
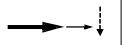
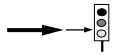
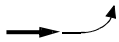
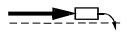
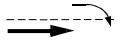
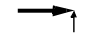
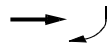
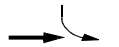
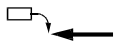
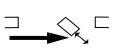
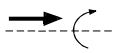
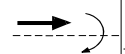
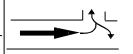
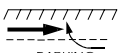
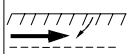
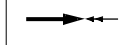
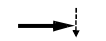
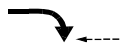
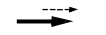
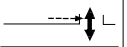
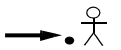
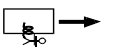
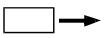
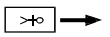
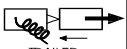
Appendix 1 Broad distraction source categories used in police reported crash analysis

Inside the vehicle distraction source	Description
1. Passengers	Where the source of distraction is from, related to or in response to one or more passengers actions.
2. Telecommunications	Where the objects involved are related to telecommunication devices (at present cell-phone, pagers or radio-telephones) and actions to use them. They may or may not be brought into the vehicle.
3. Emotionally upset-preoccupied	Where the source of the distraction relates to the driver, where they are upset, angry, crying or similar behaviour, or cognitively preoccupied-thinking about something such as day-dreaming, thinking about the day. The distraction is not related to the presence of passengers. If the emotional state is related to a intention to crash then this is not considered to be distraction.
4. Food-drink	Where the object involved relates to food or drink objects or containers and actions to use them.
5. Personal effects	Where the objects involved relates to items brought into vehicle such as books, bags, tissues, briefcases, etc. Also includes clothing and glasses.
6. Smoking	Where the objects involved relates to smoking (pipes, cigarettes, lighters etc) and actions to use them.
7. Entertainment systems	Where the objects involved relates to the entertainment system of the vehicle (currently stereo/CD/radio/cassettes) or similar items brought into the vehicle for the same purpose, and actions to use them.
8. Vehicle controls/devices	Where the objects involved relates to controls/ devices or gauges integral to the vehicle (other than entertainment). Also includes physical adjustments to mirrors and the windscreen etc.
9. Animal or insect in vehicle	Where the objects involved relate to animals or insects in the vehicle.
10. Sneezing/coughing/itching	Where the source of the distraction is related to the driver, and the actions are similar to sneezing, coughing, itching or stretching.
11. General distraction - inside	Where enough information is provided to assign the distraction as inside the vehicle but there is insufficient information to categorise the object or behaviour involved further.

Appendix 2: Movement Crash Classification Diagram

	TYPE	A	B	C	D	E	F	G	O
A	OVERTAKING AND LANE CHANGE	 PULLING OUT OR CHANGING LANE TO RIGHT	 HEAD ON	 CUTTING IN OR CHANGING LANE TO LEFT	 LOST CONTROL (OVERTAKING VEHICLE)	 SIDE ROAD	 LOST CONTROL (OVERTAKEN VEHICLE)	 WEAVING IN HEAVY TRAFFIC	OTHER
B	HEAD ON	 ON STRAIGHT	 CUTTING CORNER	 SWINGING WIDE	 BOTH OR UNKNOWN	 LOST CONTROL ON STRAIGHT	 LOST CONTROL ON CURVE		OTHER
C	LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	 OUT OF CONTROL ON ROADWAY	 OFF ROADWAY TO LEFT	 OFF ROADWAY TO RIGHT					OTHER
D	CORNERING	 LOST CONTROL TURNING RIGHT	 LOST CONTROL TURNING LEFT	 MISSED INTERSECTION OR END OF ROAD					OTHER
E	COLLISION WITH OBSTRUCTION	 PARKED VEHICLE	 ACCIDENT OR BROKEN DOWN	 NON VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	 WORKMANS VEHICLE	 OPENING DOOR			OTHER
F	REAR END	SLOW VEHICLE	 CROSS TRAFFIC	 PEDESTRIAN	QUEUE	 SIGNALS	 OTHER		OTHER
G	TURNING VERSUS SAME DIRECTION	 REAR OF LEFT TURNING VEHICLE	 LEFT SIDE SIDE SWIPE	 STOPPED OR TURNING FROM LEFT SIDE	 NEAR CENTRE LINE	 OVERTAKING VEHICLE	 TWO TURNING		OTHER
H	CROSSING (NO TURNS)	 RIGHT ANGLE (70° TO 110°)							OTHER
J	CROSSING (VEHICLE TURNING)	 RIGHT TURN RIGHT SIDE		 TWO TURNING					OTHER
K	MERGING	 LEFT TURN IN	 RIGHT TURN IN	 TWO TURNING					OTHER
L	RIGHT TURN AGAINST	 STOPPED WAITING TO TURN	 MAKING TURN						OTHER
M	MANOEUVRING	 PARKING OR LEAVING	 "U" TURN	 "U" TURN	 DRIVEWAY MANOEUVRE	 PARKING OPPOSITE	 ANGLE PARKING	 REVERSING ALONG ROAD	OTHER
N	PEDESTRIANS CROSSING ROAD	 LEFT SIDE	 RIGHT SIDE	 LEFT TURN LEFT SIDE	 RIGHT TURN RIGHT SIDE	 LEFT TURN RIGHT SIDE	 RIGHT TURN LEFT SIDE	 MANOEUVRING VEHICLE	OTHER
P	PEDESTRIANS OTHER	 WALKING WITH TRAFFIC	 WALKING FACING TRAFFIC	 WALKING ON FOOTPATH	 CHILD PLAYING (TRICYCLE)	 ATTENDING TO VEHICLE	 ENTERING OR LEAVING VEHICLE		OTHER
Q	MISCELLANEOUS	 FELL WHILE BOARDING OR ALIGHTING	 FELL FROM MOVING VEHICLE	 TRAIN	 PARKED VEHICLE RAN AWAY	 EQUESTRIAN	 FELL INSIDE VEHICLE	 TRAILER OR LOAD	OTHER