

Understanding Aggressive Driving and Ways to Reduce It, Phase 2: Engaging Bystanders and Developing Effective Messages

Prepared by

Bridget L. Hanson, PhD, Kelly Green, MPA, Jennifer MacFarlane, MPH,
Brooke Z. Charbonneau, PhD, Kaylee Guajardo, MS, & Kari Finley, PhD

Center for Health and Safety Culture
Montana State University

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16. Abstract Aggressive driving is a prevalent traffic safety concern that contributes to crash risk and undermines traffic safety culture. Building on Phase 1 work that defined aggressive driving and identified promising intervention points, this Phase 2 study examined two complementary strategies to reduce aggressive driving: supporting bystanders (i.e., spouses/partners, family members, and close friends) to intervene with drivers who engage in aggressive driving, and developing and testing media messages to encourage safer driving among drivers themselves. Key informant interviews were conducted with bystanders. Findings informed the development of a three-step bystander intervention that included expressing concern and connecting to shared values. The intervention was tested with a national sample of 102 bystanders. Results demonstrated increased bystander confidence, greater use of constructive strategies, and perceived reductions in aggressive driving frequency. Participants reported that the strategies were feasible, acceptable, and helpful. Media messages were developed in three main themes: cognitive reappraisal, adaptive response, and prosocial driving. Messages were tested with 864 drivers who reported recent engagement in aggressive driving. Findings indicated that, across message themes, messages were well received, prompted reflection on driving behavior, and supported changes in perceptions related to safety and responsibility. Together, these findings suggest that engaging bystanders and deploying supportive, nonjudgmental messaging are promising, complementary approaches to reducing aggressive driving and strengthening traffic safety culture. Resources were developed: a bystander conversation guide, a community dissemination toolkit, and a messaging development resource.		13. Type of Report and Period Covered Final Report (May 2024 – July 2026)	
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Acronyms and Abbreviations

AI	artificial intelligence
ANOVA	analysis of variance
AR	adaptive response
c	contemplation
CR	cognitive reappraisal
<i>M</i>	mean
MANOVA	multiple analysis of variance
p	precontemplation
PD	prosocial driving
<i>SD</i>	standard deviation
U.S.	United States

1 Introduction

Traffic crashes are a major public health concern. In the United States (U.S.), approximately 40,000 lives are lost in traffic crashes each year (National Center for Statistics and Analysis, 2025). Eliminating fatal and serious injury crashes requires a multi-faceted approach that includes safe roads, safe vehicles, and safe road users, including drivers (Michael et al., 2021; U.S. Department of Transportation, 2025).

Aggressive driving is a prevalent and concerning risky driving behavior (Finley et al., 2024; Steinbach et al., 2025). Aggressive driving is an umbrella term used to describe a variety of behaviors, including tailgating, preventing others from passing, and running red lights; it is also often used to describe a driver's negative emotional state while engaging in those behaviors (e.g., annoyance, hostility). Defined as "any unsafe driving behavior that is performed deliberately, with ill intention or disregard for safety, and impacts others," aggressive driving differs from other risky driving behaviors in that the driver has negative intentionality (Finley et al., 2024; Lennon & Watson, 2015; Steinbach et al., 2025).

Aggressive driving is common and increasing in the U.S. as well as in other countries (Krahé et al., 2026; Møller & Haustein, 2018; Steinbach et al., 2025). Recent prevalence research finds that 96% of drivers in the U.S. reported engaging in aggressive driving behaviors at least once in the past year, with nearly all specific aggressive driving behaviors increasing from 2014 to 2025 (Steinbach et al., 2025). Perceptions of aggressive driving follow this trend, with people perceiving that others are driving more aggressively over the past five years, especially during the COVID-19 pandemic (Stephens et al., 2022).

Aggressive driving varies in severity from mild, such as responding to other drivers with rude gestures, to severe, such as forcing other vehicles off the road. Many aggressive driving behaviors (including those that are mild) distract from the driving task and can be dangerous in that way. Aggressive driving behaviors are often cyclical and can escalate from mild to severe, thereby also increasing risk (Finley et al., 2024; Love & Nicolls, 2025; Soole et al., 2011; Sullman & Stephens, 2021).

As part of a safe system with safe road users, it is important to reduce aggressive driving.

1.1 Phase 1 Review

This research project expands on previous work sponsored by the Traffic Safety Culture Transportation Pooled Fund. Phase 1 of this project included a literature review to

define aggressive driving, a contextual model to explain its occurrence, a survey of road users to further refine the definition and operationalization of aggressive driving behaviors and potential points of intervention (as presented in the contextual model), and a resource created for traffic safety practitioners about ways to bolster their current efforts to address aggressive driving (Finley et al., 2024).

Based on the survey results, Phase 1 included recommendations and ideas for bolstering existing traffic safety culture efforts in order to reduce aggressive driving. Specifically, in Phase 1, several implications for interventions with drivers emerged. Directly with drivers, we recommended growing prosocial driving, supporting cognitive reappraisal and adaptive responses while driving, and challenging misperceptions; one likely avenue for reaching drivers directly is through media messaging. Phase 1 results also suggested that bystanders, especially spouses, partners, family members, and close friends can be influential in encouraging others to not drive aggressively. Therefore, we recommended engaging bystanders to address aggressive driving. While these ideas were based on Phase 1 findings, the specific strategies for engaging bystanders were not developed and had not been tested. The final report and resources developed in Phase 1 can be found at <https://www.mdt.mt.gov/research/projects/trafficsafety-ad.aspx>.

1.2 Project Objectives

Expanding on work completed in Phase 1, the first Phase 2 objective was to develop and test strategies to engage bystanders in discouraging aggressive driving. Bystanders are defined as spouses/partners, family members, and close friends of drivers who engage in aggressive driving behaviors. A second, separate objective was to develop and test media messages to reduce aggressive driving behavior.

2 Task 1 – Key Informant Interviews

The purpose of Task 1 was to understand bystanders' opportunities and develop strategies to support bystanders in intervening to reduce aggressive driving behavior. Bystanders are defined as partners, family members, and close friends of drivers who engage in aggressive driving behaviors. We conducted key informant interviews with a sample ($n = 16$) of bystanders to understand their experience with someone important in their life driving aggressively to identify opportunities and potential avenues for intervention.

A manuscript based on Task 1 is under review for publication in a peer-reviewed, open-access journal. Upon publication, we will update the report to include a link to the article.

3 Task 2 – Bystander Intervention Strategies

Based on Task 1 interview results, we identified key components of effective strategies to engage bystanders. Strategies should include supporting bystanders' comfort and confidence intervening, especially intervening early, through communication skills; should apply the transtheoretical model for behavior change; and should support bystanders in connecting to shared values, expressing concern, clarifying misperceptions, and bolstering cognitive reappraisal.

The purpose of Task 2 was to test bystander intervention strategies with a sample of bystanders well-positioned to intervene with people who drive aggressively (e.g. friends, spouses/partners, and parents).

3.1 Method

The protocol was reviewed and approved by the Montana State University Institutional Review Board [2025-2111-EXEMPT] prior to data collection. Participants provided informed consent before participation.

3.1.1 Participants

Participants were recruited via a purchased Qualtrics panel. To be eligible, participants needed to be comfortable reading and writing in English, be at least 18 years old, and live in the U.S. They also had to be concerned about the driving behavior of a close friend or family member (i.e., their spouse/partner, child, or friend) and report that the driver engaged in at least two aggressive driving behaviors. Two data collection activities (surveys) were conducted, separated by at least two weeks. To be included, participants had to complete both surveys. The first survey was completed by 333 participants; 147 participants also completed the two-week follow-up survey. Of the 147 who completed both surveys, 29 were removed during data quality checks due to speeding through the survey ($n = 1$) or inconsistent or implausible responses (e.g., parent participant age the same or older than child driver age, reporting having talked to their person many times (>8) over the past two weeks about their driving *and* reporting that the person does not know they are concerned; $n = 28$). Additionally, 16 participants were removed due to an extended interval (greater than 27 days) between the two surveys. The final sample consisted of 102 participants.

Most participants were friends (43.1%) or spouses/partners (42.2%) of people who drive aggressively. Some parents of children who drive aggressively also participated (14.7%). Participant demographics are shown in Table 1.

Table 1. Participant Demographics

	Parent	Friend	Spouse/ Partner	Total
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>N</i> (%)
Relationship	15 (14.7)	44 (43.1)	43 (42.2)	102 (100)
Age				
18-24	0 (0)	7 (15.9)	2 (4.7)	9 (8.8)
25-34	3 (20.0)	6 (13.6)	11 (25.6)	20 (19.6)
35-44	1 (6.7)	10 (22.7)	13 (30.2)	24 (23.5)
45-54	2 (13.3)	8 (18.2)	6 (14.0)	16 (15.7)
55-64	4 (26.7)	7 (15.9)	4 (9.3)	15 (14.7)
65+	5 (33.3)	6 (13.6)	7 (16.3)	18 (17.6)
Gender				
Man	6 (40.0)	21 (47.7)	24 (55.8)	51 (50.0)
Woman	9 (60.0)	23 (52.3)	19 (44.2)	51 (50.0)
Race				
White or Caucasian	13 (86.7)	33 (75.0)	28 (65.1)	74 (72.5)
Black or African American	2 (13.3)	10 (22.7)	9 (20.9)	20 (19.6)
American Indian/Native American or Alaskan Native	2 (13.3)	0 (0)	2 (4.7)	4 (3.9)
Asian	0 (0)	1 (2.3)	4 (9.3)	5 (4.6)
Native Hawaiian or Other Pacific Islander	0 (0)	0 (0)	0 (0)	0 (0)
Other	1 (6.7)	0 (0)	0 (0)	1 (1.0)
Prefer not to say	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Ethnicity				
Spanish, Hispanic, or Latino	3 (20.0)	4 (9.1)	6 (14.0)	13 (12.7)
Licensed Driver				
Yes	14 (93.3)	41 (93.2)	40 (93.0)	95 (91.3)
No	1 (6.7)	3 (6.8)	3 (7.0)	7 (6.9)
State				
Alabama	1 (6.7)	1 (2.3)	1 (2.3)	3 (2.9)
Arizona	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Arkansas	0 (0)	1 (2.3)	0 (0)	1 (1.0)
California	3 (20.0)	5 (11.4)	2 (4.7)	10 (9.8)
Colorado	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Delaware	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Florida	0 (0)	1 (2.3)	4 (9.3)	5 (4.9)
Georgia	4 (26.7)	3 (6.8)	1 (2.3)	8 (7.8)
Idaho	0 (0)	1 (2.3)	1 (2.3)	2 (2.0)
Illinois	0 (0)	2 (4.5)	2 (4.7)	4 (3.9)
Indiana	2 (13.3)	1 (2.3)	0 (0)	3 (2.9)
Kentucky	0 (0)	1 (2.3)	2 (4.7)	3 (2.9)
Maryland	1 (6.7)	1 (2.3)	1 (2.3)	3 (2.9)
Massachusetts	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Michigan	0 (0)	1 (2.3)	4 (9.3)	5 (4.9)
Minnesota	0 (0)	0 (0)	2 (4.7)	2 (2.0)
Missouri	0 (0)	1 (2.3)	0 (0)	1 (1.0)
Nebraska	1 (6.7)	0 (0)	1 (2.3)	2 (2.0)
Nevada	0 (0)	0 (0)	1 (2.3)	1 (1.0)
New Hampshire	0 (0)	2 (4.5)	0 (0)	2 (2.0)
New Jersey	0 (0)	3 (6.8)	1 (2.3)	4 (3.9)

