

Understanding Aggressive Driving and Ways to Reduce It - Phase 1

by

Dr. Kari Finley, Jay Otto, and Dr. Nic Ward
Center for Health and Safety Culture

A proposal prepared for the

Montana Department of Transportation
2701 Prospect Avenue
P.O. Box 201001
Helena, MT 59620-1001

March 2022

TABLE OF CONTENTS

| | |
|---|----|
| List of Tables | ii |
| Problem Statement | 3 |
| Background Summary | 4 |
| Benefits | 5 |
| Objectives | 6 |
| Research Plan | 7 |
| TSC Pooled Fund Involvement..... | 9 |
| Products..... | 10 |
| Project Implementation..... | 11 |
| Schedule..... | 12 |
| Budget..... | 13 |
| Staffing..... | 15 |
| Facilities..... | 17 |
| Center for Health and Safety Culture..... | 17 |
| Information Services..... | 17 |
| Graphic and Communication Services..... | 17 |
| Administrative Services | 17 |
| References..... | 18 |

LIST OF TABLES

Table 1. Project Budget by Item 13

Table 2. Pay Rate and Benefits 13

Table 3. Project Budget by Task..... 13

Table 4. Project Budget by State and Federal Fiscal Years 14

Table 5. Schedule of Staffing..... 16

PROBLEM STATEMENT

Aggressive driving is a topic of interest to most states because it increases crash risk and there is evidence suggesting aggressive driving has been increasing, especially during the COVID-19 pandemic (Office of Behavioral Safety Research, 2021). Aggressive driving is an umbrella term often used to describe a variety of risky driving behaviors (i.e., speeding, tailgating, failing to yield, preventing others from passing, running stop signs and red lights, etc.). Aggressive driving is also commonly used to describe a driver’s affective motivation (i.e., annoyance, hostility, anger, impatience, etc.) to engage in risky driving behaviors. Without consensus on what defines aggressive driving, it has been difficult to understand what factors precipitate such behaviors and what strategies effectively prevent and reduce the incidence of aggressive driving behavior.

The proposed research project seeks to address these gaps with a two-phase project. In Phase 1 of this project, we will conduct a literature review to define aggressive driving, formulate a contextual model to explain its occurrence, and develop and implement a survey of road users to identify and differentiate clusters of driving behaviors that are perceived as “aggressive.” The information gathered in Phase 1 will be applied in Phase 2 to develop strategies to prevent and reduce the incidence of aggressive driving behavior.

BACKGROUND SUMMARY

Traffic crashes are a major public health concern in the United States. In 2020 alone, 38,824 people lost their lives in traffic crashes making this the highest number of annual traffic fatalities since 2007 (Stewart, 2022). While there are many causes that contribute to traffic crashes, aggressive driving is considered a leading cause, with some previous research evidence suggesting aggressive driving may be a cause in approximately 56% of fatal crashes (AAA Foundation for Traffic Safety, 2013). Aggressive driving is also considered to be common behavior among drivers. A recent self-reported aggressive driving behavior survey suggested, approximately 80% of drivers reported expressing anger, aggression, or road rage while driving at least once in the past 30 days (AAA Foundation for Traffic Safety, 2022). Furthermore, there is evidence to suggest that aggressive driving is increasing, especially during the COVID-19 pandemic (Office of Behavioral Safety Research, 2021).

Some behaviors categorized as “aggressive” include behaviors like purposefully tailgating, failing to yield, preventing others from passing, running stop signs, yelling or honking, and cutting other drivers off in traffic on purpose (AAA Foundation for Traffic Safety, 2016; Lee et al., 2010). Despite evidence that aggressive driving contributes to negative traffic safety outcomes and is prevalent, do we know enough about aggressive driving to develop effective strategies to reduce such behavior? For example, what do we mean by “aggressive” and does this label describe the state of the driver or the effect of the behavior?

Various definitions of aggressive driving have been developed, but consensus has not been reached. Some definitions of aggressive driving emphasize a driver’s intentions to engage in risky behaviors. For example, according to the AAA Foundation for Traffic Safety (2022, p. 1), aggressive driving is “any unsafe driving behavior, performed deliberately and with ill intention or disregard for safety”. However, other definitions have suggested that aggressive driving includes specific dangerous driving behaviors regardless of intent (Hennessy, 2011, p. 151). The National Highway Traffic Safety Administration (2004) defines aggressive driving as “a combination of moving traffic offenses so as to endanger other persons or property.” But this definition conflates “aggressive,” “unlawful,” and “risky” driving without explaining the etiology of these behavior categories.

