

1 **A mixed-methods study of driver education informed by the Goals for Driver Education: Do young**  
2 **drivers and educators agree on what was taught?**

3 **Abstract**

4 Evaluation research suggests that professional driver education and training has little effect on  
5 reducing the crash involvements of young drivers. Driver education and training programs have been  
6 criticised as being unsystematically designed and lacking an empirical or theoretical basis. The Goals  
7 for Driver Education (GDE) is a theoretical framework developed to address these criticisms. The  
8 GDE defines four hierarchical levels of driving behaviours and influences on driving and three  
9 individualised Person-specific factors that should be considered in driver education and training  
10 programs. The aim of this study was to compare and contrast, in a methodologically rigorous  
11 manner, the perceptions that young drivers ( $n = 22$ ;  $M_{age} = 17.80$  years,  $SD = 6.54$  months) and driver  
12 educators ( $n = 10$ ;  $M_{age} = 54.5$  years,  $SD = 9.21$  years) have of a professional driver education and  
13 training course they participated in or facilitated. Eight semi-structured focus groups were  
14 conducted and the GDE was used to direct the collection and analysis of the data. Young drivers  
15 mainly discussed basic driving skills located on the lower levels of the GDE rather than higher level  
16 abstract factors that increase risk for young drivers. Driver educators tended to group particular GDE  
17 levels and Person-specific factors together when discussing the driving course and paid limited  
18 attention to Goals and contexts of driving. Results suggest that driver educators should provide  
19 direct instruction regarding the more abstract social and contextual factors that influence driving to  
20 potentially increase the efficacy of driver education and training as a safety countermeasure.

21 **Keywords:** Young drivers; Novice drivers; Driver education; Driver training; Goals for Driver  
22 Education; GADGET matrix; Graduated driver licensing

## 23 1.1 Introduction

24 Road traffic injuries are the leading cause of death of individuals aged 15-29 years ( World  
25 Health Organisation, 2016). In 2015, in high income countries such as the United States and  
26 Australia, approximately 28% of deaths of 15-19 year olds and 24% of 20-24 year olds were caused  
27 by road injury (Institute for Health Metrics and Evaluation, 2015). Graduated Driver Licensing (GDL)  
28 programs, which regulate the type, time and contexts of driving for young people, have been  
29 adopted as the dominant governmental response to the issue of young driver crashes in North  
30 America and Australasia (Bates et al., 2014; Langley, Wagenaar, & Begg, 1996; Senserrick & Williams,  
31 2015). Evaluations of GDL consistently demonstrate statistically significant, and often sizeable,  
32 reductions in young driver crash rates (Shope, 2007; Vanlaar et al., 2009). However, crash rates of  
33 young drivers remain high in comparison to experienced drivers even in jurisdictions with a GDL  
34 system (Bradshaw, Turner, Makwasha, & Cairney, 2015). As such, further research and additional  
35 interventions are needed. This paper describes a mixed-methods study focused on professional  
36 driver education and training as a safety countermeasure for young drivers. The introduction is  
37 divided into three parts. First, an overview of young driver education and training research is  
38 provided. This is followed by a detailed explanation of a major theoretical framework about driver  
39 education and training, the Goals for Driver Education (GDE; Hatakka, Keskinen, Gregersen, Glad, &  
40 Hernetkoski, 2002; Peraaho, Keskinen, & Hatakka, 2003). Lastly, the aim of the study is presented.

## 41 1.2 Driver Education and Training

42 Driver *education* refers to the delivery of knowledge about driving and road safety and may  
43 not necessarily be conducted in a vehicle while driver *training* usually refers to the development of  
44 proficiency in specific skills (e.g. braking) (Beanland, Goode, Salmon, & Lenné, 2013). A wide variety  
45 of approaches to both driver education and driver training have been developed (Raftery &  
46 Wundersitz, 2011) and often elements of both driver education and driver training are presented  
47 within a single program (Groeger, 2011). In practice, it can be difficult to differentiate between

48 driver education and driver training and research often conflates these terms (Raftery & Wundersitz,  
49 2011; Royal Automobile Club of Victoria, 2016).

50           Formalised driver education and training with professional instructors has a high level of  
51 face-validity (Lonerero, 2008). It is likely that many organisations providing these courses, and the  
52 parents of attendees, have the expectation that these courses will increase young drivers' skills and,  
53 in doing so, reduce the chance that they will experience a motor vehicle crash (Mayhew, Simpson, &  
54 Robinson, 2002). Despite this, most evaluation research indicates that participation in professional  
55 driver education and training has not lead to significant reductions in crashes of young drivers  
56 (Christie, 2001; Elvik, Høy, Vaa, & Sørensen, 2009; Glendon, McNally, Jarvis, Chalmers, & Salisbury,  
57 2014; Haworth, Kowadlo, & Tingvall, 2000; Ker et al., 2005; Lonerero & Mayhew, 2010; Lund, Williams,  
58 & Zador, 1986; Mayhew, et al., 2002; Mayhew, Simpson, Williams, & Ferguson, 1998; Roberts &  
59 Kwan, 2001; Thomas III, Blomberg, & Fisher, 2012). Moreover, studies that have specifically  
60 examined skid training indicate that it does not reduce young driver crashes or violations and may  
61 actually increase risky driving behaviour and young driver crashes (Farmer & Wells, 2015; Gregersen,  
62 1996).