	Parent	Friend	Spouse/ Partner	Total
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>N</i> (%)
New York	0 (0)	2 (4.5)	4 (9.3)	6 (5.9)
North Carolina	0 (0)	1 (2.3)	1 (2.3)	2 (2.0)
Ohio	0 (0)	3 (6.8)	1 (2.3)	4 (3.9)
Oklahoma	0 (0)	1 (2.3)	0 (0)	1 (1.0)
Oregon	0 (0)	3 (3.8)	1 (2.3)	4 (3.9)
Pennsylvania	1 (6.7)	0 (0)	2 (4.7)	3 (2.9)
South Carolina	0 (0)	2 (4.5)	1 (2.3)	3 (2.9)
South Dakota	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Tennessee	0 (0)	1 (2.3)	0 (0)	1 (1.0)
Texas	2 (13.3)	2 (4.5)	3 (7.0)	7 (6.9)
Virginia	0 (0)	4 (9.1)	1 (2.3)	5 (4.9)
Washington	0 (0)	1 (2.3)	0 (0)	1 (1.0)
Wisconsin	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Geographic Area				
Urban area or large city	2 (13.3)	14 (31.8)	18 (41.9)	34 (33.3)
Suburb near a large city	8 (53.3)	17 (38.6)	17 (39.5)	42 (41.2)
Small city or town	1 (6.7)	6 (13.6)	6 (14.0)	13 (12.7)
Rural	4 (26.7)	7 (15.9)	2 (4.7)	13 (12.7)

Time between when participants completed the baseline survey and received the intervention and when they completed the follow-up survey averaged 17.5 days ($SD = 2.9$) and ranged from 14 to 26 days.

3.1.2 Procedure

The Qualtrics survey started with a consent form followed by questions to determine eligibility (e.g., age, country of residence, language, and if there was someone in their life whose driving concerns them and their relationship to that person). Participants were then asked demographic questions about themselves and the person in their life who drives aggressively. The survey did not use the word “aggressive” to describe driving behaviors. Instead, the instruction said: “We have a few questions about your {person} and their driving that concerns you. When you think about their driving, please think specifically about their risky driving that impacts other people, like {x, y endorsed aggressive behaviors}”, where the statement was populated with two example behaviors that the participant endorsed from the inclusion criteria screening questions. Throughout the survey, the language to describe the driver was customized to the relationship where “your {person}” was populated with “your child,” “your friend,” “your spouse”, or “your partner,” as appropriate.

Participants were asked how concerned they were about their person’s driving (with two of the endorsed aggressive behaviors provided as examples), whether they had tried talking to their person before, whether the person is aware of the participant’s concern, previous intervention strategies the participant has used, and how confident the

participant was in their ability to communicate about their person's driving and influence them to drive more safely. Participants then received the intervention (see subsection 3.1.3 for details). Briefly, the intervention contained information to guide the participant in a three-step conversation with their person to prevent their aggressive driving behaviors. At the end of the intervention, they received a link to a summary of the information they obtained in the intervention. Immediately after the intervention, participants again rated their confidence in being able to intervene and their confidence in being able to implement the new intervention strategies they learned. (See Appendix A for the survey instrument.)

Two weeks later, participants were invited to answer additional questions intended to assess the feasibility and perceived efficacy of the intervention. First, participants indicated whether they had talked with their person about their driving over the past 2 weeks. Then, they were asked how many times in the past 2 weeks they did a number of things to intervene with their person, including each of the strategies delivered in the intervention, as well as some other common intervention strategies. Example items include: expressed concern to your {person} about their driving and hinted that their driving is unsafe. Participants were asked questions to determine how the conversation went if they indicated they had talked to their person about their driving, including the driver's reaction and the participants' ability to communicate effectively and implement the strategies. After, participants were asked about how their person's driving changed and their current level of concern about their person's driving. They were then asked to indicate their intentions and confidence to intervene in the future and to describe what other strategies they might employ. Finally, participants indicated the degree to which they were able to apply the intervention information, how helpful the intervention information was, whether/how many times they referenced the summary, what other information would have been helpful, and any feedback they had about the intervention. (See Appendix A for the survey instrument.)

3.1.3 Intervention

We developed a three-step plan to help participants intervene with their person (i.e., their friend, spouse/partner, child) who engages in aggressive driving behaviors. Intervention components were based on the findings from key informant interviews completed in Task 1 of this project. Artificial intelligence (AI), specifically OpenAI's ChatGPT, was used to support initial drafts of content; we reviewed, edited, and finalized all intervention content.

The first step of the intervention taught participants how to express their concerns to their person about their aggressive driving behaviors and connect to their personal values. The second step illustrated how bystanders can compare their person's

aggressive driving behaviors to other settings. The third step gave participants a choice between three different intervention strategies they could employ to discourage their person from driving aggressively. Specifically, participants could choose to help their person correct misperception, encourage their person to respond differently to other drivers, or emphasize preventing harm from aggressive driving. (See Appendix A for an example of the three-step intervention.)

The content was customized based on the participant's relationship to the person driving aggressively (i.e., their spouse/partner, child, or friend), whether the participant believed their person was aware of their driving as a problem (aware versus not aware), and whether the participant believed their person was open to change (resistant versus not resistant). The content was designed to give participants different intervention strategy options to make the intervention information more flexible and applicable to a wider range of individuals while also being customized to make the intervention feel individualized. Content was modified based on relationship type for all steps, and, consistent with the transtheoretical model for behavior change (Prochaska, 2008; Rio Szupszynski & Ávila, 2021), content was customized based on the participant's perception of their person's awareness and resistance. With the different strategy options for Step 3, there were 36 different versions of the intervention in total.

Throughout the intervention, as with the survey, the content never referred to the driving behaviors as "aggressive driving"; instead, specific behaviors that the participant indicated they were concerned about with regard to their person's driving were pulled through into the content to orient the participant to the driving behaviors of focus. In the intervention's introduction, participants were reassured that their worries are normal, encouraged that what they do still matters even if the aggressive driving behaviors do not decrease right away, and given tips for communicating with their person. A call-out box described "I statements" and described how to use them because the use of "I statements" helps to reduce defensiveness, de-escalate conflict, and promote understanding (Hargie, 2021; Rogers et al., 2018). Participants then proceeded through each of the three steps detailed below.

The intervention concluded by emphasizing the importance of speaking up and what to do if their person has a negative response to the conversation. Additionally, participants were provided with a link to download a summary of their customized intervention for future use, and participants were informed that they would be invited to another survey in a few weeks.

3.1.3.1 Step 1: Express Concern and Connect to Values

In Step 1, the participants were encouraged to begin intervening by expressing concern for the person's safety and were given examples of "I" statements they could use to help express that concern. For example, "Hey, I noticed you get really tense while driving. Everything okay?" In this step, the call-out box was modified based on relationship type as well as the driver's awareness that their driving is a problem. For example, for a spouse or partner participant who perceives their spouse/partner as aware that their driving is a problem, participants saw a call-out box that said, "It sounds like your spouse/partner is aware there is a problem. That is a great step to helping them change. The goal of raising concern is to help them to start or continue to evaluate their choices." However, if the driver was perceived as not aware, the call-out box said, "It sounds like your spouse/partner is not aware that their driving behaviors are a problem. The goal of raising concern is to get them to think about and discuss their driving."

Next, participants were encouraged to think about their person's values and were given examples such as "being responsible" or "protecting others." Then participants were given examples of how to connect with their person based on their relationship and values. For example, if a participant thought their friend valued "individual liberty and freedom of choice," the example of what they could say was, "Think of it like this: we expect people to respect our space and rights, same goes for the road. Tailgating or cutting someone off takes away their choice to drive safely too." In contrast, if the participant was the parent of a child driving aggressively who had the same value ("individual liberty and freedom of choice"), the example was, "You've always been someone who makes their own choices, but the more you push the limits, the more likely someone else gets to step in and make decisions for you."

Finally, participants were reminded that their efforts may not show immediate results but open a dialogue with their person in a way that does not make them feel judged and reaffirms their values. The goal of the first step was to support participants in beginning a dialogue with their person and encourage them to reflect on their values and how those may not align with their driving behaviors.

3.1.3.2 Step 2: Compare to Other Settings

Step 2 described that driving can feel anonymous, so drivers may do things they would not do in other settings. Therefore, the second step invited participants to compare their person's aggressive behaviors while driving to their person's behaviors in a different setting. Participants were given examples of things they could say, which differed based on the relationship between the participant and their person. For example, the participant could put their person's driving behavior in the context of a grocery store and the example for the friend said, "Imagine if we were in a grocery store and someone

was taking a second too long to grab something... would we yell at them to move? It's kind of like laying on your horn." An example for a parent concerned about their child's driving said, "Imagine if we were in a grocery store and I started yelling at strangers in the aisle just because they were in the way of the cereal we want. It's kind of like yelling at other drivers when frustrated." A call-out box also suggested keeping the tone light and humorous to avoid defensiveness. The goal of Step 2 was for the participant to help their person further reflect on the inconsistency of their behavior while driving compared to other settings.

3.1.3.3 Step 3: Choose an Intervention Strategy

Step 3 was broken into three different intervention strategies that the participant could use to help their person drive more safely. Participants could choose to help their person correct misperceptions, encourage their person to respond differently to other drivers, or emphasize preventing harm from aggressive driving. The content was customized based on the relationship between the participant and their person, as well as their person's resistance to changing their driving behavior. Each intervention strategy option gave example conversations about driving between the participant as a bystander and their person. If a participant chose to learn about correcting misperceptions, participants were encouraged to gently share a more realistic view to help their person better understand the situation in which their aggressive driving behaviors occur. If a participant chose to encourage their person to respond differently, they were shown conversations that try to calm their person and reframe reactions to and assumptions of other driver behaviors that are antecedents to their aggressive driving. Finally, if participants chose to learn how to encourage their person to prevent harm, they were given examples of how to discuss the potentially dangerous consequences to the driver themselves or to others. After receiving the Step 3 content, participants had an option to go back and choose a different option if they felt the strategy did not make sense for their person.

3.2 Results

In the results that follow, the participant is the bystander who is concerned about the driving behavior of someone in their life. All data is reported by the participant. In some cases, results reference "the driver"; that information comes from questions about the driver that were asked of the participant. The relationship categories are labeled based on participant role. In the "parent" relationship, the participant is the parent and the driver is the child.

3.2.1 Driver Demographics

Table 2 summarizes driver demographics. Drivers were of all ages, and most were men ($n = 62$, 60.8%).