If aggressive driving is indeed a distinct form of behavior with specific risk factors, then we need a definition that can represent its unique characteristics. Further, we need to be able to identify and understand factors that precipitate such behavior and to develop a contextual model that explains its occurrence. Without a reasonable contextual model to represent the factors and context that influence aggressive driving, we are not able to predict conditions that can increase this behavior nor identify strategies to reduce it. For example, speeding because of time frustration represents a fundamentally different context and behavioral mechanism than speeding because of personal enjoyment. Without a model, we cannot develop strategies to effectively prevent and reduce the incidence of aggressive behavior.

BENEFITS

How aggressive driving is defined, what factors precipitate such behavior, and what strategies effectively prevent and reduce the incidence of aggressive driving behavior are not widely understood. The proposed research seeks to address these gaps by proposing a two-phase project. In Phase 1, we will conduct a literature review to define aggressive driving, formulate a contextual model to explain its occurrence, and develop and implement a survey of road users to identify and differentiate clusters of driving behaviors that are perceived as “aggressive.” The research completed in Phase 1 will be used to develop resources to help traffic safety stakeholders guide decision making and conversations about aggressive driving. The work completed in Phase 1 will also be used in Phase 2 to develop strategies to prevent and reduce the incidence of aggressive driving behavior.

OBJECTIVES

In this project, we propose the following objectives.

1. We will conduct a review of literature to understand the origin of aggressive behavior in the context of driving, compare common definitions of aggressive driving, and explore models to explain and predict aggressive behavior. Based on this review, we will also explore ways to reduce aggressive driving to inform the development of effective intervention strategies in Phase 2. Finally, we will explore other alternative terms that may better represent the core nature of the behaviors we are considering (e.g., “antisocial driving”).
2. Based on a synthesis of what is learned from the literature, we will propose a standard definition of aggressive driving and develop a contextual model to explain aggressive driving. We will illustrate how the contextual model might be used to design strategies to reduce aggressive driving.
3. We will develop and implement a survey of road users to identify and differentiate clusters of driving behaviors that are perceived as “aggressive.” This survey will be used to validate and refine the proposed definition and model of aggressive driving.
4. We will create resources for traffic safety practitioners that can be used to guide decision making and conversations about aggressive driving. We will also create a poster, PowerPoint presentation, and webinar to support project dissemination.

RESEARCH PLAN

The Center for Health and Safety Culture is proposing a two-phase project for aggressive driving. The methods proposed for Phase 1 of this project are divided into four tasks:

- Task 0. Project Management
- Task 1. Literature Review
- Task 2. Survey Development
- Task 3. Create Resources and Complete Final Report

Task 0. Project Management

Dr. Kari Finley will be the principal investigator for this project. As a Research Scholar at the Center for Health and Safety Culture (CHSC) and from her experience leading other projects, Finley is well qualified to lead the project. She will participate in the kick-off meeting to review the details of the project and to make sure all policies and procedures are followed to align with MDT's expectations. Finley will be supported by Kelly Green who will provide financial data. As part of project management, communications will leverage existing communication plans from the support contract including the monthly phone call with MDT and the quarterly meetings with the pooled fund panel. To ensure quality of deliverables, the pooled fund panel will review draft deliverables. Necessary revisions will then be made for the final products submitted to MDT.

Task 1. Literature Review

A literature review will be conducted to understand the origin of aggressive behavior in the context of driving, compare common definitions of aggressive driving, and explore models that explain and predict aggressive behavior. The review will also identify ways to reduce aggressive driving to inform the development of an effective intervention in Phase 2. The review will also explore other alternative terms that may better reflect the core nature of the behaviors we are considering (e.g., "antisocial driving"). This review of literature will inform the development of a proposed definition of aggressive driving and a contextual model to explain aggressive driving.

To obtain research articles for this review, a keyword search will be conducted using databases that cover published academic research (e.g., Google Scholar, TRID database and Montana State University Library search engines Academic Search Complete and EBSCO). The search will be limited to peer-reviewed and publicly available literature published in English after 2000. Word search and phrase combinations will include: "aggressive behavior," "aggressive driving behaviors," and "factors associated with aggressive driving." Once articles are reviewed for relevance, additional key words that were used in combination will narrow the search. Additionally, the reference lists of relevant articles will be reviewed for other potentially relevant articles that may have been missed with the key word searches.

