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.

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 (Lonero, 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, Hoye, Vaa, & Sorenson, 2009; Glendon, McNally, Jarvis, Chalmers, & Salisbury,

57   2014; Haworth, Kowadlo, & Tingvall, 2000; Ker et al., 2005; Lonero & 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.

121

Table 1.

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

	Knowledge and skills	Risk-increasing factors	Self-evaluation and awareness skills

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)

122

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   transcriptsthat 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).

250

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?

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

251

252   As the GDE was used to frame the current study, the thematic analysis demanded a more

253 structured, top-down approach to the coding than in other more inductive qualitative approaches

254 (Braun & Clarke, 2006). First, portions of transcribed text were assigned as being indicative of GDE

255 levels or Person-specific factors. The same text elements could be assigned both a GDE level and

256 Person-specific factor but could not be assigned more than one GDE level or more than one Person-

257 specific factor. There were no specific constraints on the amount of text within each transcript that

258 could have a single code assigned. Rather the priority was placed on capturing latent instances of a

259 particular GDE level or Person-specific factor. However, facilitator comments were not coded and, in

260 most cases, codes were applied to comments made by individuals rather than crossing over

261 discussions involving multiple participants.

262   The main facilitator (DR), who is the first author, coded each transcript while a randomly

263 selected subsample of two driver educator and two young driver focus group transcriptions were

264 coded independently by the second facilitator (AH). After this, the coders met and discussed the

265 codes they had applied. The discussion was focused on text elements that had been coded

266 differently by each facilitator and ensuring that each text element that was included in the analysis

267 had been coded appropriately with a single GDE level, Person-specific factor, or unique combination

268 of these. A number of codes were modified as a result of these discussions. After the initial

269 discussion, percentage agreement between the independent coders ranged between 84.13% and

270 99.48% ($M_{agreement}$ = 92%, *SD* = 4.0%) depending upon the particular code and focus group being

271 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.

305

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 (%)
Goals for life/skills for living (Level Four) (%)				
Young drivers	2.5	4.3	5.1	11.9
Driver educators	6.1	12.6	8.9	27.6
Goals and contexts for driving (Level Three) (%)				
Young drivers	5.7	8.4	7.0	21.1
Driver educators	6.1	7.9	4.2	18.2
Mastery of traffic situations (Level Two) (%)				
Young drivers	17.9	11.7	7.0	36.6
Driver educators	9.3	7.5	7.5	24.3
Vehicle Manoeuvring (Level One) (%)				
Young drivers	23.0	4.5	2.9	30.4

Driver educators	12.6	8.4	8.9	29.9
Percentage of GDE-related text (%)				
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.

306

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[1], 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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[1] 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 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

576   **Acknowledgements**

577   The research team would like to acknowledge Sharlene Makin and colleagues for assistance with

578   recruitment and the use of facilities to conduct the focus groups.

579   **Funding source**

580   This research was supported by the Australian Government through the Australian Research

581   Council's *Linkage Projects* funding scheme (project LP140100409).

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