

A Call to Improve Sampling Methodology and Reporting in Young Novice Driver Research

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1 **Title**

2 A call to improve sampling methodology and reporting in young novice driver research

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27

28 **Abstract**

29 Young drivers continue to be overrepresented in road crash fatalities despite a multitude of
30 research, communication and intervention. Evidence-based improvement depends to a great
31 extent upon research methodology quality and its reporting, with known limitations in the
32 peer-review process. The aim of the current research was to review the scope of research
33 methodologies applied in ‘young driver’ and ‘teen driver’ research and their reporting in four
34 peer-review journals in the field between January 2006 and December 2013. In total 806
35 articles were identified and assessed. Reporting omissions included participant gender (11%
36 of papers), response rates (49%), retention rates (39%), and information regarding incentives
37 (44%). Greater breadth and specific improvements in study designs and reporting are thereby
38 identified as a means to further advance the field.

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40

41 **A Call to Improve Sampling Methodology and Reporting in Young Novice Driver**
42 **Research**

43 Young novice driver crashes have posed a major challenge for road safety researchers,
44 practitioners, and policy-makers for decades, with young and inexperienced drivers
45 persistently overrepresented in road crashes globally [1-3]. A breadth of research has focused
46 upon identifying and ameliorating young driver risks, and interventions necessarily emerge
47 from and are informed by this extant literature. Therefore, the effectiveness of interventions
48 largely depends upon research methodology quality and its comprehensive reporting. There
49 are, however, known limitations to the peer-review process, recently discussed in terms of
50 biased reviews and conflicting reviewer reports [4,5]. However, human limitations also
51 apply, such that authors, reviewers and editors alike can simply fail to attend to reporting of
52 certain details, such as nuances and assumptions of certain methodologies or analyses while
53 focusing on “bigger picture” details of the methods and the manuscript as a whole.

54 The importance of sampling methodology in particular has been highlighted within
55 the road safety field, including motorcycle epidemiology [6] and psychiatric morbidity post-
56 crash involvement [7]. More recently as an exploratory exercise, we assessed the
57 methodologies of 30 young driver studies in a single journal during a five-year period 2008-
58 2012 [8]. We found “young” drivers were reportedly aged between 15 to 35 years and
59 “novice” drivers included those up to age 65. This complicated our ability to interpret the key
60 implications for interventions to target the youngest beginning drivers; that is, those with the
61 highest crash risk. Moreover, we found that, of 22 articles for which reporting an initial
62 response rate was appropriate, 12 (55%) failed to do so, or to discuss sampling limitations
63 and their implications. We therefore extended this exploration to three additional journals
64 which are known to regularly publish young driver research, and expanded the time frame
65 examined to eight years, allowing us to determine potential gaps and therefore avenues for
66 improving the effectiveness of young driver road safety interventions.

67 **Young novice sampling and reporting in four journals 2006-2013**

68 We identified 806 original research articles that included the search terms ‘young driver’ or
69 ‘teen driver’ in (alphabetically) *Accident Research and Prevention* (480 papers or 56.9%),
70 *Journal of Safety Research* (110, 13.6%), *Traffic Injury Prevention* (54, 6.7%), and
71 *Transportation Research Part F: Traffic Psychology and Behaviour* (162, 20.1%) published
72 between 1 January 2006 and 31 December 2013 using ScienceDirect and Taylor & Francis
73 online search facilities. Details on sampling (including participants’ age, gender) and study
74 design (response rate, retention rate, incentives) were examined for each of these 806 articles,
75 and results collated by a single assessor.