Table 2. Driver Demographics

	Parent	Friend	Spouse/Partner	Total
	n (%)	n (%)	n (%)	N (%)
Age				
15-17	2 (13.3)	0 (0)	0 (0)	2 (2.0)
18-24	7 (46.7)	9 (20.5)	2 (4.7)	18 (17.6)
25-34	3 (20.0)	7 (15.9)	12 (27.9)	22 (21.6)
35-44	1 (6.7)	10 (22.7)	11 (25.6)	22 (21.6)
45-54	1 (6.7)	7 (16.9)	7 (16.3)	15 (14.7)
55-64	1 (6.7)	6 (13.6)	4 (9.3)	11 (10.8)
65+	0 (0)	5 (11.4)	7 (16.3)	12 (11.8)
Gender				
Man	9 (60.0)	25 (56.8)	28 (65.1)	62 (60.8)
Woman	6 (40.0)	19 (43.2)	15 (34.9)	40 (39.2)

3.2.2 Aggressive Driving

Table 3 shows the frequency of specific aggressive driving behaviors, the driver's awareness that their driving is a problem, and the driver's resistance to change. Bystanders of aggressive drivers were most often worried about them tailgating other vehicles/following too close ($n = 49$, 48.0%), speeding in heavy traffic ($n = 48$, 47.1%), and weaving in and out of traffic ($n = 37$, 36.3%). Additionally, parents tended to also worry about their child responding to other drivers with yelling or rude gestures ($n = 6$, 40.0%). The majority of participants reported that their person was aware of their concern about their aggressive driving but resistant to change ($n = 85$, 83.3%).

Table 3. Aggressive Driving Behaviors, Awareness, and Resistance by Relationship

	Parent	Friend	Spouse/Partner	Total
	n (%)	n (%)	n (%)	N (%)
Aggressive Driving Behaviors				
Tailgating other vehicles or following too close	11 (73.3)	22 (50.0)	16 (37.2)	49 (48.0)
Responding to other drivers with yelling or rude gestures	6 (40.0)	14 (31.8)	8 (18.6)	28 (27.5)
Weaving in and out of traffic	5 (33.3)	20 (45.5)	12 (27.9)	37 (36.3)
Cutting off other vehicles and/or braking hard	1 (6.7)	11 (25.0)	10 (23.3)	22 (21.6)

Ignoring the right-of-way to “beat” another vehicle	3 (20.0)	8 (18.2)	11 (25.6)	22 (21.6)
Excessive honking or flashing headlights at other drivers	2 (13.3)	7 (15.9)	5 (11.6)	14 (13.7)
Speeding in heavy traffic	7 (46.7)	20 (45.5)	21 (48.8)	48 (47.1)
Purposefully slowing in front of another vehicle	1 (6.7)	4 (9.1)	9 (20.9)	14 (13.7)
Blocking vehicles that are attempting to pass or change lanes	2 (13.3)	8 (18.2)	10 (23.3)	20 (19.6)
Forcing other vehicles onto the shoulder or off the road	1 (6.7)	1 (2.3)	6 (14.0)	8 (7.8)
Running stop signs or red lights	3 (20.0)	14 (31.8)	10 (23.3)	27 (26.5)
Purposefully hitting another vehicle	0 (0)	0 (0)	1 (2.3)	1 (1.0)
Awareness				
Aware	14 (93.3)	39 (88.6)	42 (97.7)	95 (93.1)
Unaware	1 (6.7)	5 (11.4)	1 (2.3)	7 (6.9)
Resistance				
Resistant	14 (93.3)	37 (84.1)	37 (86.0)	88 (86.3)
Non-Resistant	1 (6.7)	7 (15.9)	6 (14.0)	14 (13.7)
Awareness/Resistance				
Aware/Resistant	13 (86.7)	35 (79.5)	37 (86.0)	85 (83.3)
Aware/Not Resistant	1 (6.7)	4 (9.1)	5 (11.6)	10 (9.8)
Unaware/Resistant	1 (6.7)	2 (4.5)	0 (0)	3 (2.9)
Unaware/Not Resistant	0 (0)	3 (6.8)	1 (2.3)	4 (3.9)

3.2.3 Strategy Selection

Participants could choose which strategy they would like to know more about for Step 3 of the intervention: correcting misperceptions their person may have, helping their person respond differently, or encouraging their person to prevent harm. (See Table 4.) Most participants chose to learn more about correcting their person’s misperceptions ($n = 53$, 52.0%). This was also true for parents ($n = 10$, 66.7%) and spouses/partners ($n = 26$, 60.5%). However, friends were more evenly divided among the three options. The least popular option among parents ($n = 2$, 13.3%) and friends ($n = 13$, 29.5%) was helping their drivers respond differently. The least popular choice among spouses/partners was encouraging their significant other to prevent harm ($n = 7$, 16.3%).

Table 4. Step 3 Selected Strategy by Relationship

	Parent	Friend	Spouse/Partner	Total
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>N</i> (%)
Strategy Selection				
A. Correct Misperceptions	10 (66.7)	17 (38.6)	26 (60.5)	53 (52.0)
B. Respond Differently	2 (13.3)	13 (29.5)	10 (23.3)	25 (24.5)
C. Prevent Harm	3 (20.0)	14 (31.8)	7 (16.3)	24 (23.5)

3.2.4 Bystander Concern

Bystander concern and bystander intervention initiation were measured pre-intervention and 2 weeks post-intervention. Participants reported their concern about their person's driving as "a little concerned" (1), "somewhat concerned" (2), or "very concerned" (3). Prior to the intervention, most commonly participants ($n = 43$, 42.2%) were very concerned about their person's driving behaviors ($M = 2.25$, $SD = 0.73$). At follow-up, concern reduced to somewhat ($n = 49$, 48.0%; $M = 1.89$, $SD = 0.72$). The trend of decreasing concern from pre-intervention to follow-up was the same for all relationship types. A paired samples t -test indicated that concern for their person's driving behavior decreased significantly from pre-intervention to follow-up, $t(101) = 3.93$, $p < .001$, $d = 0.93$).

3.2.5 Bystander Discussion of Aggressive Driving Behaviors

Bystanders were also asked if they talked to their driver about their driving at both pre-intervention and within two weeks of the follow-up. Specifically, participants were asked, "Have you ever tried talking to your [person] about their driving, especially [endorsed aggressive driving behavior] or [another endorsed aggressive driving behavior]?" before they received the intervention. The majority of participants had talked to their person about their driving within the past month ($n = 62$, 60.8%), with several more reporting having discussed their person's driving over a month ago ($n = 36$, 35.3%). Only four (3.9%) participants had never talked to their person before the intervention.

At follow-up, participants were asked, "Were you able to talk with your [person] about their driving over the past 2 weeks?" Most participants reported that they had talked to their person about their driving ($n = 72$, 70.6%) or at least tried to initiate the discussion ($n = 19$, 18.6%). However, some reported that they had not talked to their person nor tried to bring up the discussion ($n = 11$, 10.8%), but many of those participants still indicated that they engaged in some bystander behaviors ($n = 8$, 72.7%). Therefore, while they may not have engaged in an explicit discussion about driving with their person, they engaged in other behaviors such as "tried calming the driver while in the vehicle" or "hinted that their driving is unsafe."

3.2.6 Bystander Behaviors

Frequency of bystander intervention behaviors at pre-intervention and 2-week follow-up are shown in Table 5.¹ The behaviors were recoded into 0, 1-2, and 3+ where 0 indicates that they did not engage in a behavior, 1-2 times indicates that they tried a bystander behavior, and 3 or more times indicates that the participant engaged in the behavior more frequently. Some behaviors were specific to the parent/child relationship and were asked only of parents (see Appendix B). Behaviors specific to the Step 3 intervention choice were asked only at follow-up to the participants who had selected that strategy.

Table 5. Bystander Behaviors at Pre-Intervention and Follow-Up

	Pre-Intervention			Follow-Up		
	0	1-2	3+	0	1-2	3+
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Behavior						
(Step 1) Expressed concern to your [person] about their driving.	10 (9.8)	36 (35.3)	56 (54.9)	7 (6.9)	42 (41.2)	53 (52.0)
Hinted that their driving is unsafe	3 (2.9)	30 (29.4)	69 (67.6)	12 (11.8)	31 (30.4)	59 (57.8)
Communicated that their driving is unsafe	15 (14.7)	29 (28.4)	58 (56.9)	13 (12.7)	30 (29.4)	59 (57.8)
(Step 2) Used jokes or humor to bring up their driving	33 (32.4)	19 (18.6)	50 (49.0)	19 (18.6)	25 (24.5)	58 (56.9)
Expressed disapproval of their driving	12 (11.8)	33 (32.4)	57 (55.9)	18 (17.6)	31 (30.4)	53 (52.0)
(Step 1) Discussed how their driving aligns with their values	40 (39.2)	13 (12.7)	49 (48.0)	32 (31.4)	24 (23.5)	46 (45.1)
(Step 2) Compared their driving to behavior in other settings	35 (34.3)	22 (21.6)	45 (44.1)	28 (27.5)	25 (24.5)	49 (48.0)
Discussed the safety consequences of their driving	21 (20.6)	29 (28.4)	52 (51.0)	12 (11.8)	37 (36.3)	52 (51.0)
Discussed the financial consequences of their driving	29 (28.4)	25 (24.5)	48 (47.1)	22 (21.6)	29 (28.4)	50 (49.0)
Tried calming the driver while in the vehicle	24 (23.5)	30 (29.4)	48 (47.1)	26 (25.5)	28 (27.5)	48 (47.1)
Step 3 Specific Behaviors*						
(Step 3A) Identified and corrected misperceptions your [person] has about their driving				9 (17.0)	14 (26.4)	30 (56.6)

¹ Table of bystander behaviors by relationship can be found in Appendix B.

(Step 3B) Encouraged your [person] to respond differently while driving				1 (4.0)	7 (28.0)	17 (68.0)
(Step 3C) Talked to your [person] about how to prevent harm while driving				7 (29.2)	8 (33.3)	9 (37.5)
*only asked those who selected each strategy						

Intervention-specific behaviors for Step 1 and Step 2 increased overall from pre-intervention to follow-up. However, participants were more likely to implement Step 2 behaviors more consistently (3+ times) from pre-intervention to follow-up but less likely to implement Step 1 behaviors more consistently from pre-intervention to follow-up. Prior to the intervention, the most common intervention techniques were hinting that their person's driving is unsafe, expressing concern about their driving (Step 1), and expressing disapproval of their driving. At follow-up, expressing concern (Step 1), discussing the safety consequences of their driving, and hinting that their person's driving was unsafe were most common.

For Step 3, people were most likely to engage in the behavior they learned about in the third step when they chose respond differently (3B), with only 1 of those participants (4.0%) reporting not utilizing that strategy at follow-up, compared to 17.0% of participants who chose correcting misperceptions and 29.2% of participants who chose preventing harm. Participants who chose respond differently were also more likely to consistently use this strategy compared to participants who had chosen the other two strategies. Looking at engagement by relationship type (see Appendix B), many parents who chose correct misperceptions reported not utilizing that strategy. On the other hand, encouraging drivers to respond differently was successfully implemented across each type of relationship.

Participants were also asked an open-ended question about other strategies they used to intervene. Responses included asking for specific actions that would make their person's driving safer, setting an example by driving safe themselves, recruiting others into the discussion, setting boundaries, and exaggerating reactions to unsafe driving.

3.2.7 Bystander Self-Efficacy

Participants reported their confidence in intervening before and after receiving the intervention. For each item, participants indicated whether they were "not at all confident" (1), "a little confident" (2), "somewhat confident" (3), "fairly confident" (4), or "extremely confident" (5). See Table 6 for means (*M*) and standard deviations (*SD*).