63           Researchers have sought to determine inter-individual differences that are most  
64 characteristic of young drivers involved in crashes (Engstrom, Gregersen, Hernetkoski, Keskinen, &  
65 Nyberg, 2003; Shope & Bingham, 2008). These characteristics may include core attributes and  
66 modifiable attributes of the person, other higher-order cognitive skill levels, as well as the type of  
67 driving in which young people engage (Bates, Davey, Watson, King, & Armstrong, 2014). Core  
68 attributes may include differences in age and gender (Monárrez-Espino, Hasselberg, & Laflamme,  
69 2006), personality (Constantinou, Panayiotou, Konstantinou, Loutsiou-Ladd, & Kapardis, 2011), and  
70 experience of clinical disorders, such as Attention Deficit Hyperactivity Disorder (Merkel et al., 2013).  
71 Modifiable attributes may include driving experience (McCartt, Mayhew, Braitman, Ferguson, &  
72 Simpson, 2009) and the type and amount of driver education and training that an individual has  
73 received (Tronsmoen, 2008, 2010). Higher-order cognitive skills may include executive functions

74 such as response inhibition (Mäntylä, Karlsson, & Marklund, 2009) and hazard perception abilities  
75 (Borowsky, Shinar, & Oron-Gilad, 2010). Research such as this implies that driver education and  
76 training efforts aimed at reducing young driver crashes should specifically incorporate elements that  
77 account for these important individualised influences on driving as well as procedural driving skills.

78 One prominent reason that professional training has not led to expected safety benefits for  
79 young drivers may be that traditional training has targeted less relevant skills or those that are not  
80 the most important causal contributors to young driver crashes (Mayhew, et al., 2002). A second  
81 reason is that driver education and training programs have often been devised in an ad hoc manner  
82 without a scientific basis (Beanland, et al., 2013; Hoeschen et al., 2001; Peck, 2011). The GDE, also  
83 known as the GADGET matrix, was designed to broaden the scope of driver education and training  
84 and address these concerns (Hatakka, et al., 2002).

### 85 **1.3 The Goals for Driver Education**

86 The GDE is an organising framework for information about driver behaviour, training and  
87 skills development, and other areas of relevance for driver education and training practitioners  
88 (Berg, 2006). It aims to identify the driving skills and abilities that need to be acquired in order to  
89 become a safe driver and the factors that influence the learning process in attaining these skills and  
90 abilities (Hatakka, et al., 2002). The GDE groups driving behaviours and influences into four  
91 hierarchical levels which range from concrete and driving-specific to abstract and general (Peraaho,  
92 et al., 2003). The first level focuses on vehicle manoeuvring and is concerned with training  
93 requirements for the physical operation of the motor vehicle. Level two refers to mastering traffic  
94 situations and is concerned with an individual's ability to adapt to circumstances while driving. The  
95 third level is more abstract and centres on a person's motivations, goals and contexts of driving. The  
96 fourth level is very abstract and considers how driving fits within a person's life and is influenced by  
97 their personal development and other macro-contextual factors.

98 For the sake of categorisation within the GDE, the trip purpose (e.g. driving as a part of  
99 employment compared to driving to a place of employment), for example, would be included at

100 level three while more global personality traits, media influence or macro-economic factors would  
 101 be included at level four. However, items at each hierarchical level may have an influence on items  
 102 at other levels either directly or indirectly (Peraaho, et al., 2003) and, while all aspects of the GDE  
 103 are important, Hatakka, et al. (2002) suggest that targeting influences from the more abstract  
 104 hierarchical levels may be of the greatest importance overall. Supporting this, young drivers obtain  
 105 physical driving skills quickly (Hall & West, 1996) and once automatized may be less likely to be the  
 106 critical factor leading to young driver crash involvement compared to higher level influences such as  
 107 decision-making errors (Curry, Hafetz, Kallan, Winston, & Durbin, 2011) or intentional risk taking  
 108 (Voogt, Day, & Baksheev, 2014).

109           The GDE includes a mechanism that accounts for the training needs of individuals (Peraaho,  
 110 et al., 2003). Three Person-specific factors are included in the framework which must be considered  
 111 at each level of the hierarchy: Knowledge and skills; Risk-increasing factors; and Self-evaluation and  
 112 awareness skills (Hatakka, et al., 2002). Knowledge and skills describes the informational content of  
 113 each level and the methods with which that information is put into practice. Risk-increasing factors  
 114 refer to individual attributes and other aspects that may increase an individual's risk of crashing.  
 115 Finally, Self-evaluation and awareness skills refer to the level of insight an individual has about  
 116 themselves, the environments and contexts in which they engage, and their skills. As a consequence  
 117 of this structure, the hierarchical levels and Person-specific factors can be combined to form a matrix  
 118 of twelve unique target areas. Table 1, adapted from Peraaho, et al. (2003), depicts the connection  
 119 between each GDE level and Person-specific factor. An example item that falls into each of the  
 120 twelve unique GDE level and Person-specific factor combinations is also provided.

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Table 1.

*The twelve aspects of focus for driver education and training within the Goals for Driver Education with examples*

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Knowledge and skills	Risk-increasing factors	Self-evaluation and awareness skills
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Goals for life and skills for living (Level Four)	Knowledge of personal tendencies that effect driving	Non-acceptance of social norms regarding drug use	Ability to recognise and control impulses
Goals and contexts for driving (Level Three)	Ability to plan trips	Risks associated with driver condition	Insight about time-management skills
Mastery of traffic situations (Level Two)	Safety margins	Driving skill in relation to weather conditions	Awareness of personal driving style
Vehicle manoeuvring (Level One)	Non-declarative knowledge of how to operate car	Insufficient automatization of psychomotor skills for operating the vehicle	Realistic self-evaluation of ability to reverse park

Adapted from Peraaho, et al. (2003)

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#### 123 **1.4 The Current Study**

124           The aim of the current study is to investigate the perceptions of driver education held by  
 125 young drivers and the professional driver educators that work with them. What young drivers take  
 126 away from professional driver education course may influence the subsequent way that they drive.  
 127 An understanding of the similarities and differences between the perceptions of professional driver  
 128 education of these groups may lead to more effective, safety-focused, and theoretically supported  
 129 driver education and training.

#### 130 **2. Method**

##### 131 **2.1. Context**

132           The study was conducted in the Australian state of Queensland in 2016. A GDL program  
 133 operated in Queensland at the time of study (Queensland Department of Transport and Main Roads,

134 2016; TMR) which consisted of a fully supervised learners licence , an independent but restricted  
135 provisional licence with two age and experience based levels (P1 and P2), and an unrestricted open  
136 licence. Young drivers could progress through the various licence categories over at least a four year  
137 period with the earliest starting age being 16 years.