76 ***Participant information***

77 We applied a broad age range to define “young” drivers: 16-25 years. This accounted for a
78 typical minimum age in countries with low minimum ages (such as New Zealand and the
79 United States) through to the age after which crash reductions are apparent and restrictions no
80 longer apply in countries with high minimum ages (such as Australia) [9,10]. Age range was
81 provided in 593 (73.6%) papers (ranging across the four journals from 59.1% to 81.5%); of
82 which 130 (21.9%) included young driver ages only (range 16.2% to 56.8%). Five papers
83 (0.8%) included pre-licence (before legal learner permit/licence) ages in the jurisdiction of
84 the research (i.e. typically <16 years) (range 0.8% to 1.5%); and 77.2% combined pre-
85 licence, young and/or older drivers (range 43.2% to 83.1%). Central tendency (mean) age
86 was provided in only 12.7% papers (range 3.7% to 14.8%), with the remaining 13.8% non-
87 specific with respect to age (e.g., “<19”, “high school students”). In total, 720 (89.3%)
88 reported on participants’ gender (range 80.9% to 96.3%). That is, for 10.7% of papers, there
89 was no mention if the study included only males, females or both genders.

90 ***Study design***

91 While response rates were not relevant for 27.4% of papers (e.g. observational studies), they
92 were only reported in 51.2% of relevant papers (range 33.3% to 74.1%). Participant retention
93 rate was irrelevant for 717 papers (89.0%). Of the remaining 89 papers, 64.0% specified
94 retention rates (range 50.0% to 100%). Information regarding reimbursements or participant
95 incentives was provided in 35.2% of papers in which information regarding incentives was
96 applicable (range 25.4% to 45.1%).

97 **Implications for future young novice driver research and interventions**

98 This assessment revealed several important limitations in young novice driver sampling and
99 gaps in methodology reporting. Age was inconsistently reported in terms of both age range
100 and central age tendency without supporting information to determine likely novice versus
101 experienced driver status in order to compare findings across studies and assess likely
102 relevance for a given jurisdiction. More than one-quarter of the studies did not include the
103 age range. Some “young driver” studies included ages below the legal driving age and others
104 were combined with older-aged experienced drivers. Even for gender, more than one-tenth of
105 all articles did not specify whether a single or mixed gender sample was included, let alone
106 the relative proportion of males and females. Response rates were not reported in over half of
107 appropriate studies nor retention rates in over one-third, and 351 papers (43.5%) were lacking
108 information regarding participant reimbursements or incentives. In addition, it is noteworthy
109 that some response rates were low (e.g. the response rate of 23.8% of papers published in
110 Traffic Injury Prevention were $\leq 25\%$), it is noteworthy that such low rates do not necessarily
111 preclude generalisability and validity of the findings; rather it is fundamental that the
112 response rates are reported and their implications discussed at the time of dissemination.

113 Limitations of this work include restriction to four journals only and use of a single
114 assessor, which could have led to some misclassifications. This analysis is presented as
115 illustrative only rather than as comprehensive. However, the journals are of high reputation in

116 the road safety field and there was not one particular journal that “performed worse” across
117 all the variables, but rather inconsistent reporting was found across all four. Therefore the
118 results do suggest a lack of attention-to-detail in sampling and methodological reporting, as
119 well as peer reviewing.

120 Overall, this assessment suggests there are inherent limitations in the comparability
121 and generalisability of the current young novice driver research evidence base. Improved
122 attention to selecting, defining and reporting target populations in ways that clearly delineate
123 both young and novice status, and reporting sampling methodologies and their limitations, is
124 greatly needed to advance the field. This serves as a reminder and call out to authors,
125 reviewers and editors of the importance of attention-to-detail in the peer-review process to
126 ensure all relevant methodological details (particularly gender, age, incentives, response and
127 retention rates), as well as methodological limitations are reported to enhance the
128 comparability and generalisability of the results and to advance the young novice driver
129 research field.

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167 **What is already known on this subject**

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- Young drivers remain overrepresented in road crashes
- The young driver problem has generated a plethora of research which can inform effective intervention

173 **What this study adds**

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- Limitations in young novice driver sampling and gaps in methodology reporting can impede appraisal of the validity and the generalisability of the findings
- Attention to reporting all study-relevant data, especially age and licence status if possible, is important when used to guide effective development, implementation, and evaluation of young driver-specific interventions