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Examining behavioral and attitudinal differences among groups in their traffic safety culture

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ABSTRACT

The paper explores the concept that, for a given population, there is not a single “traffic safety culture,” but rather a set of alternative cultures in which the individual driver might belong. There are several different cultures of dangerous driving behavior and each might need a separate strategy for intervention or amelioration. First, the paper summarizes the over-arching theory explored in the research, which applies Multi-group Structural Equation Modeling (MSEM) in a modification of the Theory of Planned Behavior (TPB) in the explanation of Risky Driving Behavior, based on ten observed explanatory factors. Second, we apply Latent Class Cluster (LCC) segmentation to the full sample, revealing four segments: one cluster reflecting a “Low Risk Driving Safety Group” and three clusters describing three different groups of problematic drivers. We first apply MSEM to two groups; the “Low Risk Driving Safety Group,” and the “High Risk Driving Safety Group,” defined as the members of the three problematic clusters together, revealing how a “Low Risk” culture differs from the “High Risk” culture, with the relative importance of the TPB explanatory factors varying sharply between the two groups. Finally, the three problematic clusters are profiled for demographics and their mean scores for the ten observed explanatory factors. Each of the clusters is reviewed in terms of responses to selected survey questions. Three separate and distinct dangerous traffic safety cultures emerge: first, a culture of risky driving dominated by excitement seeking and optimism bias; a second dominated by denial of societal values; and a third characterized by its propensity to find rational justifications for its speeding behavior. The paper applies two research methods together: LCC segmentation divides our sample into meaningful subgroups, while MSEM reveals both within-group analysis of variance and between-group differences in safety attitudes and outcomes. The paper concludes that the combination of the segmentation powers of the LCC and the analysis powers of the MSEM provides the analyst with an improved understanding of the attitudes and behaviors of the separate groups, all tied back to the over-arching theory underlying the research.

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1. Introduction

The objective of this paper is to improve the understanding of how attitudes, beliefs, and values toward driving behavior influence different subgroups of the driving population in different ways. It is based on a survey of 990 residents of three northeastern states in the United States. The paper utilizes Latent Class Cluster (LCC) methods to segment the full sample into four clusters. One cluster had attitudes and behaviors toward traffic safety that were markedly better than the rest of the sample, and was labeled the “Low Risk Driving Safety Group” ($n = 501$) while the rest of the sample was labeled the “High Risk Driving Safety Group” ($n = 489$) in order to compare the two using the tools of Multi-group Structural Equation Modeling (MSEM). Secondly, the paper applies LCC segmentation analysis procedures to better understand the three distinct clusters of problematic drivers within the High Risk Driving Safety Group. The three problematic clusters of drivers are profiled in terms of attitudes, beliefs and behaviors, noting their demographics. The paper posits that there does *not* exist a single, monolithic culture of dangerous driving behavior, but rather three separate problematic cultures, each of which would require a separate set of strategies and actions to improve driving behavior. Importantly, these three clusters of drivers are defined on the basis of the similarity of their attitudes, beliefs and driving behaviors, and not on any *a priori* categorization, such as male/female, urban/rural or rich/poor.

1.1. The role of theory, and previous research

The market segmentation described in this paper has been applied to a model based on established theories in the field, using data collected to test an over-arching theory diagrammed in Fig. 1. That theory is a modification of the Theory of Planned Behavior (TPB) (Ajzen, 1991) which states that there are three proximal antecedents (attitude, subjective norm and perceived behavioral control) which predict a person’s intention to commit and act. In recent years the theory has been successfully used to predict a range of different behaviors, many in the field of public health (Conner & Armitage, 1998), and many concerning traffic violations (e.g., Elliot, Armitage, & Baughan, 2003, 2005; Forward, 2009, 2010; Letirand & Delhomme, 2005; Parker, Manstead, Stradling, & Reason, 1992; Parker, Manstead, Stradling, Reason, & Baxter, 1992; Wallén Warner & Åberg, 2005, 2008).

In an effort to operationalize this theory, Coogan, Forward, Assailly, and Adler (2012a) created a MSEM in which Risky Driving Behavior was predicted by three proximal latent factors (shown as ovals in Fig. 1); each of the latent unobserved factors was derived from two observed factors (shown as rectangles). In the theory behind structural equation modeling (Byrne, 2001; Kline, 2005; Schumacker & Lomax, 2004), the unobserved factors (ovals) are scaleless and unobservable, the model having derived them from measurement of the observed factors (rectangles) (Brown, 2006). Table A.1 shows how each of the observed factors were created from the survey items. The outcome latent factor, Risky Driving Behavior,

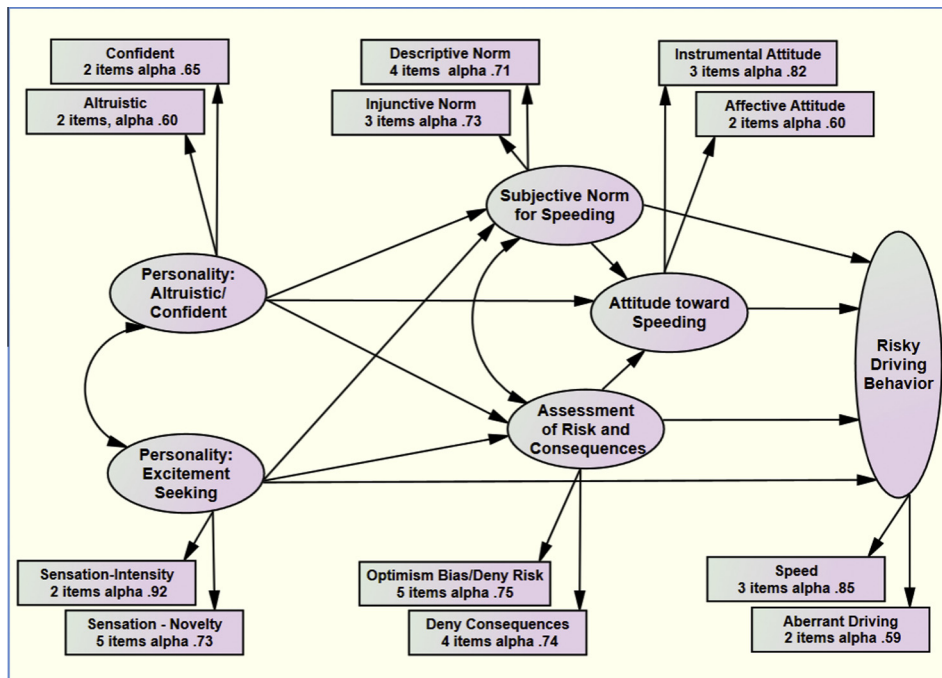


Fig. 1. A modified version of the theory of planned behavior for Risky Driving Behavior. Source: Adapted from Coogan et al. (2012a).

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