138 This research was funded as part of an Australian Research Council Linkage Project  
139 (LP140100409). Linkage Projects aim to foster applied research and practical solutions to issues by  
140 promoting research involving both university and industry partners. The bulk of the funding is  
141 independent of each project partner ensuring that conflicts of interest are avoided. As such, the  
142 study was conducted with the assistance of a driver education and training organisation located in a  
143 regional Queensland city which provided a two day course for senior high school students (aged 15-  
144 18 years). The course comprised a mixture of classroom and in-car activities including driving  
145 vehicles on a test track. While not a standardised or formalised requirement, individual driver  
146 educators would also often set 'homework' tasks to be completed after finishing the course. In this  
147 way, learnings were reinforced and opportunities for engagement of parents and other lay  
148 supervisors in the young drivers' experience of the course were provided. The nature of the course  
149 made it more accurately categorised as driver education rather than driver training, although as  
150 noted these terms are often used interchangeably. Additionally, the course included many elements  
151 of driver training and a strong focus on specific steering and braking techniques. For these reasons,  
152 the current study may provide insights for both driver education and driver training.

## 153 **2.2. Participants**

154 Twenty two young drivers ( $M_{age} = 17.80$  years,  $SD = 6.54$  months; 50% female) participated  
155 in five focus groups. Young drivers ranged in age between 17 years and 2 months and 19 years and 1  
156 month. The modal age of young drivers was 17 years and 9 months while the median age was 17.6  
157 years. To participate, individuals were required to be 17 years or older, have completed the course  
158 in the preceding 3 years, and hold a current learners or provisional drivers licence. Most participants  
159 held a provisional licence (P1 = 59.1%; P2 = 22.7%) and most (68.2%) had completed the course

160 within the previous two years. Just over half (54.5%) had completed the course while in Year 12, the  
161 final year of secondary education in Queensland. All young driver participants reported driving  
162 weekly and were currently driving an average of 6.23 ( $SD = 4.26$ ) hours per week.

163 Young drivers in Queensland are likely to receive a mix of lay and professional driver training  
164 (Bates, Watson, & King, 2014). However, professional driver education and training is not a legislated  
165 requirement in Queensland (TMR, 2016). It is possible that some young people in Queensland may  
166 gain an unrestricted licence solely through instruction by their parents or other lay supervisors. As  
167 such, young driver participants in this study were required to have completed the high school-based  
168 driver education course to ensure that both the driver educators and young drivers had a level of  
169 familiarity with professional driver education and training. Due to the nature of this population, it is  
170 likely that a large proportion of the young driver participants in the current study were either not yet  
171 licensed or were learners at the time they attended the course.

172 Ten driver educators ( $M_{age} = 54.5$  years,  $SD = 9.21$  years; 90% male) participated in three  
173 focus groups. The driver educators' ages ranged from 37 to 64 years. The driver educators self-  
174 reported an average of 8.75 years ( $SD = 7.70$  years) in the driver education industry. All driver  
175 educators had current formal qualifications in driver education and training (e.g. TLI41210 Certificate  
176 IV in Transport and Logistics [Road Transport – Car Driving Instruction]). On average these  
177 participants worked 23.30 hours per week ( $SD = 7.57$  hours) at the driver education provider,  
178 although this was unlikely to be solely presenting the high school driver course. Two participants  
179 also currently engaged in other driver training employment activities outside of the driver training  
180 organisation. The driver educators had held a driving licence (including learners) for 37.8 years ( $SD =$   
181 9.13 years) on average with a range of 21 to 48 years.

182 Young driver participants were recruited by email using a database maintained by the driver  
183 education and training provider or through word-of-mouth advertising to other individuals (e.g.  
184 teachers) who may have access to individuals fulfilling the inclusion criteria. Recruitment continued  
185 until data saturation was deemed to have occurred. Only driver educators employed at the



186 organisation who taught the specific high school course were recruited. All eligible driver educator  
187 participants chose to take part in the study. Other than providing assistance with recruitment of  
188 participants, the driver education organisation was not involved in any other aspect of the study,  
189 including its design and methodology, conducting the focus groups, or preparation of the  
190 manuscript. The organisation and its employees were not provided with any materials to be used in  
191 the focus groups prior to them occurring and were not advised of the aims and objectives of the  
192 study. Additionally, it should be noted that the driver education participants were all employed at  
193 the same organisational level and employees at management levels were specifically excluded from  
194 the study to reduce the potential for bias based on power differentials. Young driver participants  
195 were provided with an AUD\$15 gift card for attending. Driver educator groups were conducted at  
196 the organisation during existing work hours and participants were paid as normal for the time spent  
197 in the focus groups.

### 198 **2.3. Design and procedure**

199 Eight focus groups consisting of either young drivers (5 groups of 3-6 participants) or driver  
200 educators (3 groups of 3-4 participants) were conducted between January and July 2016. The young  
201 driver groups were conducted at convenient times for participants throughout this period, while the  
202 driver educators groups were conducted sequentially on a single day in January 2016. Groups were  
203 audio recorded and transcribed verbatim. Most groups were conducted during work hours on week  
204 days at the driver training organisation or at university facilities located in Brisbane. One young  
205 driver group was held in a quiet room at a church hall that was a convenient location for the  
206 participants.

207 The procedure for all groups was standardised. The focus group time was divided into two  
208 sections with the second section focusing on a different aspect of driver education. As such, the  
209 duration of discussions relevant for the current study ranged from 34 minutes to 1 hour and 22  
210 minutes. Participants were greeted, the study purposes and ethical requirements explained, written  
211 consent was obtained, and a short demographics questionnaire (e.g. age, current licence etc.) was

212 completed. Initial icebreaker questions were asked at the beginning of the focus groups. These  
213 questions probed about the course in general terms and allowed participants to become  
214 comfortable with the facilitators and the voice recorder. Examination of the GDE framework  
215 followed (see Table 2) and continued until it became evident that participants had nothing new to  
216 contribute. At the conclusion of the focus group, participants were asked if they had anything else to  
217 contribute. Immediately after each group, the facilitators held an informal debriefing session with  
218 each other where initial observations were discussed.