At pre-intervention, the participants on average felt "fairly confident" that they could communicate effectively ($M = 3.10$, $SD = 1.26$) but less confident in their ability to influence their person to drive more safely ($M = 2.92$, $SD = 1.45$). After receiving the

intervention, participants were asked the same two items as in the pre-intervention, as well as confidence in implementing step-specific behaviors. Post-intervention, participants felt “somewhat confident” to “fairly confident” in communicating with their person ($M = 3.48$, $SD = 1.15$), influencing their driving ($M = 3.32$, $SD = 1.27$), and all steps of the intervention (M ranges from 3.45-3.67). Confidence was consistent at post-intervention for Step 3, with no differences based on relationship ($p = 0.28$) or selected strategy ($p = 0.45$).

Examining confidence from pre-intervention to post-intervention using a mixed 2 (time: pre vs. post) by 3 (relationship type: parent, friend, vs spouse/partner) analysis of variance (ANOVA), participants felt more confident post-intervention in communicating effectively with their person about their driving compared to pre-intervention ($F(1, 99) = 8.13$, $p = 0.01$, $\eta_p^2 = 0.08$). Importantly, there was no main effect for relationship type ($F(2, 99) = 1.88$, $p = 0.16$, $\eta_p^2 = 0.04$) nor a time by relationship type interaction ($F(2, 99) = 1.18$, $p = 0.31$, $\eta_p^2 = 0.02$).

Similarly, participants felt significantly more confident post-intervention compared to pre-intervention in their ability to influence their person’s driving ($F(1, 99) = 10.33$, $p < 0.01$, $\eta_p^2 = 0.09$). Although there was no time by relationship type interaction ($F(2, 99) = 0.26$, $p = 0.77$, $\eta_p^2 = 0.01$), there was a significant main effect for relationship ($F(2, 99) = 4.30$, $p = 0.02$, $\eta_p^2 = 0.08$). Specifically, post-hoc analyses demonstrated that spouses/partners had higher overall confidence in influencing their person’s driving ($M = 3.53$, $SD = 1.30$) compared to parents ($M = 2.73$, $SD = 1.10$; $p = 0.03$) or friends ($M = 2.85$, $SD = 1.18$; $p = 0.01$). Parents and friends did not significantly differ from one another ($p = 0.75$).

Table 6. Bystander Confidence by Relationship at Pre- and Post-Intervention

	Pre-Intervention				Post-Intervention			
	Parent	Friend	Spouse/ Partner	Total	Parent	Friend	Spouse/ Partner	Total
<i>How confident are you that you can...</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Communicate effectively with your [person] about their driving	2.73 (1.28)	3.00 (1.20)	3.33 (1.29)	3.10 (1.26)	2.93 (1.10)	3.57 (1.11)	3.58 (1.18)	3.48 (1.15)
Influence your [person] to drive more safely	2.60 (1.24)	2.61 (1.42)	3.35 (1.47)	2.92 (1.45)	2.87 (1.13)	3.09 (1.18)	3.72 (1.31)	3.32 (1.27)
(Step 1) Express concern to your [person] about their driving					3.40 (1.06)	3.64 (1.20)	3.79 (1.26)	3.67 (1.21)
(Step 1) Connect to values that matter to your [person]					3.20 (0.86)	3.34 (1.18)	3.65 (1.17)	3.45 (1.14)
(Step 2) Compare their driving in other settings					3.33 (1.05)	3.68 (1.10)	3.74 (1.02)	3.66 (1.06)
(Step 3A) Correct misperceptions your [person] has about their driving					3.50 (0.71)	3.24 (1.15)	3.65 (1.33)	3.49 (1.17)
(Step 3B) Help your [person] respond differently					1.50 (0.71)	3.85 (0.90)	3.70 (1.34)	3.60 (1.23)
(Step 3C) Help your [person] understand how to prevent harm					3.67 (0.58)	3.43 (1.40)	3.43 (1.51)	3.46 (1.32)

At the follow-up, participants were asked to rate “To what extent do you feel you were able to...” for the same items, with a response scale from “not at all” (1) to “very much so” (5). See Table 7 for means and standard deviations. Overall, participants reported that they were able to communicate with their person ($M = 3.19$, $SD = 1.15$), influence their person’s driving ($M = 3.08$, $SD = 1.23$), and implement Step 1 and 2 of the intervention (M ranges from 3.06-3.45). Most items did not significantly differ by relationship (all $ps > 0.05$), except for comparing their person’s driving to different settings (Step 2; $F(2, 99) = 3.12$, $p = 0.049$), where spouses/partners ($M = 3.42$, $SD = 1.22$) were more successful than friends ($M = 2.82$, $SD = 1.32$; $p = 0.03$). For Step 3, participants who chose to correct their person’s misperceptions (3A) were most able to implement the strategy ($M = 3.26$, $SD = 1.24$), compared to those who chose to help their person respond differently (3B; $M = 2.92$, $SD = 1.50$) or help their person understand how to prevent harm (3C; $M = 2.92$, $SD = 1.28$), though these differences were not statistically significant ($p = 0.27$) and did not differ by relationship ($p = 0.78$).

Table 7. Bystander Self-Efficacy by Relationship at Follow-Up

	Follow-Up			
	Parent	Friend	Spouse/ Partner	Total
<i>To what extent were you able to...</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Communicate effectively with your [person] about their driving	2.93 (1.03)	3.11 (1.22)	3.35 (1.11)	3.19 (1.15)
Influence your [person] to drive more safely	2.87 (0.99)	2.93 (1.28)	3.30 (1.25)	3.08 (1.23)
(Step 1) Express concern to your [person] about their driving	3.53 (0.92)	3.50 (1.27)	3.37 (1.25)	3.45 (1.21)
(Step 1) Connect to values that matter to your [person]	3.13 (1.25)	3.09 (1.38)	3.28 (1.30)	3.18 (1.32)
(Step 2) Compare their driving in other settings	2.73 (1.10)	2.82 (1.32)	3.42 (1.22)	3.06 (1.27)
(Step 3A) Correct misperceptions your [person] has about their driving	3.10 (0.99)	3.06 (1.30)	3.46 (1.30)	3.26 (1.24)
(Step 3B) Help your [person] respond differently	1.50 (0.71)	3.00 (1.53)	3.10 (1.52)	2.92 (1.50)
(Step 3C) Help your [person] understand how to prevent harm	3.67 (1.16)	2.86 (1.41)	2.71 (1.11)	2.92 (1.28)

3.2.8 Driver Response

Further measures at two-week follow-up were used to examine outcomes of the intervention. Specifically, participants were asked on six dimensions of communication how the conversation went with their person. Each dimension of communication used a semantic differential from 1-5. Participants rated their person during the interaction from “closed-minded” (1) to “open-minded” (5), “unconcerned” (1) to “concerned” (5) about their driving, “withdrawn” (1) to “engaged” (5) in the conversation, “unwilling” (1) to “willing” (5) to change their driving, “negative” (1) to “positive” (5) attitude, and “angry or upset” (1) to “happy” (5). Results are illustrated in Figure 1. Overall, participants reported that drivers tended to be open-minded ($M = 3.14$, $SD = 1.43$), engaged in the

conversation ($M = 3.17$, $SD = 1.30$), willing to change ($M = 3.06$, $SD = 1.31$), positive ($M = 3.04$, $SD = 1.28$), and happy ($M = 3.16$, $SD = 1.19$). However, at follow-up, participants indicated that overall drivers tended to be unconcerned about their driving ($M = 2.95$, $SD = 1.31$). These results did not differ by relationship group (all $ps > 0.05$) or Step 3 strategy selection (all $ps > 0.05$).

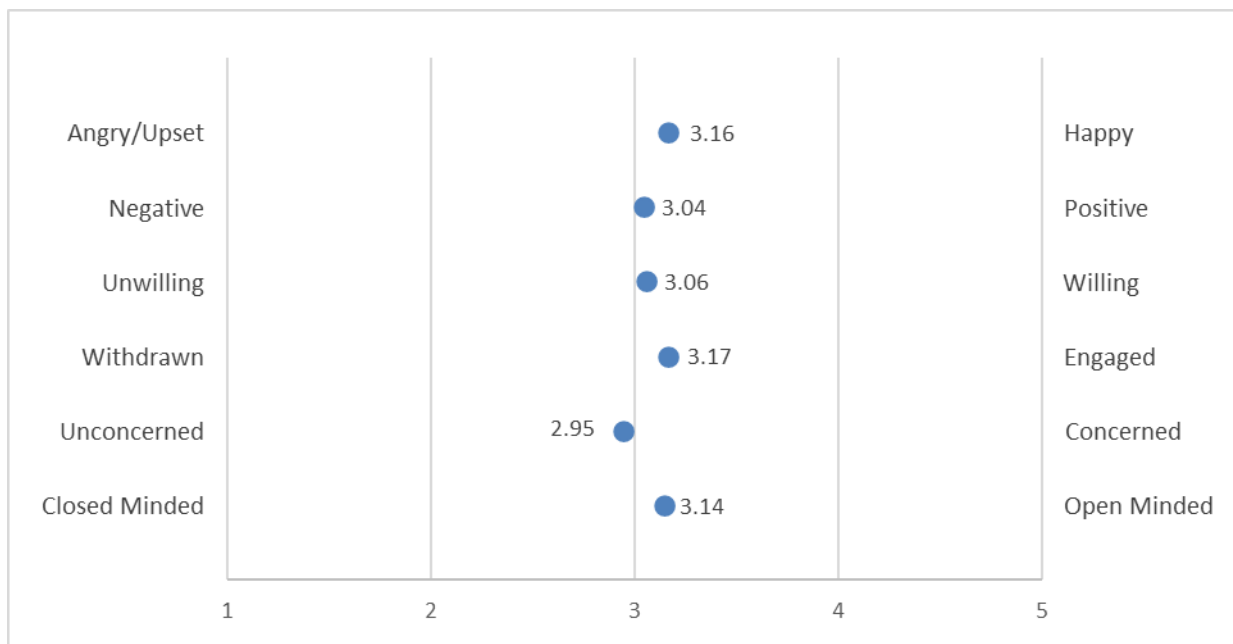


Figure 1. Mean Ratings of Driver During Interactions

At follow-up, participants were also asked how the frequency of their person's aggressive driving behavior changed over the past 2 weeks. Participants reported whether their person drives that way "much less often" (1), "somewhat less often" (2), "about the same" (3), "somewhat more often" (4), or "much more often" (5), with the distribution illustrated in Figure 2. Overall, participants indicated that the aggressive driving behaviors occurred less often to about the same ($M = 2.45$, $SD = 0.98$), with no difference across relationship groups ($p = 0.77$). Participants were also asked how their person's driving safety changed from "a lot better" (1), "somewhat better" (2), "about the same" (3), or "somewhat worse" (4), with the distribution illustrated in Figure 3. Most participants felt their person's driving was somewhat better to about the same ($M = 2.39$, $SD = 0.81$). The patterns did not differ across relationship groups ($p = 0.49$).

