Risky Driving: The Role of Cognition in Youth

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Abstract

Youth (aged 15 to 24 years), engage in risky driving more than any other age group. Previous research has established a link between cognition and fitness to drive for older drivers. The present study aims to explore these findings in a youth driver sample. 100 undergraduate students completed a cognitive test battery and drives on a simulator. Results revealed global cognitive functioning, executive function and visuospatial skills were related to risky driving behaviors. However due to being below the recommended 80% cut-off scores could not be developed. Future studies should examine cognitive factors in combination with personality and social factors to identify risky young drivers.

Introduction, Method, Results, Discussion

Risky driving is one of the leading causes of youth mortality worldwide (World Health Organization, 2014). Research into older drivers has established a link between risky driving and cognition, culminating in the Information Processing Model developed by Uc and Rizzo (2008). The model highlights how different forms of cognitive dysfunction can result in poor driving outcomes. As a result, cognitive function can predict an individual's fitness to drive for older drivers Recently, Zicat, Bennett, Chekaluk, and Batchelor (2018) extended the model to a sample of younger drivers, highlighting its validity across the lifespan. However, there is yet to be a study utilising measures of cognitive ability to predict an individual's propensity to take risks in a younger driver sample. Such research may help in profiling potentially risky drivers which can aid in reducing the number of potentially risky youth on the roads. As such, the present study aims to address this gap by developing cognitive measures as indicators of an individual's propensity to engage in risky driving.

There were 100 participants in this study (72% female) with an average age of 20 years and average number of years spent driving of 4 years. Participants completed a battery of cognitive tests, previously shown to be related to driving performance (Bennett, Chekaluk & Batchelor, 2016) and drove a simulator which measured speeding, out of lane and collisions. Significant relationships between cognitive tests scores and driving performance measures were identified and logistic regressions and Area Under the Curve analyses were examined to assess variance and develop cut-off scores.

The results of the present study indicate that several cognitive tests were significantly related to driving performance. Table 1 outlines the four separate binary logistic regressions carried out in order to determine whether risky driving could be predicted from cognitive performance. Following this, four separate Area Under the Curve analyses were performed in order to assess model fit. Although each model was significant, no model was able to meet the 80% criterion required to develop cut off scores (Bedard, Weaver, Dārzin, & Porter, 2008).

The present study was able to replicate previous findings by validating the Information Processing Model by Uc and Rizzo (2008) in a sample of younger drivers. In line with the model, this study found significant relationships between measures of visuospatial ability and speeding, executive function and lane positioning and mental status with total number of collisions. However, the present study was not able to successfully achieve its aim of developing cut-off scores. This may be due to a number of methodological limitations and time constraints such as some cognitive measures used being better suited for older samples of drivers (Reger et al., 2004). Nevertheless, future research should aim to assessing a more broader sample that is more indicative of the young driver population and take into account other potentially important variables such as personalty and

social factors. A more comprehensive study may aid in preventing risky youth on the road through a combined cognitive, personality and social profile.

Table 1. Logistic Regressions for related Cognitive Predictors and Driving Performance

Variable	β	*SE* β	Wald χ^2	*p*	Cox & Snell R^2	95% CI for e^{β}		
						e^{β}	Lower	Upper
Collisions								
MMSE	-.379	.183	4.29	.038	.048	.68	.48	.98
SDLP								
SST	-.294	.107	7.61	.006	.082	.75	.60	.92
Speeding								
VOSP	-.382	.132	8.44	.004	.090	.68	.53	.88
CFT-Copy	-.154	.080	3.72	.054	.035	.86	.73	1

Note. MMSE= Mini-Mental State Examination; SDLP= Standard Deviation of Lane Position; SST= Stop Signal Task; VOSP= Visual Object and Spatial Perception Battery; CFT-Copy= Rey Complex Figure Test-Copy; *SE*= Standard Error; e^{β}= Odds Ratio; CI= Confidence Interval.

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