219           The design of the driver educator focus groups differed from the young driver groups in two  
220 ways. First, a short 10 minute presentation about the GDE framework was provided by the main  
221 facilitator immediately after discussion of the icebreaker questions. The driver educators were also  
222 given a handout detailing the GDE matrix, just prior to the presentation, which they could refer back  
223 to during the focus group. The GDE presentation was provided to the educators, and not to the  
224 young drivers, because it was recognised that the driver educators would have a higher level of  
225 knowledge about driver education and training but would most likely have little knowledge about  
226 the GDE. Also, in contrast to the young driver groups, it was decided that questions directly  
227 referencing the GDE would be the best approach for these individuals. This was because the driver  
228 educators have some expertise and engagement in the driver education and training field and thus  
229 are able to talk at a more abstract level about ideas related to the GDE. Care was taken to ensure  
230 that only a base level of information about the GDE was provided in the presentation and that  
231 language emphasising the importance of particular GDE components over others was avoided.  
232 Hatakka, et al. (2002)'s assertion that education and training about the higher levels or more  
233 abstract combinations of GDE components are possibly more important over the long term was not  
234 mentioned. The handout consisted of a single page with a figure explaining the GDE reproduced  
235 from Hatakka, et al. (2002) and a table from Peraaho, et al. (2003), similar to Table 1. As can be seen  
236 from in Table 2, the young drivers were asked indirectly about the GDE components using language

237 appropriate to their age and level of understanding. Appropriate ethical clearance from university  
 238 authorities was obtained prior to beginning the study (QUT: 1500001083; GU: 2016/879).

#### 239 **2.4. Analysis and coding**

240 Little guidance has been provided regarding how the GDE can be used to accomplish its  
 241 stated objectives of directing the design and evaluation of effective driver education and training  
 242 programs. A method of operationalising the GDE was developed to examine participant perceptions  
 243 of the content of an existing driver education and training program. As noted, the focus groups  
 244 examined a range of aspects related to young driver education and training. The portions of the  
 245 transcripts that were coded and analysed consisted of discussion that was: (1) was focused by the  
 246 GDE question prompts; (2) occurred during the icebreaker section; and (3) occurred during the  
 247 concluding sections of each group. Portions of the transcripts where discussion was focussed on  
 248 other aspects of driver education were not coded. The analysis of audio transcripts was conducted  
 249 using Nvivo 11 Pro (2016).

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Table 2.

*Question probes from the young driver and driver educator focus groups listed in the order they were presented to participants*

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#### Young driver question probes

What did the driver education course teach you about yourself when controlling a vehicle?

Thinking about your current driving, how has what you learned at the driver education course influenced the way you think about yourself in different types of driving situations?

Would you say that attending the driver education course made you personally consider how more broad types of things, like having other passengers in the car, the mood you are in, or where you are headed to may underlie the way you choose to drive?

How has the driver education course made you think about where driving will fit/fits into your life?

#### Driver educator question probes

From what you have just heard, what are your first impressions of the GDE framework? Could it fit in with the driver education course?

If you had to prioritise instruction of vehicle manoeuvring, mastery of traffic situations, goals and contexts of driving, or goals for life and skills for living, which one would it be?

How feasible would it be to teach a course that covers all of the GDE levels? How feasible is this for driver education providers to teach in general?

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*Note.* During the focus groups the facilitators referred to the driver education and training organisation and course by name.

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As the GDE was used to frame the current study, the thematic analysis demanded a more structured, top-down approach to the coding than in other more inductive qualitative approaches (Braun & Clarke, 2006). First, portions of transcribed text were assigned as being indicative of GDE levels or Person-specific factors. The same text elements could be assigned both a GDE level and Person-specific factor but could not be assigned more than one GDE level or more than one Person-specific factor. There were no specific constraints on the amount of text within each transcript that could have a single code assigned. Rather the priority was placed on capturing latent instances of a particular GDE level or Person-specific factor. However, facilitator comments were not coded and, in most cases, codes were applied to comments made by individuals rather than crossing over discussions involving multiple participants.

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The main facilitator (DR), who is the first author, coded each transcript while a randomly selected subsample of two driver educator and two young driver focus group transcriptions were coded independently by the second facilitator (AH). After this, the coders met and discussed the codes they had applied. The discussion was focused on text elements that had been coded differently by each facilitator and ensuring that each text element that was included in the analysis had been coded appropriately with a single GDE level, Person-specific factor, or unique combination of these. A number of codes were modified as a result of these discussions. After the initial discussion, percentage agreement between the independent coders ranged between 84.13% and 99.48% ( $M_{agreement} = 92\%$ ,  $SD = 4.0\%$ ) depending upon the particular code and focus group being examined. Discussion continued until consensus between the coders was reached.

272 Text items that had been coded with both a GDE level and a Person-specific factor then  
273 guided the analysis. Working with the set of young driver transcripts, the number of text elements  
274 (e.g. word, phrase, sentence etc.) which were *specifically* coded with one of the twelve possible code  
275 combinations in the GDE matrix (e.g. Risk-increasing factors and Goals and contexts of driving) was  
276 obtained. Following this, the total number of text elements which were represented with *any*  
277 combination of GDE level and Person-specific factor was obtained. The first number was divided by  
278 the second number and then multiplied by one hundred to obtain the percentage amount that the  
279 specific code combination represented the total number of text elements that were coded with both  
280 a GDE level and Person-specific factor. This process was repeated for each of the twelve GDE level  
281 and Person-specific factor combinations in the matrix and replicated with transcripts from the driver  
282 educator focus groups. Text which was not coded with both a GDE level and Person-specific factor is  
283 therefore not included in the analysis.