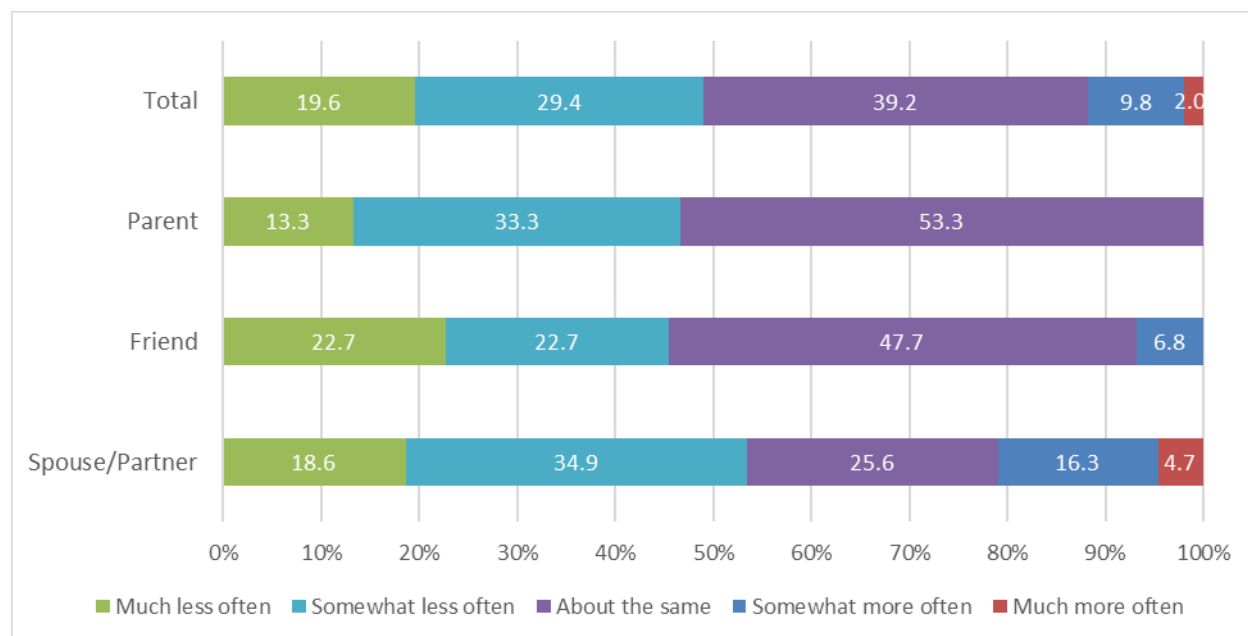


Figure 2. Aggressive Driving Frequency Change Reported at Follow-Up

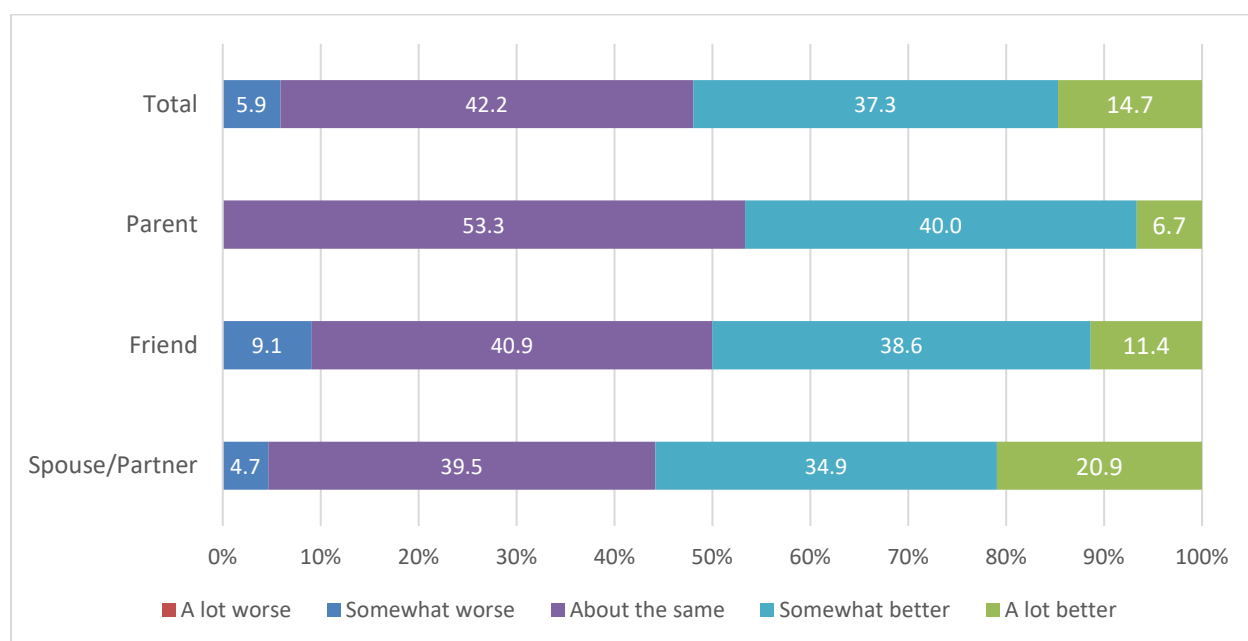


Figure 3. Driving Safety Change Reported at Follow-Up

Participants were asked how likely they thought it was that their person would change their driving in the future to be safer. Response options were “not likely at all” (1), “a little likely” (2), “somewhat likely” (3), “quite likely” (4), and “extremely likely” (5). Results are shown in Figure 4. Overall, participants tended to think that their driver was somewhat likely to drive more safely in the future ($M = 3.01$, $SD = 1.17$), with no significant differences by relationship type ($p = 0.50$).

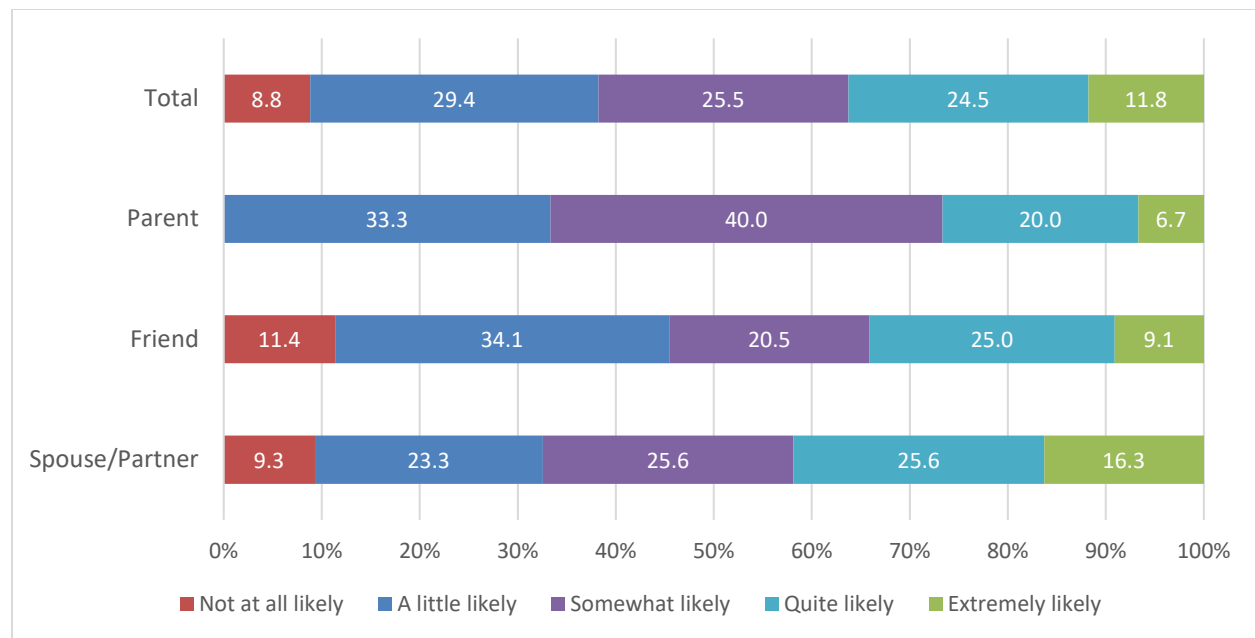


Figure 4. Likelihood that Driver Would Change in Future to be Safer

3.2.9 Further Bystander Intervention

To understand whether bystanders would continue to implement what they learned, participants were asked how likely they were to talk to their person about their driving in the future, from “not likely at all” (1) to “extremely likely” (5). The distribution of responses by relationship is shown in Figure 5. Few participants ($n = 21$; 20.6%) indicated that it was not at all likely or only a little likely that they would have future conversations. On average, participants reported that they were somewhat to quite likely to talk to their person ($M = 3.41$, $SD = 1.10$), with no differences across relationship types ($p = 0.60$).

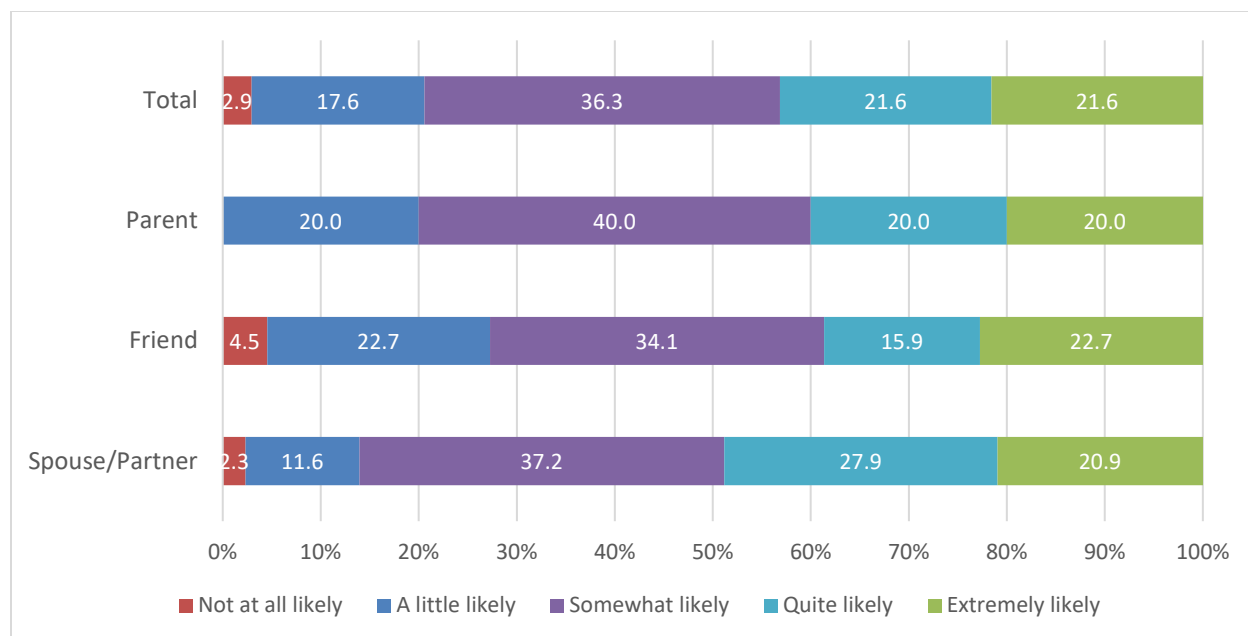


Figure 5. Participant Likelihood of Future Discussion About Driving

We also asked participants in an open-ended question what else they would do in the future to support their person to drive more safely. Parents emphasized calm communication and monitoring of their child's driving. They also discussed positive reinforcement. One parent noted that they would, "Express what they are doing right, instead of just concentrating on the negative." Friends tended to focus on the importance of continued conversations and asking for specific safer driving behaviors. One even noted that they would support their person saying, "I will go to driving school with them to support their driving issue." Spouses/partners focused on how to be supportive and comforting with their partner. They were also willing to practice safe driving with their significant other, with one spouse/partner sharing that they would, "encourage regular breaks, provide gentle reminders, and attend driving safety courses together."