Dr. Finley will lead the literature review task and definition development. Dr. Nic Ward will lead the development of a contextual model to explain the occurrence of aggressive driving. The **Task 1 Report** will include a summary of the literature review, a proposed definition of aggressive

driving, and a contextual model to explain aggressive driving. Jay Otto, Dr. Bridget Hanson, Kelly Green, and Jamie Arpin will support and contribute to this task.

Task 2. Survey Development

Development and implementation of a survey of road users will identify and differentiate clusters of driving behaviors that are perceived as “aggressive.” This survey will be used to validate and refine the proposed definition and model of aggressive driving. The final model will be used in Phase 2 when strategies to reduce aggressive driving are developed.

Hanson and Otto will be responsible for survey development, pilot testing, and refinement. Data collected in the study will be analyzed. Hanson and Otto will analyze the results and summarize the findings in the **Task 2 Report**. Finley, Arpin, and Green will support this task.

Task 3. Create Resources and Complete a Final Report

- **Create Resource for Traffic Safety Practitioners.** Based on what we learn from the review of literature and survey implementation, we will create resources for traffic safety practitioners that can be used to guide decision making and conversations about aggressive driving.
- **Poster** A poster will be created for traffic safety professionals to use to disseminate information in a traffic safety poster session.
- **PowerPoint Presentation** A PowerPoint presentation will be created for traffic safety professionals to use to disseminate information.
- **A Recorded Webinar** A webinar will be completed to disseminate findings from this project.
- **Final Report** A final report will be completed summarizing each task in the project.

Finley, Otto, and Hanson will be responsible for creating these products and will be supported by Green and Arpin. A summary of each task for this project will be provided in a **Final Report**. The Pooled Fund Board will review and approve the final products.

TSC POOLED FUND INVOLVEMENT

We anticipate the assistance of the TSC Pooled Fund board in contributing to the review and approval of the project deliverables.

PRODUCTS

1. **Task 0.** Quarterly Progress Reports
 - a. Progress reports based on MDT template for each quarter of project
2. **Task 1. Report:** Literature Review
3. **Task 2 Report:** Survey Development and Results of the survey
4. **A Resource** for traffic safety practitioners that can be used to guide decision making about aggressive driving and guide conversations about aggressive driving.
5. **A Poster** suitable for use at TRB
6. **PowerPoint slides** summarizing the results of the project
7. **A Recorded Webinar** summarizing the results
8. **Final Report:** A comprehensive research report of the project

PROJECT IMPLEMENTATION

In Phase 1 of this project, a literature review will be conducted to define aggressive driving and to formulate a contextual model to explain its occurrence. Ways to reduce aggressive driving to inform the development of an effective intervention in Phase 2 will also be reviewed. Further, a survey of road users will be developed and implemented to identify and differentiate clusters of driving behaviors that are perceived as “aggressive.” Resources for traffic safety practitioners that can be used to guide decision making and conversations about aggressive driving will be developed. The research completed in Phase 1 will be used in Phase 2 to develop strategies to prevent and reduce the incidence of aggressive driving behavior.

Schedule

SCHEDULE

The timeline for the main tasks and deliverables is summarized below for this 19-month project. Task deliverables will be given to MDT by the end of the month denoted by an “X”.

| | Month | | | | | | | | | | | | | | | | | | | |
|--|---------------|-----|-----|---------------|-----|-----|---------------|-----|-----|---------------|-----|-----|---------------|-----|-----|---------------|----------|-----|---------------|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | |
| Task 0. Project Management Quarterly Progress Report | X <u>X</u> | X | X | X <u>X</u> | X | X | X <u>X</u> | X |
| Task 1. Literature Review | X | X | X | X | X | X | <u>X</u> | X | | | | | | | | | | | | |
| Task 2. Survey Development | | | | | | | X | X | X | X | X | X | <u>X</u> | X | | | | | | |
| Task 3. Create Resources and Final Report | | | | | | | | | | | | X | X | X | X | X | <u>X</u> | X | X | |

BUDGET

The project costs are summarized below. Table 1 summarizes the costs by budget item; Table 2 summarizes the pay rate and benefit rate for project staff; Table 3 summarizes the costs by task; and

Table 4 summarizes the project costs by fiscal year. Note that a variety of staff are included in the budget because of (1) the need for skills and knowledge across a range of disciplines, and (2) the need to control the budget by using staff from lower salary ranges.