284 By highlighting these co-occurring codes, all instances in the transcriptions that  
285 corresponded directly to the twelve unique target areas making up the GDE matrix were identified,  
286 greatly expanding the evaluative scope possible in the study. Moreover, by converting frequency  
287 counts to percentages the codes that were applied to each transcript become comparable both  
288 within and across the young driver and driver educators focus groups. For example, examining the  
289 transcripts this way allowed instances in the text where young drivers talked about knowledge and  
290 skills related to Mastery of traffic situations (Level Two) to be scrutinised, and to be compared and  
291 contrasted with similarly coded text elements in the other young driver or driver educator focus  
292 groups. The qualitative examination of the transcripts was guided by the results of the frequency  
293 calculations and focused on the GDE components and combinations that had the largest and  
294 smallest percentages of discussion. Illustrative quotes are provided throughout the results and  
295 discussion section. The speaker is identified according to the focus group they participated in (e.g.  
296 YND1= participant in young driver group 1; DE1 = participant in driver educator group 1).

### 297 **3. Results and discussion**

298           The focus groups were centred on a particular driver education course in which all  
 299 participants had been involved, either as a participant or driver educator. Both the young drivers and  
 300 the driver educators perceived that each of the possible GDE level and Person-specific factor  
 301 combinations had been present during the two day course (see Table 3). This is especially the case  
 302 for the driver educators who agreed that “it pretty much describes what we do” (DE3). However,  
 303 there were both similarities and differences in the amount of discussion of different GDE  
 304 components in the young driver and driver educator focus groups.  
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Table 3.

*The percentage of text elements coded as specific GDE level and Person-specific factor combinations in the young driver and driver educator focus groups.*

	Knowledge and skills (%)	Risk-increasing factors (%)	Self-evaluation and awareness skills (%)	Percentage of GDE- related Text (%)
<u>Goals for life/skills for living</u>				
<u>(Level Four) (%)</u>				
Young drivers	2.5	4.3	5.1	11.9
Driver educators	6.1	12.6	8.9	27.6
<u>Goals and contexts for driving</u>				
<u>(Level Three) (%)</u>				
Young drivers	5.7	8.4	7.0	21.1
Driver educators	6.1	7.9	4.2	18.2
<u>Mastery of traffic situations</u>				
<u>(Level Two) (%)</u>				
Young drivers	17.9	11.7	7.0	36.6
Driver educators	9.3	7.5	7.5	24.3
<u>Vehicle Manoeuvring</u>				
<u>(Level One) (%)</u>				
Young drivers	23.0	4.5	2.9	30.4

Driver educators	12.6	8.4	8.9	29.9
<u>Percentage of GDE-related text (%)</u>				
Young drivers	49.1	28.9	22.0	100
Driver educators	34.1	36.4	29.5	100

*Note.* GDE = Goals for Driver Education; Percentages were calculated by obtaining the number of text elements that were coded with a specific combination of GDE level and Person-specific factor specified in the GDE matrix, obtaining the total number of text elements that were coded with any combination of GDE level and Person-specific factor, and dividing the first number by the second one and multiplying by 100. Calculations were performed separately for the young driver and driver educator transcripts.

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### 307 **3.1 Perceptions of the young driver education and training course focus**

308 In general, the percentage amounts of combined GDE level and Person-specific factors  
 309 indicate that the young drivers were more likely to speak about driving specific factors (e.g. GDE  
 310 level one and level two) than more abstract influences on driving (e.g. GDE level three and level  
 311 four). Young drivers were also much more likely to talk about Knowledge and skills related to these  
 312 levels than the other Person-specific factors. All young driver groups mentioned, for example, “a  
 313 particular type of driving, steering, they call it push/pull steering” (YND5). The most common  
 314 combination of GDE level and Person-specific factor for the young drivers was Knowledge and skills  
 315 and Vehicle manoeuvring (Level One) making up 23.0% of the total number of coded text elements.  
 316 The least frequently discussed combination by the young drivers was Knowledge and skills and Goals  
 317 for life/skills for living (Level Four). As such, it appears the young drivers perceived that the course  
 318 they attended was heavily focused on education and training of basic driving skills and to a much  
 319 less extent more abstract influences identified in the GDE framework.

320 For the driver educators, relatively equal percentage frequencies were found for Vehicle  
 321 manoeuvring (Level One) (29.9%) and the highly abstract and macro-contextual level Goals for  
 322 life/skills for living (Level Four) (27.6%). The least amount of discussion by the driver educators was  
 323 concerned with Goals and contexts for driving (Level Three) (18.2%). Risk-increasing factors was

324 discussed most among the Person-specific factors but there was relatively little difference in the  
325 proportions that each Person-specific factor was discussed overall (between 7% and 4.7%). This  
326 contrasted with the young drivers where differences between the amounts of discussion of each  
327 Person-specific factor were quite large (between 27.1% and 6.9%). The most common combinations  
328 discussed by the driver educators were Vehicle manoeuvring (Level One) with Knowledge and skills  
329 and Goals for life/skills for living (Level Four) and Risk-increasing factors, which were discussed in  
330 equal proportions (12.6%). However, Goals and contexts of driving (Level Three) and Self-evaluation  
331 and awareness skills was the combination least likely to be discussed by the driver educators  
332 (4.2%). Thus it appears that the driver educators perceive that there is at least some focus in the  
333 course on both basic driving skills and more abstract influences related to driving.

334         There may be implications for the driver education organisation if young drivers and driver  
335 educators have different perceptions of the main focus of the driver education course. For example,  
336 the driver educators may perceive they have provided a comprehensive driver education course that  
337 effectively focuses on the major factors affecting young driver behaviour identified in the GDE. At  
338 the same time, the young drivers may have perceived that the course is mostly focused on more  
339 basic driver training located at lower levels of the GDE. The young drivers thus may come away from  
340 the course erroneously thinking they have received complete instruction regarding the most  
341 important aspects of driving while not comprehending some of the most important contributors to  
342 young driver crash involvement. The misalignment of young driver and driver educator perceptions  
343 may mean that there is no indication for the driver education organisation that the course should be  
344 changed, expanded in its scope, or that the way that course components are delivered should be  
345 modified to potentially increase its effectiveness.