3.2.10 Intervention Feedback

Importantly, participants were asked about their application and perceived helpfulness of the intervention information. Participants rated whether they were able to apply the information they learned to their interactions with their person on a scale from "not at all" (1) to "very much" (5). Overall, participants tended to feel that they were somewhat able to apply the information they learned ($M = 3.41$, $SD = 1.07$), which did not change by the type of relationship ($p = 0.50$). They were also asked how helpful the information was overall from "not at all helpful" (1) to "extremely helpful" (5). Overall, participants tended to find the information somewhat helpful to very helpful ($M = 3.57$, $SD = 1.03$). However, this differed by relationship as determined by a one-way ANOVA ($F(2,99) =$

3.89, $p = 0.02$, $\eta_p^2 = 0.07$). Specifically, spouses/partners ($M = 3.88$, $SD = 0.93$) found the information more helpful compared to both parents ($M = 3.20$, $SD = 1.08$; $p = 0.03$) and friends ($M = 3.39$, $SD = 1.04$; $p = 0.02$) whereas parents and friends found the intervention equally helpful ($p = 0.54$). Many participants used the one-page summary provided to them after the intervention ($n = 42$, 45.1%). About half of parents ($n = 7$, 46.7%) and spouses/partners ($n = 22$, 51.2%) referred to the summary between the intervention and the follow-up, but fewer friends referenced the summary ($n = 17$, 38.6%).

In open-ended questions, we also asked what other information would have been helpful and for feedback on the intervention. Most indicated that they did not need more information ($n = 69$, 67.6%) and had positive or no feedback ($n = 92$, 90.2%). One parent participant reflected, “It has been helpful and is relevant and realistic.” Another participant (a spouse) noted, “The content was clear and well-organized. A quick reference checklist at the end would make it even more actionable.” Others also noted that information about how to navigate emotions would be helpful such as, “how to deescalate [the] situation.” Participants also indicated that examples of consequences, examples of how to drive safer, and video demonstrations would have been helpful to include.

3.3 Discussion

Bystanders are well-positioned to support safer driving behaviors in their close friends and family members, and the role of bystanders to reduce aggressive driving is understudied. This study focused on determining feasibility and perceived effectiveness of an intervention to support bystanders in interacting with important others in their lives to reduce aggressive driving. Findings suggest that parents, friends, and spouses/partners can utilize educational materials to support interactions with their loved ones toward reductions in aggressive driving behaviors.

Overall, after receiving the intervention, participants reported increased confidence in their ability to communicate with their person and to influence their person to drive more safely. This is an important step, as prior research indicates that perceived self-efficacy is a critical factor in whether bystanders attempt to intervene in risky behaviors (Krieger et al., 2017; Sjögren et al., 2020). By providing practical guidance with relationship-specific examples and customizable strategies, the intervention helped bystanders overcome barriers and effectively interact with their person to address aggressive driving. However, differences by relationship type highlight potential nuances. For instance, spouses/partners consistently expressed greater confidence and greater perceived ability to influence their person’s driving compared to friends and parents. This may reflect greater frequency of shared driving experiences among partners or

greater effect on daily behavior due to intimate relationships. In contrast, parents often reported lower confidence, suggesting that intergenerational power dynamics may limit perceived influence.

The intervention's responsive and flexible design, which allowed participants to choose their own Step 3 strategy, appears to have been effective. Participants who chose to support their person in responding differently were especially likely to implement the strategy consistently, suggesting that this option may be particularly accessible or actionable in real-world contexts. By contrast, strategies emphasizing correcting misperceptions or harm prevention were not applied as consistently. It is possible these approaches require greater skill, comfort, or repeated practice.

While bystanders generally described drivers as open-minded, engaged, and willing to consider change, many also perceived drivers as unconcerned about their own behavior. This reflects a tension common in risk communication: bystanders may succeed in initiating dialogue, but drivers' resistance to acknowledging harm limits the potential for immediate change. Nonetheless, a meaningful proportion of participants perceived reductions in aggressive driving frequency and modest improvements in safety at follow-up, suggesting that even short-term interventions can yield positive outcomes.

It is critical to consider the findings of this study in light of its limitations. First, the participants were recruited from an online panel and may differ from the general population. That is, their experiences and perceptions may not generalize to the larger population of U.S. adults. Further, we recruited a relatively small sample size; while appropriate for a feasibility study such as this one, the small sample size further restricts generalizability. While participants from each relationship group (i.e., parents, friends, spouses/partners) were included, the parent group was small. Our ability to draw conclusions is limited, especially for subgroup analyses that further restricted group size within parents, such as analyses around Step 3 strategy selection. Additionally, as this was a feasibility and acceptability study, we assessed participants' perceptions of effectiveness but did not gather information from drivers directly nor did we include objective measures of driver behavior.

Despite these limitations, the current study demonstrates that bystanders of people who drive aggressively can increase their confidence in interacting to improve their loved one's driving by engaging with educational materials. Further, bystanders were generally able to utilize the strategies with their loved one and many reported less engagement in aggressive driving behaviors and safer driving.

3.4 Conclusion

This study provides promising evidence that bystanders can be supported in playing an active role in reducing aggressive driving. Traffic safety culture emphasizes the collective responsibility of communities to promote safe road use, and these findings highlight how close social networks can contribute to that effort. By empowering bystanders with relationship-tailored tools and encouraging early, values-based conversations, interventions can extend the reach of traditional traffic safety campaigns beyond drivers themselves.

Information about tools and resources to engage bystanders can be found in the Resources section of this report.

4 Task 3 – Message Development and Testing

The purpose of Task 3 was to develop and test media messages with a sample of drivers who engaged in aggressive driving behavior.

4.1 Method

The approach included developing messages and recruiting a sample of drivers who have engaged in aggressive driving behaviors.

4.1.1 Message Development

We used findings from Aggressive Phase 1 to identify opportunities to develop messages intended to reduce aggressive driving. Phase 1 survey results indicated that people were less likely to drive aggressively when they engaged in prosocial driving behaviors. Survey results also suggested that there may be opportunities to reduce aggressive driving through messages about cognitive reappraisal and adaptive responses (Finley et al., 2024). Therefore, message development focused on utilizing three themes: prosocial driving, cognitive reappraisal, and adaptive response. Additionally, research indicates that behavior change is supported through alignment with the transtheoretical model (Prochaska, 2008; Rio Szupczynski & Ávila, 2021). That is, meeting people where they are in readiness and willingness to change is a powerful support for behavior change. Considering this, message development included two stages of readiness – precontemplation and contemplation. Precontemplation messages are intended to raise the level of consciousness and concern about current driving behaviors and contemplation messages are intended to move people from awareness to considering change.

4.1.1.1 Message Components and Context

Using the three themes and two stages as the foundation for message development, we created a messaging workbook (inclusive of example messages) to identify the primary audience and messaging context. We also clarified messaging goals from a broad and aspirational lens—including what the messaging should inspire drivers to think, feel, and do as a result of the message. The messaging workbook also identified key elements, including the three themes, tailoring the message to the intended stage of change, and using a nonjudgmental, supportive frame to reduce psychological reactance (Otto et al., 2021).

To better understand the context for messaging, we engaged with members of the Traffic Safety Culture Transportation Pooled Fund to gather the aggressive driving messages currently used by their agencies/organizations as well as the communication

channels used to share those messages. Messages were reviewed, and common components were incorporated into the key elements of the messaging workbook. Most members indicated that their agency/organization's traffic safety messaging about aggressive driving primarily targeted the general population; however, some participants selected specific demographic groups, including teens, young adults, adults, and older adults. Pooled Fund members indicated that they used a variety of channels for distributing messages, including television, radio, social media, online ads (banner ads, search ads, display ads), variable message boards, billboards, and print media (newspapers, magazines) and many members shared that they believe television, radio, social media, online advertising (banner, search, display), variable message boards, and billboards to be the most effective.

4.1.1.2 Message Content

Based on the information gathered from Pooled Fund members, we decided to develop messages with two parts. The first part was a longer message, such as the content that might be used for a radio commercial or a social media post. The second part was brief, such as what might appear on a roadway message board. The two parts of each message set were complementary.

After deciding on the basic framework of messages (i.e., two-part messages within three themes each with precontemplation and contemplation messages) and the key elements of the messaging workbook, Claude AI was used to generate an initial list of messages. Contents from the Aggressive Driving Phase 1 report, the Belief Change Task 1 Report, and the messaging workbook were uploaded into the generative tool and then prompted to generate message pairs for prosocial driving, cognitive reappraisal, and adaptive response messages for people in both the precontemplation and contemplation stages of behavior change. A total of 57 message sets were initially generated.

Prosocial driving messages included language to influence community building, courtesy, and considerate behavior among drivers. Cognitive reappraisal messages included language to reframe thoughts and assumptions about other drivers, whereas adaptive response messages include language to help drivers develop coping strategies and alternative responses while driving.

Within each theme, messages were categorized into two stages. Precontemplation stage messages used a first-person narrative focused on raising awareness without pressure to change. The precontemplation messages included subtle questioning while avoiding direct calls to action. Contemplation stage messages were created to be more direct about behavior change and included specific strategies and techniques. The contemplation stage messages appealed to values (such as community responsibility)

and provided a clearer rationale for why change matters when compared to precontemplation stage messages.

After the initial list was developed, the 57 message sets were reuploaded to Claude AI to analyze each draft messages for the presence of psychological elements. These psychological elements included cognitive dissonance, social identity, enhanced emotional benefits, and enhanced self-efficacy. Messages containing cognitive dissonance elements highlighted contradictions between values or typical behavior and driving behavior. Social identity elements appealed to community belonging and representation. Enhanced emotional benefit elements emphasized how courteous driving makes the driver feel better, and enhanced self-efficacy elements build confidence that change is possible and achievable. A spreadsheet was created indicating which elements were present in each of the message sets. Messages that did not contain any psychological elements were removed from the initial list.

Then, researchers manually reviewed and edited each of the messages for meaning, clarity of language, and consistency with each of the three themes, stage of change, and presence of psychological elements. Messages were prioritized based on the presence of psychological elements to ensure elements were represented across the themes and stages. Researchers narrowed the list to three message sets within each theme and stage to ensure variety within each group and differentiation across groups. Within each theme and stage combination, one message included elements of cognitive dissonance.

The final collection of messages contained 18 message sets, with three for each theme and stage of change combination (3 themes: prosocial driving, cognitive reappraisal, adaptive response x 2 transtheoretical model stages: precontemplation and contemplation x 3 messages). Messages are presented in Appendix C.

4.1.2 Design and Sample

To assess satisfaction with messages intended to reduce aggressive driving and their effectiveness in addressing aggressive driving, an experiment was designed to deliver messages, obtain immediate feedback, and follow up to assess recall and change. The protocol was reviewed and approved by the Montana State University Institutional Review Board [2025-2372-EXEMPT] prior to data collection. Participants provided informed consent before participation.

