COLLEGE OF ENGINEERING
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

Research Horizons Day & Research Week March 11-15, 2019

Research Horizons Day

Multinomial Logit Analysis of Injury Severity in Crashes Involving Emotional Drivers

Kristen Hubbert, Mehrnaz Doustmohammadi

Department of Civil and Environmental Engineering

Overview and Objectives

- Seeks to identify factors which influence severity of “emotional driving” crashes
- 1545 “emotional driving” crashes from the Critical Analysis Reporting Environment (CARE) considered
- Multinomial logit (MNL) regression model was applied to identify significant factors
- Separate MNL model applied to non-emotional data to use as comparison and reference

Data

- Data from 1545 “emotional driving” crashes in Alabama between 2010 and 2014
- 17 initial independent variables considered including driver, vehicle, traffic, roadway, geometric, and environmental characteristics
- 3 levels of severity considered: Property Damage Only, Possible/Minor Injury, Fatal/Incapacitating Injury

Model Results

Variable Description	Fatal/Incapacitating Injury		Possible/Minor Injury	
	β	p-value	β	p-value
Intercept	-1.604	0.000	-0.219	0.161
Rural or Urban (Base: Urban)				
Rural	0.725	0.000	-0.012	0.934
Primary Contributing Circumstance (Base: Improper Driving)				
Distraction	-0.816	0.023	-0.701	0.002
Driving too Fast	0.250	0.271	-0.081	0.625
Misjudge Stopping Distance	-1.223	0.042	-0.586	0.024
Other	-0.361	0.201	0.195	0.268
Manner of Crash (Base: Single Vehicle Crash)				
Angle/Sideswipe	-0.486	0.073	-0.626	0.001
Rear End	-1.072	0.001	-0.329	0.074
Side Impact	-0.437	0.181	0.054	0.784
Other	-0.173	0.633	-0.470	0.066
Speed Limit (Base: Less than 45MPH)				
Greater than or equal 45MPH	0.626	0.001	0.213	0.087
Vehicle Maneuvers (Base: Movement Straight)				
Turning	-1.291	0.001	-0.733	0.000
Other	-0.400	0.045	-0.562	0.000

Conclusions/Recommendations

- 5 of the initial 17 independent variables were found to influence severity: Rural/Urban, Primary Contributing Circumstance, Manner of Crash, Speed Limit, and Vehicle Maneuvers
- Results of the “emotional driving” data showed similar trends to the non-emotional driving data, with the “emotional driving” data experiencing a higher magnitude of impact
- Speed limits on rural roads could be reduced in order to decrease crash severity

Acknowledgements

The authors would like to thank the Center for Advanced Public Safety from the University of Alabama.

CAPS
CENTER for ADVANCED PUBLIC SAFETY