### 346 **3.2 General perceptions of GDE level and Person-specific factor combinations**

347         There was less variability in how the GDE levels and Person-specific factors were discussed in  
348 conjunction with each other in the driver educator focus groups compared to the young driver



349 groups. The coefficient of variation<sup>1</sup>, for example, for all possible GDE component combinations in  
350 the driver educator transcripts (31%) was much lower than in the young driver transcripts (61%).  
351 This indicates that the young drivers were more likely to talk about a range of GDE level and Person-  
352 specific factor combinations whereas driver educators were more likely to discuss specific re-  
353 occurring GDE level and Person-specific factor combinations. Tentatively, it seems that the driver  
354 educators' grouped together particular levels of the GDE hierarchy with particular Person-specific  
355 factors when discussing the content and structure of the course. The implication is that some driver  
356 educators may skew the education and training that they provide to young drivers, potentially over-  
357 emphasising some aspects of the GDE to the neglect of other important components of driver  
358 education and training identified in the matrix.

359         The GDE does not stipulate that each of the twelve GDE level and Person-specific factor  
360 combinations should be weighted equally in importance. However, it is suggested that all GDE levels  
361 and Person-specific factors should be attended to in some way in driver education and training  
362 courses (Hatakka, et al., 2002). The consequences of including a greater focus on a particular GDE  
363 level, Person-specific factor, or combination of these, are currently unknown. Moreover, it may be of  
364 greater importance to examine which GDE component or combinations of components receive  
365 greater attention and ensure that the focus is on the parts of the framework that are most effective  
366 at reducing young driver crashes. Reflecting the general lack of clarity in novice driver education and  
367 training research (Simons-Morton & Ehsani, 2016), however, little guidance is given regarding this,  
368 other than that the higher levels are most likely to be more important in influencing the driving  
369 behaviours of individuals over the long term (Peraaho, et al., 2003). The current study identified that  
370 the young drivers perceived that the course was focused primarily on more basic driver training.  
371 Given that young drivers are likely to obtain physical driving skills relatively quickly via both formal  
372 and informal training (Hall & West, 1996) and, in GDL jurisdictions, much of this training would be  
373 accomplished informally with parents it seems appropriate that formal driver education and training

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<sup>1</sup> The coefficient of variation is a measure of dispersion that can be used to compare the variability of different variables. It is the ratio of the standard deviation divided by the mean (Bridgmon & Martin, 2012).

374 should have a greater focus on the higher more abstract combinations related to Goals and contexts  
375 of driving (Level Three) and Goals for life/skills for living (Level Four).

### 376 **3.3 Perceptions of higher and more abstract GDE component combinations**

377 One notable aspect of the results is the large amount of discussion of aspects of education  
378 and training related to Goals for life/skills for living (Level Four) by the driver educators compared to  
379 the young drivers. In total, over twice the amount of discussion by the driver educators (27.9%) than  
380 the young drivers (11.9%) was related to this GDE level. The abstract combination of Goals for life  
381 and skills for living and Risk-increasing factors was one of the two GDE component combinations  
382 discussed most by the driver educators. This suggests that the driver educators at least considered  
383 some of the more intangible factors affecting young drivers or attempted to teach students about  
384 these more high level or abstract driving influences. Looking at the transcripts, it appears that the  
385 educators perceived they were providing instruction at the lower GDE levels as a gateway to  
386 communicating higher level insights or knowledge. This notion is concretely verbalised by an  
387 educator who stated “well some of our early activities on all the courses certainly cover [GDE levels]  
388 one and two, so the figure eight and slalom, that’s about vehicle manoeuvring, but it’s more, it’s  
389 starting to work on these as well (points to higher levels on GDE handout)” (DE1). Reiterating this,  
390 another educator commented that “it’s not the driving skills that we’re actually focussed on, we’ve  
391 got to use the motor car to prove stuff but we’re really trying to show them that...they need to be a  
392 lot more cautious in a motor car than what they thought and it’s much easier to crash a motor car  
393 than what they thought” (DE3). However, the results of the focus groups with young drivers suggest  
394 this was not an effective pedagogical strategy.

395 The analysis of the young driver transcripts indicated very low proportions of discussion  
396 centred on Goals for life/skills for living (Level Four). For example, the young drivers spent less than  
397 half the time than the driver educators in discussion of driver education that related to Person-  
398 specific factors associated with Goals for life/skills for living (Level Four) but nearly double the  
399 amount of time in discussion of knowledge and skills related to vehicle manoeuvring. This suggests

400 that the young drivers did not consciously understand the intent of the driver educators that training  
401 at the lower, driving-specific levels of the GDE should be connected with aspects of driving related to  
402 the higher, more abstract GDE levels. As such, it may be more beneficial for young driver safety  
403 outcomes to provide education on aspects related to Goals for life/skills for living (Level Four) in a  
404 more direct manner.

405 Driver overconfidence and its connection to driving errors, violations, lapses and other  
406 adverse outcomes has been examined in previous research (Wohleber & Matthews, 2016). Driver  
407 overconfidence can be defined as an inaccurate self-perception of driving ability compared to actual  
408 driving ability combined with a perception of unique immunity to higher levels of risk compared to  
409 similar others (Matthews & Moran, 1986). Both experienced and inexperienced drivers are likely to  
410 have some inaccuracies in their self-assessment of driving ability or beliefs about personal  
411 susceptibility to risk (Svenson, 1981). However, some research suggests that driver overconfidence  
412 may be more prominent in young drivers, particularly young males (Matthews & Moran, 1986;  
413 Wohleber & Matthews, 2016).