4.1.2.1 Participants

Verasight provided the participant panel. To be eligible to participate, participants needed to be 18 years old, live in the U.S., be a licensed driver, and report driving at least weekly over the past month. Participants also needed to endorse at least two

aggressive driving behaviors over the past month. Of those who were invited and began the survey, 78% met inclusion criteria.

Two data collection activities (surveys) were conducted, separated by one week. The first survey was completed by 1,400 participants and 960 of those also completed the second survey. Data was reviewed for completeness, and participants were removed for missingness in either survey exceeding 20%, with 152 responses removed from the first survey and 96 responses removed from the second survey. The final sample consisted of 1,248 participants for the first survey (89.1%) and 864 participants who completed both surveys (90.0%).

Participant demographics are displayed in Table 8. Demographics did not differ between the sample of participants for the first survey and the sample that completed both surveys.

Table 8. Participant Demographics

	Survey 1 Sample	Survey 1 & 2 Sample
	<i>n</i> (%)	<i>n</i> (%)
Age		
18-21 years	29 (2.3)	15 (1.7)
21-25 years	76 (6.1)	50 (5.8)
26-35 years	184 (14.7)	119 (13.8)
36-45 years	250 (20.0)	166 (19.2)
46-54 years	197 (15.8)	142 (16.4)
55-64 years	213 (17.1)	145 (16.8)
65 years or older	299 (24.0)	227 (26.3)
Gender		
Man	618 (49.5)	424 (49.1)
Woman	618 (49.5)	433 (50.1)
Transgender man	1 (0.1)	1 (0.1)
Transgender woman	0 (0)	0 (0)
Non-binary	10 (1.2)	6 (0.7)
Self-described	1 (0.1)	0 (0)
Race		
White or Caucasian	1002 (80.3)	703 (81.4)
Black or African American	121 (9.7)	74 (8.6)
American Indian/Native American or Alaska Native	42 (3.4)	28 (3.2)
Asian	81 (6.5)	58 (6.7)
Native Hawaiian or Other Pacific Islander	8 (0.6)	8 (0.9)
Other	55 (4.4)	33 (3.8)
Prefer not to say	7 (0.6)	7 (0.8)
Ethnicity		
Spanish, Hispanic, or Latino origin	184 (14.7)	124 (14.4)
State		
Alabama	20 (1.6)	14 (1.6)

Arizona	21 (1.7)	12 (1.4)
Arkansas	9 (0.7)	7 (0.8)
California	197 (15.8)	127 (14.7)
Colorado	16 (1.3)	9 (1.0)
Connecticut	15 (1.2)	12 (1.4)
Delaware	2 (0.2)	2 (0.2)
District of Columbia	1 (0.1)	1 (0.1)
Florida	69 (5.5)	51 (5.9)
Georgia	51 (4.1)	35 (4.1)
Hawaii	2 (0.2)	2 (0.2)
Idaho	7 (0.6)	6 (0.7)
Illinois	42 (3.4)	32 (3.7)
Indiana	37 (3.0)	26 (3.0)
Iowa	7 (0.6)	5 (0.6)
Kansas	6 (0.5)	4 (0.5)
Kentucky	10 (0.8)	6 (0.7)
Louisiana	36 (2.9)	22 (2.5)
Maine	4 (0.3)	3 (0.3)
Maryland	15 (1.2)	12 (1.4)
Massachusetts	20 (1.6)	13 (1.5)
Michigan	54 (4.3)	39 (4.5)
Minnesota	14 (1.1)	9 (1.0)
Mississippi	11 (0.9)	8 (0.9)
Missouri	15 (1.2)	13 (1.5)
Montana	3 (0.2)	1 (0.1)
Nebraska	4 (0.3)	2 (0.2)
Nevada	16 (1.3)	11 (1.3)
New Hampshire	1 (0.1)	1 (0.1)
New Jersey	55 (4.4)	44 (5.1)
New Mexico	6 (0.5)	4 (0.5)
New York	84 (6.7)	54 (6.2)
North Carolina	27 (2.2)	17 (2.0)
North Dakota	2 (0.2)	1 (0.1)
Ohio	33 (2.6)	18 (2.1)
Oklahoma	13 (1.0)	6 (0.7)
Oregon	8 (0.6)	6 (0.7)
Pennsylvania	46 (3.7)	32 (3.7)
Rhode Island	1 (0.1)	0 (0)
South Carolina	18 (1.4)	16 (1.9)
South Dakota	4 (0.3)	4 (0.5)
Tennessee	18 (1.4)	12 (1.4)
Texas	106 (8.5)	76 (8.8)
Utah	9 (0.7)	7 (0.8)
Virginia	62 (5.0)	41 (4.7)
Washington	21 (1.7)	17 (2.0)
West Virginia	6 (0.5)	5 (0.6)
Wisconsin	24 (1.9)	19 (2.2)

Participants reported engaging in a variety of aggressive driving behaviors over the past month. (See Table 9.) On average, participants reported 6 different aggressive driving behaviors. The most common behaviors were sped up when the traffic light was

changing from yellow to red, honked or flashed headlights when another driver did something inappropriate, drove 15 miles per hour faster than the normal flow of traffic, and yelled or made an angry gesture at another driver. Aggressive driving behaviors were similar for the sample of participants who completed the first survey and the sample that completed both surveys.

Table 9. Aggressive Driving Behaviors

	Survey 1 Sample	Survey 1 & 2 Sample
	<i>M (SD)</i>	<i>M (SD)</i>
Total number of aggressive behaviors	6.2 (3.3)	6.1 (3.1)
	<i>n (%)</i>	<i>n (%)</i>
Sped up when the traffic light was changing from yellow to red	1135 (90.9)	791 (63.4)
Drove 15 miles per hour faster than the normal flow of traffic	826 (66.2)	559 (44.8)
Honked or flashed headlights when another driver did something inappropriate	809 (64.8)	566 (45.4)
Yelled or made an angry gesture at another driver	731 (58.6)	513 (41.1)
Overtook traffic by weaving in and out of lanes	435 (34.9)	298 (23.9)
Tailgated another driver	415 (33.3)	284 (22.8)
Slowed in front of another driver on purpose	374 (30.0)	247 (19.8)
Blocked another driver that was attempting to pass or change lanes	367 (29.4)	249 (20.0)
Cut off and/or braked hard in front of another driver	299 (24.0)	183 (14.7)
Ignored the right-of-way to “beat” another driver	272 (21.8)	178 (14.3)
Forced another driver onto the shoulder or off the road	81 (6.5)	45 (3.6)
Hit another vehicle on purpose	62 (5.0)	30 (2.4)

4.1.2.2 Experimental Design

The experimental design consisted of nine conditions to which participants were randomly assigned. Each participant received messages from two of the three themes and was assigned to one of three transtheoretical model stage conditions – precontemplation, contemplation, or both. Participants each viewed four messages. Participants in the precontemplation and contemplation conditions received two of the three messages for each theme, randomly chosen. Participants in the precontemplation and contemplation paired condition received a precontemplation and a contemplation message for each theme, with the pair of messages randomly chosen.

4.1.2.3 Procedure

Data collection was conducted by Verasight using the Qualtrics platform for online survey administration. Participants were invited and randomly assigned to condition at

the beginning of the survey. They provided informed consent, followed by screening questions to ensure age eligibility as well as living in the U.S., having a driver's license, driving at least weekly, and engaging in two or more aggressive driving behaviors over the past month. Participants who met inclusion criteria continued to the survey, where they were asked questions about their perceptions of themselves as a driver as well as perceptions about other drivers. Then, participants were presented with message sets, with the messages presented based on the participant's condition. Each message was presented, and then after a four-second delay, questions about the message set were shown (with the message still remaining on the screen). For each message, participants indicated whether they had seen it before, and then they rated the message on 12 five-point semantic differentials to assess their satisfaction with each message (e.g., positive-negative; understandable-confusing; boring-interesting). This procedure was repeated for the four message sets presented to each participant. Then, participants were shown each message again and asked to indicate the extent to which the message made them think about their driving and motivated them to drive more safely.

One week later, participants were invited to complete the second survey. The second survey asked participants if they had thought about any of the driving messages over the past week and to indicate the extent to which the messages made them think about their driving. Participants' recall of messages was assessed by showing, in random order, the messages they had seen as well as distractor messages that they had not been shown in the first survey. For each message, participants indicated whether they had seen it before or not. Participants also responded again to the perception questions (i.e., their perceptions about themselves as drivers and their perceptions of other drivers). See Appendix D for the screening survey, Survey 1, and Survey 2.

4.2 Results

Data were exported from Qualtrics and analyzed in IBM SPSS and R for descriptive and inferential statistics. Message reaction was assessed at Survey 1 and is therefore based on the Survey 1 sample ($n = 1,248$). Recall and change in perceptions are based on the sample of participants who also completed Survey 2 ($n = 864$). Analyses included tests for differences based on characteristics of the messages participants viewed, specifically theme (i.e., adaptive response, cognitive reappraisal, or prosocial driving) and stage (i.e., precontemplation only, contemplation only, or pairs).

4.2.1 Message Reaction

Participants rated each message on 12 semantic differentials (e.g., positive-negative; understandable-confusing; boring-interesting). These ratings were reverse coded as needed and averaged into a composite score from 1 to 5, with higher scores indicating a more positive reaction and greater satisfaction with each message. Cronbach's alphas

for each message composite score ranged from .93 to .95. Overall, participants had a positive, satisfied reaction to the messages, with average scores exceeding the scale midpoint of 3 (M range: 3.5 – 4.1). Across themes, prosocial driving messages were the most highly rated, with all prosocial driving precontemplation messages receiving an average rating of 4.0 and prosocial contemplation messages receiving average ratings of 3.9 and 4.0. The highest rated message was ARc3, an adaptive response contemplation stage message ($M = 4.1$, $SD = 0.8$). (See Figure 6.)

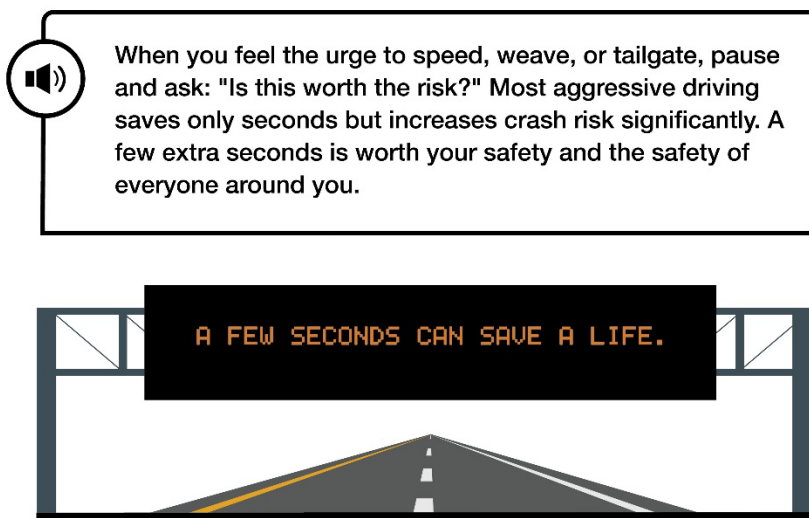


Figure 6. Highest Rated Message (ARc3 - Adaptive Response Contemplation)

At the first survey, after seeing each message for the second time, participants also indicated agreement with the statements “This message makes me think about my driving” and “This message motivates me to drive more safely,” with responses ranging from 1 (strongly disagree) to 5 (strongly agree) for each. Participants’ ratings averaged at or above the midpoint (3) for both statements across all messages (M ranges = 3.0 – 3.8 for think; 3.2 – 3.9 for motivate). Overall, the prosocial driving messages were consistently highly rated, with more than 60% of respondents agreeing or strongly agreeing that the messages made them think about their driving and more than 65% of respondents agreeing or strongly agreeing that the messages motivated them to drive more safely, except for PDc3, which had lower agreement (49.6% and 58.3%, respectively). Across the two statements, ARc3 again received the most agreement ($M = 3.8$, $SD = 1.0$; 69.2%).