Table 1. Project Budget by Item

| Item | Total |
|---------------------------|------------------|
| Salaries | \$63,808 |
| Benefits | \$20,492 |
| Contracted Services | \$0 |
| Supplies | \$346 |
| Communications | \$0 |
| Other: Qualtrics | \$11,200 |
| Total Direct Costs | \$95,846 |
| Indirect Costs (25%) | \$23,961 |
| Total Project Cost | \$119,807 |

Table 2. Pay Rate and Benefits

| Individual | Salary Rate | Benefit Rate |
|-----------------|-------------|--------------|
| Arpin, Jamie | \$31.49 | 41.47% |
| Finley, Kari | \$52.98 | 33.41% |
| Green, Kelly | \$37.72 | 37.33% |
| Hanson, Bridget | \$55.00 | 32.32% |
| Otto, Jay | \$59.39 | 31.69% |
| Ward, Nicholas | \$94.90 | 27.38% |

Table 3. Project Budget by Task

| Item | Total |
|---------------------------------------|------------------|
| 0 – Project Management | \$6,006 |
| 1 – Literature Review | \$40,814 |
| 2 – Surveys | \$49,273 |
| 3 – Create Resources and Final Report | \$23,715 |
| Total Project Cost | \$119,807 |

Table 4. Project Budget by State and Federal Fiscal Years

| Item | State Fiscal Year | | Federal Fiscal Year | | |
|---------------------------|--------------------------|---------------|----------------------------|---------------|---------------|
| | 2023 | 2024 | 2022 | 2023 | 2024 |
| Salaries | 43,962 | 19,847 | 18,158 | 38,742 | 6,908 |
| Benefits | 13,877 | 6,615 | 5,400 | 12,714 | 2,377 |
| Supplies | 346 | 0 | 346 | 0 | 0 |
| Other | 11,200 | 0 | 0 | 11,200 | 0 |
| Total Direct Costs | 69,385 | 26,461 | 23,905 | 62,657 | 9,285 |
| Indirect Costs (25%) | 17,346 | 6,615 | 5,976 | 15,664 | 2,321 |
| Total Project Cost | 86,731 | 33,077 | 29,881 | 78,321 | 11,606 |

STAFFING

Staffing for this project involves members of the Center for Health and Safety Culture. Each staff member contributes to the project in a unique way based on their specific expertise and background. Table 5 summarizes staff time by task for the 19-month duration of this project. Overall, this effort can be interpreted as the equivalent of one person working on this 13.52% of the time for 19 months (see FTE in Table 5). We believe this FTE equivalent effort is reasonable to satisfy the goals of this project in a cost-effective manner.

Kari Finley, Ph.D., will serve as the PI for the project and oversee all efforts. Finley is a Research Scholar at the Center for Health and Safety Culture. Finley will contribute as a lead writer for the literature review, will develop content for the practitioner resources, and provide oversight and support for all other Task deliverables. Finley is a Behavioral Specialist with extensive experience in behavior change and facilitating brief interventions.

Jay Otto, M.S., Otto is the principal scientist of the Center for Health and Safety Culture. He oversees all the Center's projects and fosters integration and dissemination of research findings across projects. Otto will lead the survey design, key findings, and data analysis for Task 2. Otto will also support the development of the literature review and creating resources for the project.

Bridget Hanson, Ph.D., is a Senior Research Scholar at the Center for Health and Safety Culture. Hanson will be involved in the development and implementation of the survey, key findings and data analysis for Task 2 and will be involved in the development of resources in Task 3. Hanson will also contribute to writing the Task 2 Report and Final Report for this project.

Nic Ward, Ph.D., will contribute to the project bringing nearly 20 years of international research in human factors applied to traffic safety. Professor Nicholas Ward (F. Erg. S) is currently a Professor of Mechanical and Industrial Engineering at Montana State University and Director for the Center for Health and Safety Culture. Professor Ward will lead the contextual model development in Task 1 of this project and will be a co-lead in writing the Task 1 Report.

Jamie Arpin will contribute to supporting the literature review, survey work, resource development and task report writing for the project.

Kelly Green, M.P.A., will be involved in the financial and contract management of this project. She will contribute to the resource development in Task 3 and will support the writing for all task reports for the project.