414 In connection with the GDE, driver overconfidence seems to be captured as under-  
415 developed Self-evaluation and awareness skills, particularly related to Vehicle manoeuvring (Level  
416 One) and Mastery of traffic situations (Level Two). However, discussion of Self-evaluation and  
417 awareness skills regarding Vehicle manoeuvring (Level One) made up only 2.9% of all the text  
418 elements from the young driver groups. In comparison, the proportion of text elements assigned to  
419 this combination in the driver educator discussions was 8.9%. Self-evaluation and awareness skills  
420 and Mastery of traffic situations (Level Two) were combined 7.0% of the time by the young drivers  
421 and 7.5% of the time by the driver educators. As such, there was a disparity in the amount of  
422 discussion of self-evaluation and awareness skills at the most basic level of driving a car but both  
423 groups attended equally to this Person-specific factor when discussing education and training that  
424 centred on traffic interactions. Nevertheless, in terms of the total percentage frequencies, these

425 combinations were relatively small, making up only 9.9% of the young driver and 16.4% of the driver  
426 educator discussions.

427           One educator summed up the association between training Self-evaluation and awareness  
428 skills and Vehicle manoeuvring (Level One) succinctly stating “you’ve gotta prove it to them that  
429 they’re not as good as they thought they are and we’re in a really good situation [to] prove it to  
430 them in a really safe environment” (DE2). Similarly, another educator described a driving task  
431 completed on the skid pan which was conducted with the intention of showing them “how very  
432 small changes in speed made ‘em crash and hit that cone”(DE2). This activity aimed to “level up their  
433 actual ability with their perception of ability” (DE2). These comments seem to be related to driver  
434 educator attempts to influence the level of driving overconfidence present in many young drivers.  
435 Although, given the low proportion of time spent discussing this GDE level and Person-specific factor  
436 combination overall, it does not appear to be a priority topic for these educators. This is mirrored in  
437 the young driver transcripts with the low percentage frequency suggesting that they did not perceive  
438 the course they attended was particularly focused on calibrating their perceptions of capability with  
439 the objective reality of their skill level.

440           Finally, the pattern of discussion that emerged in the analysis suggests that, across the  
441 Person-specific factors, the driver educators tended to pay least amount of attention to education  
442 and training related to Goals and contexts of driving (Level Three). The driver educators  
443 acknowledged the potential importance of peers and other social driving influences on young drivers  
444 in the focus groups. One driver educator discussed a part of the course in which videos of young  
445 people who have been hurt or disabled in a crash are played. It seems that the idea of this part of  
446 the course is to stimulate reflection in the students about how drink driving may personally affect  
447 the driver, their friends, and their family. This is exemplified with the comment “there’s no way in  
448 the world I’d feel happy about seeing my mate sittin’ in that chair and I watched him get into that  
449 car half pissed and drive off...I’d feel some guilt for that, you know, and so we bring all that round  
450 and have a group discussion about it” (DE2). However, the discussion of psychosocial influences on

451 driving, such as alcohol and substance use and peer pressure, was relatively superficial and did not  
452 appear to be a major focus for the driver educators in the current study. This is indicated by another  
453 comment from the same educator who said “we can’t go into a lot of details [in a two day course]  
454 but the main things that affect the young ones is peer group pressure, substance abuse, fatigue,  
455 road rage, things like that...I think we touch on some of this probably as best we could” (DE2).

456         The limited discussion of Goals and contexts of driving (Level Three) by the driver educators  
457 is reflected in the perceptions of the young drivers. This GDE level was discussed infrequently by the  
458 young drivers compared to the two more driving-specific GDE levels. The main way that the young  
459 drivers talked about this GDE level was in reference to a new awareness that peer passengers were a  
460 potential source of distraction for the driver. For example, one young driver talked about how she  
461 now reminded herself to stay focused when driving because she had “just picked up four friends  
462 who are off to this really exciting thing but [she] said [she] would drive” (YND1).

463         While driver distraction is an important issue that contributes to driver errors and crashes  
464 for young drivers (Young & Salmon, 2012), Goals and contexts of driving (Level Three) is also wider in  
465 scope encompassing other motivational and psychosocial driving influences. For example, Hatakka,  
466 et al. (2002) suggest that the decision whether to drive or to take public transport would be located  
467 on this level. Peer engagement and social life is an important aspect of adolescent development  
468 (Hoffnung, 2013) and young people often socialise at events (e.g. parties) or locations where alcohol  
469 or other illicit substances that effect driving ability may be consumed (Lipperman-Kreda, Mair,  
470 Bersamin, Gruenewald, & Grube, 2015; Mair, Lipperman-Kreda, Gruenewald, Bersamin, & Grube,  
471 2015). Furthermore, these events often occur late at night or continue into the early hours of the  
472 morning. Statistics indicate that young drivers have heightened risk of crashing in the evening and at  
473 night on the weekend (Beanland, et al., 2013; Mair, et al., 2015; Thomas & Jones, 2014). However,  
474 there was next to no discussion of drink-driving, non-distraction related peer factors such as peer  
475 pressure, driving late at night or other non-driving situational or contextual influences on driving by

476 the young drivers. This is not surprising given the apparent lack of focus on Goals and contexts of  
477 driving (Level Three) by the driver educators.

478         Some young people may take risks simply because a risk-taking opportunity arises from  
479 which they have not experienced any adverse consequences (Gibbons, Gerrard, & Lane, 2003). That  
480 is, a young driver may find themselves in a non-driving situation or context that is conducive to  
481 taking driving risks, such as attending a party with no alternative method of returning home other  
482 than driving. It is conceivable that a young driver's self-awareness of how they personally are likely  
483 to act in driving-related contextual situations would impact upon their ability to recognise the risks  
484 they face and to put into action the knowledge and skills they have to alleviate or reduce these risks.  
485 As such, equipping young drivers to make a choice to drive to these events or not and giving them  
486 strategies to avoid or minimise their involvement in situations that may impair their driving ability  
487 may be a particularly important facet of young driver education. The apparent low priority of the  
488 Goals and contexts of driving (Level Three) by the driver educators in the current study is thus  
489 surprising. Arguably, given research suggesting that young drivers obtain physical driving skills  
490 relatively quickly (Deery, 1999) and that other contextual factors feature prominently in the driving  
491 behaviours of this group (Shope & Bingham, 2008), Goals and contexts of driving (Level Three),  
492 broadly, should be a more specific focus of driver educators.

