



TECHSUMMARY *November 2023*

State Project No. DOTLT1000388 | LTRC Project No. 21-1SA

Highway Safety Culture Assessment through Louisiana's Regions

INTRODUCTION

Very bluntly, culture matters, particularly related to daily, human behaviors. Culture signifies a feature of individuals that affects multiple components of daily life, such as rearing children and acceptance of risk and health outcomes. Correspondingly, driving represents an essential feature of who we are as individuals. As driver and passenger deaths represent a significant public health concern, discussion about the cause, reason, or justification for the crashes represents a difficult dialog. While some crashes are the result of strictly environmental conditions (i.e., weather, asphalt decay, traffic conditions, improperly working lights), a disproportionately large number of crashes are the result of driver error, stemming from distraction, following too close, improper lane changes, speeding, drinking while driving, or other behaviors. It is proposed that this difficult dialog stems from an essential feature of who we are as individuals—our culture. Understanding our culture is important towards the understanding of driver behaviors. Through an understanding of the interplay between culture and driver behaviors, highway safety may be enhanced. To gain this understanding, cultural factors at levels ranging from personal to regional within Louisiana need to be identified and assessed in terms of their relationship to highway safety.

OBJECTIVES

The primary goal of this project was to gain a nuanced understanding of how culture impacts highway safety throughout Louisiana. The primary goal is separated into the following objectives:

1. Identify the current knowledge about human behavior, driver performance, and traffic safety culture.
2. Assess safety culture in Louisiana, including provisions of scalable guidelines for measuring traffic safety culture.
3. Compare and contrast behavioral and cultural patterns across regions.
4. Measure, identify, describe, and predict daily driver behaviors in conjunction with problematic areas and associated highways in Louisiana, further allowing an understanding of the association between culture and daily driving behaviors among drivers in Louisiana.
5. Develop best practice guidelines for strategically changing attitudes, accepting risky driving behaviors, and cultural acceptance of unsafe driving practices.

SCOPE

The project examined the contributions of culture towards driver behaviors in Louisiana and used multiple approaches to complete this goal, including:

1. A comprehensive review of literature related to culture, highway safety, and human behavior.
2. Collection and analysis of secondary data from 34 sources related to transportation safety, related behavioral issues, socioeconomic indicators, and demographics.
3. Design, implementation, and data analysis of a survey consisting of complete and validated responses from 1,701 drivers throughout Louisiana.
4. A feasibility study to assess the potential effectiveness of using roadside cameras and sensors to collect naturalistic driving data.

METHODOLOGY

Analysis of secondary data included two parts: a descriptive analysis in which secondary data was analyzed in terms of highway safety research topics (e.g., cell phone distraction, seat belt use, driving under the influence of alcohol, etc.) and a metadata analysis in which survey items from data sources were analyzed individually and then grouped by vehicle driver and occupant behaviors and associated behavioral model factors.

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A survey was designed to support the theoretical model in Figure 1. Three hypotheses were tested using this model. The numbers in Figure 1 refer to the following hypotheses:

1. Driver risk behavior is significantly associated with an individual's values.
2. Values differ significantly depending on individual, family, work, and community social environmental measures.
3. Social environment measures differ significantly between locations in Louisiana.

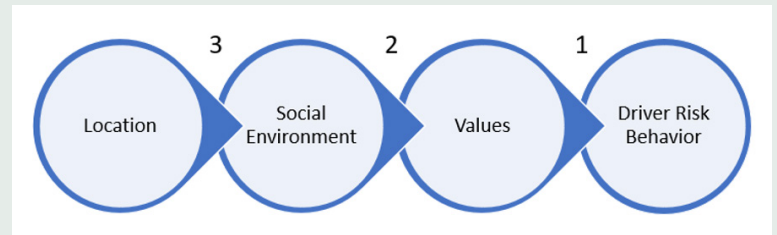


Figure 1: Theoretical model

Survey response data was analyzed in three phases. An Exploratory Factor Analysis (EFA) was performed on the pilot survey data, and results from it were used to guide Confirmatory Factor Analysis (CFA) and Latent Factor Path Model construction with the full data set after all responses were collected. Results from the Latent Factor Path Model were used to determine significance for hypothesis 1. ANOVA and Chi-square tests were used to determine significance for hypotheses 2 and 3.

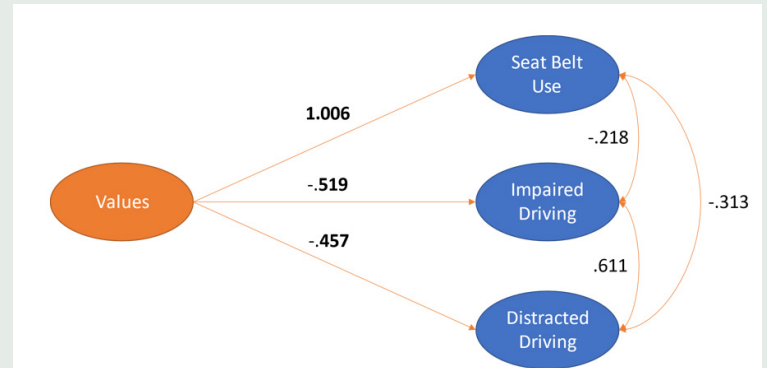


Figure 2. Significant relationships in Path Model

The feasibility study included a literature review as well as a review of existing equipment and vendors that met requirements.

CONCLUSIONS

The survey analysis confirmed all three hypotheses. In relation to hypothesis 1, driver risk behaviors of impaired driving, distracted driving, and seat belt use were found to be significantly associated with driver values (Figure 2). Drivers with higher levels of values as measured by factors of benevolence, universalism, and interdependence had lower levels of impaired driving and distracted driving and higher levels of seat belt use. Impaired driving and distracted driving behaviors were found to be positively associated with one another, and driver seat belt use was found to be negatively associated with both behaviors. For hypothesis 2, the results showed that values differ significantly on individual, family, work, and community social environmental measures. For hypothesis 3, it was found that social environment measures differ significantly within regions of Louisiana.



Figure 3. Camera and sensor equipment

The feasibility study resulted in the identification of one vendor who had expertise in observational data collection through use of specialized camera equipment, lighting, and sensors mounted on a small trailer for portability (Figure 3). Potential data includes driver distraction behaviors, seat belt use, and vehicle speed.

RECOMMENDATIONS

The following recommendations are suggested based on project results:

- Target highway safety improvement strategies to social environment groups or specific regions using results from project analyses. For example, the values factor of interdependence might be leveraged by educating specific groups about how the death or injury of one person in a crash has cascading effects in the world. A full listing of targeting strategies is included in the project report.
- Conduct a survey every two years to examine the ongoing effects of culture and values on driving behaviors and similar attitudes.
- Consider safety culture in the context of crash data. A table with specific considerations is included in the project report.
- Promote culture, including individual differences and socioeconomic variances, as continuing factors warranting further studies to understand the relationship between culture and driver behaviors, namely seatbelt use, distracted driving, and impaired driving.
- Recognize that safety is not exclusively a demographic variable, but rather a way of thinking which stems from values and concurrently these values will direct safe driving behaviors.
- Isolate and realize that "cultural-based behaviors" and "social equity" are diverse constructs and should be treated appropriately.
- Recognize that driver behaviors (seatbelt use, impaired driving, and distracted driving) are not independent constructs, and values will direct these behaviors.