Table 5. Schedule of Staffing

| Name | Role | FTE* | Hours by Task | | | | Total |
|--------------------|------------------------|-------------|---------------|------------|------------|------------|-------------|
| | | | 0 | 1 | 2 | 3 | |
| Finley, Kari | Principal Investigator | 0.96 | 35 | 140 | 55 | 90 | 320 |
| Arpin, Jamie | Research Staff | .019 | 0 | 10 | 15 | 40 | 65 |
| Green, Kelly | Research Staff | .018 | 45 | 7 | 5 | 5 | 62 |
| Hanson, Bridget | Research Staff | .085 | 0 | 55 | 155 | 70 | 280 |
| Otto, Jay | Research Staff | .085 | 0 | 55 | 155 | 70 | 280 |
| Ward, Nic | Research Staff | .033 | 0 | 110 | 0 | 0 | 110 |
| Total | | .135 | 80 | 377 | 385 | 275 | 1117 |

*based on 19 months

FACILITIES

Center for Health and Safety Culture

The Center for Health & Safety Culture (CHSC) is an interdisciplinary center serving communities and organizations through research, training, and support services to cultivate healthy and safe cultures. The Center is dedicated to applying research to develop sustainable solutions to complex social problems. Our research focuses on understanding how culture impacts behavior – especially behavior associated with health and safety. We have expanded beyond Positive Community Norms (PCN) to consider a broader set of cultural influences in addition to norms including values, beliefs, and attitudes. This broadly operating model to measure, analyze, and transform culture is called “Positive Culture Framework” (PCF). This framework is grounded in validated psychological models of human social behaviors related to health and safety. We address a variety of issues working with tribal, federal, state, and community agencies as well as private non-profit and for-profit organizations and companies. Current research projects include addressing substance abuse, traffic safety, child maltreatment and violence. The Center works with a variety of clients and sponsors including local, state, federal governmental agencies (e.g., state departments of transportation), private businesses, corporations, community coalitions, and private foundations.

Information Services

The MSU Library system has licenses with the largest databases of published literature as well as open access to published articles in numerous peer reviewed journals. These resources will be critical in researching past studies and identifying evidence-based strategies. Literature and information gathering are performed through the Carnegie Research Level 1 Library (Renne Library). In addition to an extensive collection of printed material, the library subscribes to dozens of databases and hundreds of refereed journals in print and electronic format. Specific items not accessible through these sources can be located and retrieved by the Interlibrary Loan service, which is affiliated with other research libraries across the United States. Typical sources used to aid literature searches include TRIS Online (Transportation Research Information Services), E-Science Server, Transportation Research Board Research Records and Annual Meeting CD-ROMs, Google Scholar, Google, and Montana Local Technical Assistance Program library.

Graphic and Communication Services

Communications staff provides technical editing, layout, graphic design, and web page support. Information Technology staff maintains network servers and individual computers, software, and hardware. Relevant university communication facilities include a video and conference room facilities.

Administrative Services

The researchers at CHSC are assisted by a highly qualified group of experienced support staff. Administrative staff members assist with budgeting, procurement, contracts, and accounting. The university provides Extended University services for online educational course development and publications and an Institutional Review Board (IRB) to oversee all research engaging humans.

REFERENCES

- AAA Foundation for Traffic Safety. (2013). *Road Rage: How to Avoid Aggressive Driving*.
<https://exchange.aaa.com/wp-content/uploads/2013/06/Road-Rage-Brochure.pdf>
- AAA Foundation for Traffic Safety. (2016, July 12). *Prevalence of Self-Reported Aggressive Driving Behavior: United States, 2014*. AAA Foundation for Traffic Safety.
<https://aaafoundation.org/prevalence-self-reported-aggressive-driving-behavior-united-states-2014/>
- AAA Foundation for Traffic Safety. (2022). *Aggressive Driving – AAA Exchange*. Aggressive Driving. <https://exchange.aaa.com/safety/driving-advice/aggressive-driving/>
- Hennessy, D. (2011). Chapter 12—Social, Personality, and Affective Constructs in Driving. In B. E. Porter (Ed.), *Handbook of Traffic Psychology* (pp. 149–163). Academic Press.
<https://doi.org/10.1016/B978-0-12-381984-0.10012-8>
- Lee, C., Saxena, M., Lin, P.-S., Gonzalez-Velez, E., & Rouse, J. (2010). Aggressive Driving and Safety Campaigns. *Transportation Research Record: Journal of the Transportation Research Board*, 2182, 79–87. <https://doi.org/10.3141/2182-11>
- National Highway Traffic Safety Administration (NHTSA). (2004). *Aggressive driving enforcement: Evaluations of two demonstration programs*. U.S. Department of Transportation. <https://www.nhtsa.gov/sites/nhtsa.gov/files/809707.pdf>
- Office of Behavioral Safety Research. (2021). Continuation of research on traffic safety during the COVID-19 public health emergency: January – June 2021. *National Highway Traffic Safety Administration, Report No. DOT HS 813 210*, 15.

Stewart, T. (2022). Overview of motor vehicle crashes in 2020. *Report No. DOT HS 813 266*, National Highway Traffic Safety Administration, 43.