#### 493 **4 Strengths and Limitations**

494         A key strength of this study is the high level of methodological rigour. The study was  
495 approached with an underlying phenomenological philosophy that ensured that the authentic 'voice'  
496 of the participants was prioritised while the GDE was utilised to structure the analysis and impose a  
497 level of order and efficiency in the data collection and analysis. Some criticism exists regarding the  
498 non-scientific nature of much evaluation research in traffic psychology (Glendon, 2011). The focus  
499 on applying the GDE framework in a practical way ensured that the research was both systematic  
500 and theoretically grounded. The continued involvement of the same facilitators throughout all of the  
501 focus groups ensured consistency in the data collection. Bias in the analysis was reduced by the

502 independent coding of transcripts by the two facilitators. A further strength of the current study is  
503 the collection and analysis of data from both young drivers and driver educators. These two groups  
504 are interdependent and inherently involved in the process of learning to drive but differ greatly in  
505 their respective levels of interest, motivation, experience and knowledge. The dataset obtained was  
506 rich and allowed a depth of understanding that would not be possible with the use of quantitative  
507 self-report or purely observational study designs.

508         Despite these strengths, there are some limitations which require acknowledgement. The  
509 application of a categorical theoretical framework to a continuous flow of dialogue was challenging  
510 and some issues were encountered in this process. While being a comprehensive and organised  
511 theoretical framework, it appears that little development has occurred in the time since the theory  
512 was originally designed. The demarcations between the hierarchical levels and between the Person-  
513 specific factors are at times unclear and this made making concrete assignment of specific codes to  
514 specific text elements difficult. The high level of agreement between independent coders, however,  
515 is suggestive of an unbiased understanding of the GDE and its application to the transcribed focus  
516 group texts. Future theoretical development of the GDE would serve to alleviate these issues.

517         While it is possible that the GDE presentation to driver educators may have influenced the  
518 way in which the driver educators responded in the focus groups, care was taken to only provide  
519 information in an impartial way. Care was also taken at the beginning of each focus group to ensure  
520 the driver educators were comfortable speaking honestly and openly in the groups setting. As such it  
521 is unlikely that the driver educator responses would have been biased due to the additional information  
522 they received regarding the GDE. It is possible that not presenting the same GDE information to the  
523 young drivers could have led to differences in responses by these participants compared to the  
524 driver educators, particularly about the higher levels and more abstract components of the GDE.  
525 However, it is likely that the young drivers participants provided a more organic and authentic  
526 discussion of their experiences by using the indirect questions. Thus the differences in methodology  
527 between the driver educator and young driver focus groups is likely to have contributed to the

528 nature of the findings by taking into account the amount of experience with driver education and  
529 training of each participant type.

530 Finally, the fact that participants were all involved with a single course at a particular  
531 organisation may limit the generalisability of the study. However, driver education is not mandated  
532 in Queensland and a great variety of driver education and training has been developed. It is possible  
533 that young drivers attending driver education and training courses within Queensland would be  
534 exposed to very different course curriculums. Thus, the requirement that young drivers had  
535 completed the course at the organisation also ensured that both the young drivers and driver  
536 educators were discussing a somewhat standardised experience of driver education. Future studies  
537 could apply a different methodology to obtain a more diverse sample, such as individual qualitative  
538 interviews with driver trainers and their students. A quantitative analysis of a driver education  
539 course with questions derived directly from the GDE matrix may also be of value.

#### 540 **5. Practical applications**

541 A number of practical applications arise from the current study. First, the intuitive method of  
542 applying codes corresponding to the GDE levels and Person-specific factors to the focus group  
543 transcripts provided a rich, detailed and organised data set for qualitative analysis. This process  
544 could readily be applied to other forms of text-based qualitative data related to driver education and  
545 training. The usability and flexibility of this process and the scientific underpinning of the GDE may  
546 increase the rigour of evaluation research regarding driver education and training. Second, the  
547 insights gained in the current study using the GDE to evaluate a particular young driver education  
548 course can be applied to the design of future driver education and training programs. Using this  
549 process it became evident that young driver and driver educator perceptions of the focus of the  
550 education they received may differ substantially. Finally, the study offered some evidence-based  
551 suggestions regarding the GDE components that should be prioritised in young driver training. It is  
552 recommended that training relating to the higher levels of the GDE, particularly Goals and contexts



553 for driving (Level Three) and Self-evaluation and awareness skills be highlighted in future young  
554 driver education and training programs.

## 555 **6. Conclusion**

556 This study compared the perceptions that young drivers and driver educators had of a driver  
557 education and training. The GDE was operationalised and used to direct both the data collection and  
558 analysis. The results indicated that the young drivers receiving the driver education and training  
559 perceived what they were learning differently to what the driver educators perceived they were  
560 teaching. The students did not perceive that they were learning much about the higher levels of the  
561 GDE framework. In comparison, it appeared that the driver educators believed they were providing  
562 instruction covering the whole of the GDE. Moreover, the driver educators appeared to believe that  
563 they were using more basic skills-based training to also provide education and training about more  
564 abstract and less driving-specific influences on driving. Notwithstanding that the young novice  
565 drivers were not provided with the GDE matrix as part of the discussion, the misalignment of  
566 perceptions between young drivers and driver educators indicates that this may not be a particularly  
567 effective training strategy. It is recommended that driver educators should focus on providing  
568 information based on these higher more abstract levels in a more explicit manner. To date,  
569 evaluations of traditional driver education and training have not unequivocally demonstrated that  
570 safer young drivers result from participation in these programs. However, it is possible that  
571 systematically designed, broadly focused and scientifically-underpinned driver education and  
572 training programs may, in the future, complement GDL programs as an effective young driver safety  
573 countermeasure. The results from this study may assist in the design of more effective driver  
574 education and training programs in order to reduce young driver crash rates.

575

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