See Appendix E for descriptives of reaction by message.

4.2.2 Message Follow Up

One week after completing Survey 1, including viewing the messages, participants completed Survey 2, which assessed whether participants had thought about the messages and their ability to recall the messages.

4.2.2.1 Thinking About and Describing Messages

Participants indicated whether they had thought about the messages over the past week. More than half of the participants had, with 32.9% indicating once or twice, 19.4% indicating a few times, and 3.8% reporting that they had thought about the messages “quite a bit.” The remaining 43.9% reported that they had not thought about the messages. How much participants thought about the messages did not differ by theme or stage of messages viewed, $F(8, 855) = .55, p = .82$.

Those who had thought about the messages ($n = 485$) were asked to describe, via an open-ended text box, the message as best as they could recall. Participants’ responses were reviewed by two researchers. Unrelated or irrelevant comments not about driving were removed, and the remaining comments were categorized into groups based on how well they matched one of the four messages the participant had viewed. More than half of the participants (53.9%) described an aggressive driving-related message; 36.0% described a message that was coded as not an exact match (e.g., “How my driving affects other people”; “Focus on what you can control”; “Everyone makes mistakes”) and 17.9% described a near or exact match (e.g., “We’re all doing the best we can”; “You can be someone else’s calm”; “Deep breaths help road rage”). In the match group, participants described all 18 messages, with 1 to 9 participants describing each. The three most commonly described messages were CRc1 (12.7%), ARp3 (11.3%), and ARc3 (9.9%).

Some participants (20.9%) said they did not remember a particular message or said they remembered “all of them”; 10.8% of participants described a general message about “driving safe” or “driving nicer,” and 14.4% described a driving message not about aggressive driving.

4.2.2.2 Recall

Participants’ recall of messages at Survey 2 (one week after seeing the messages) ranged from 46.7% accurate (ARp3) to 62.8% (ARc3). However, Survey 2 accuracy recall is modified by participants’ Survey 1 report of having seen the messages previously. Since messages were created for this study and were not previously disseminated, Survey 1 affirmative response for having seen the message previously is considered false recall. After adjusting for Survey 1 false recall, recall by message ranges from 34.3% (ARc3) to 55.5% (ARp1). See Appendix F for Survey 2 recall, Survey 1 false recall, and adjusted recall by message.

Collapsing messages into groups to test for differences in recall based on message theme and stage revealed no differences by theme, $F(2, 858) = 1.06, p = .35$, or stage, $F(2, 858) = .47, p = .62$.

4.2.2.3 Message Effects

At Survey 2, participants responded to five items about the effect of the messages they had seen one week earlier, indicating their agreement that the messages made them think about their driving, motivated them to drive more safely, made them think about the safety or wellbeing of other people on the road, made them think about what they can control when driving, and made them think about reacting differently to other people on the road. Participants rated each statement from 1 (strongly disagree) to 5 (strongly agree). Participants' ratings averaged above the midpoint (3) for all statements, ranging from 3.6 to 3.8 and indicating agreement. (See Figure 7.) Agreement with the statements did not differ by theme or stage of messages viewed, $F(4, 859) = .69, p = .60$.

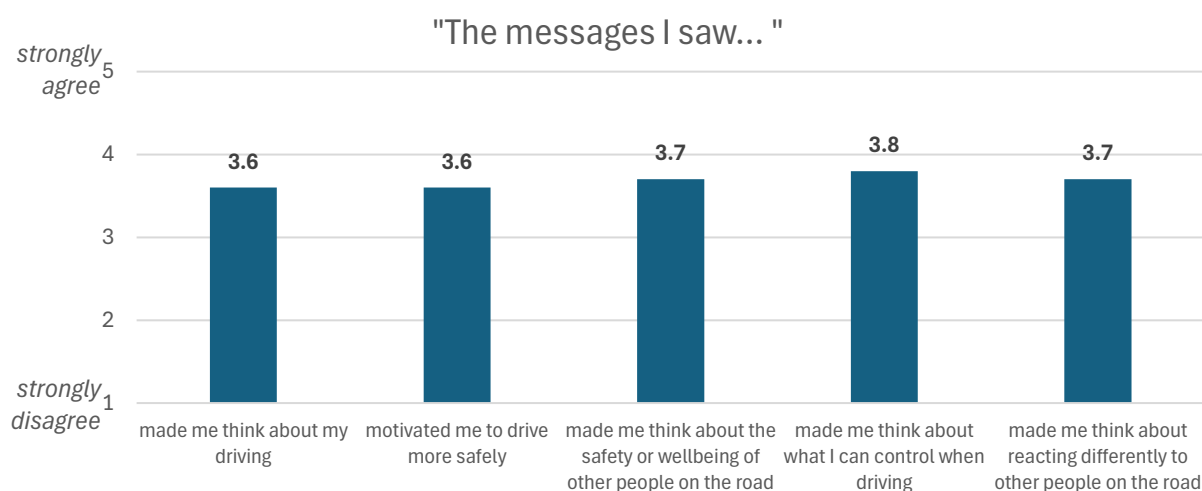


Figure 7. Participants' Agreement with Statements about Messages

4.2.3 Perceptions of Self and Others as Drivers

During both surveys, participants responded to a set of items to assess their perceptions of themselves as a driver (5 items), their driving habits (3 items), and their perceptions of other drivers (5 items). Items were averaged for three composite scores. The five items assessing self-perceptions included "I am a safe driver" and "I treat other people on the road with respect"; higher composite scores indicated greater perception that they are good and safe drivers. The three items assessing driving habits included "I am considering making changes to how I drive" and "I do not think my driving habits are a problem"; the latter was reversed, and, for the composite, higher scores indicated

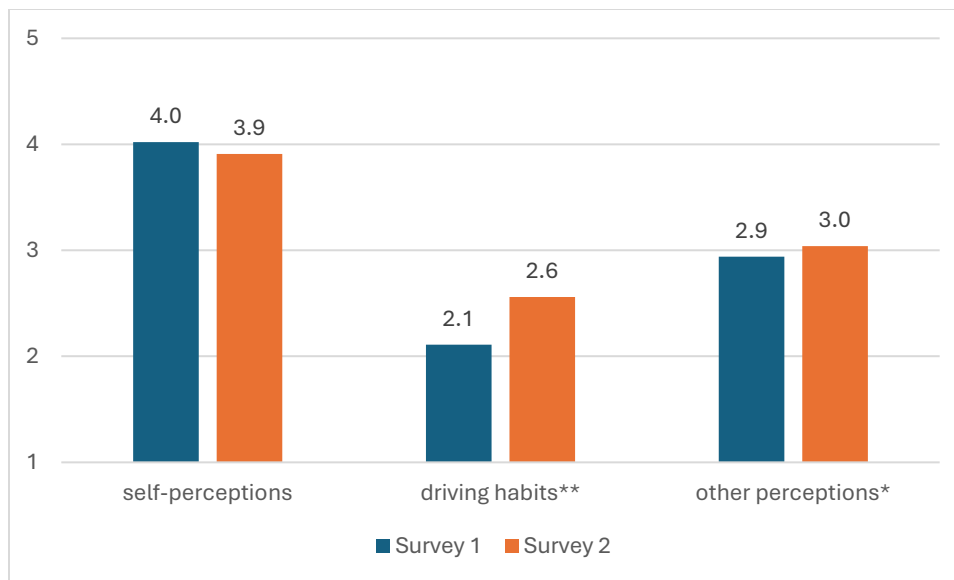
greater concern about their driving habits and consideration of making a change. For perception of others, the five items were similar to the self-perception items and included “Most drivers are good drivers” and “Most drivers treat other people on the road with respect.” Cronbach’s alphas for the composite scales are presented in Table 10.

Table 10. Cronbach’s Alphas for Perception Scales

Scale	Number of items	Cronbach’s alpha at Survey 1	Cronbach’s alpha at Survey 2
Self-perceptions	5	.70	.73
Driving habits	3	.67	.58
Other perceptions	5	.87	.87

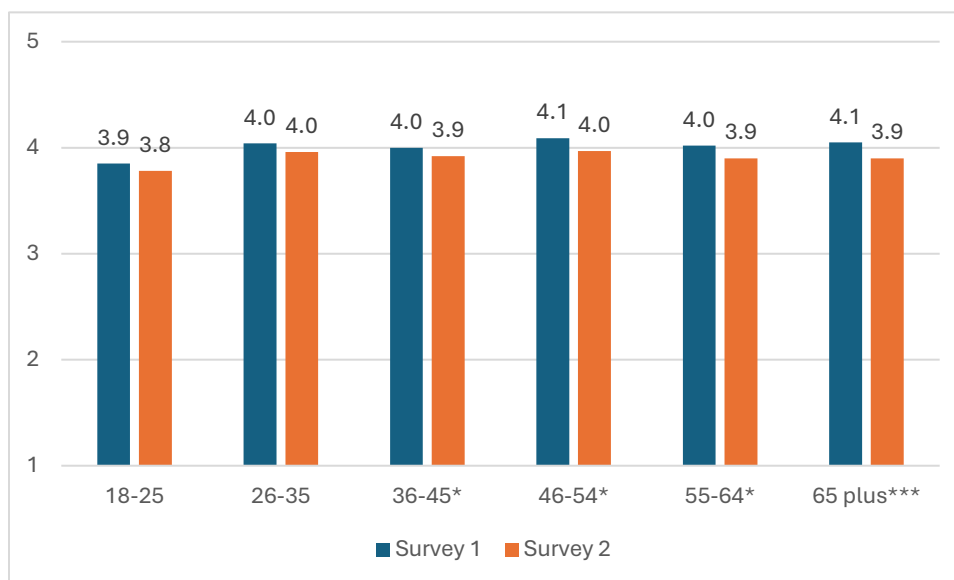
A repeated measures multiple analysis of variance (MANOVA) was conducted to examine potential changes in the three perceptions scales over time (from Survey 1 to Survey 2). Message themes and stages were included as between-subjects factors and participant age and gender were included as covariates. The overall multivariate test revealed significant main effects for time, Pillai’s Trace = 0.018, $F(1, 853) = 15.28$, $p < .001$, $\eta_p^2 = .018$, and perceptions, Pillai’s Trace = .124, $F(2, 852) = 60.03$, $p < .001$, $\eta_p^2 = .124$. These main effects were modified by a significant time by perceptions by age interaction, Pillai’s Trace = .013, $F(2, 852) = 5.61$, $p = .004$, $\eta_p^2 = .013$. There was no significant effect for message theme or stage, nor was the interaction significant.

Follow-up repeated measures ANOVA tests revealed a significant time by age interaction for self-perceptions, $F(1, 853) = 5.12$, $p = .024$, $\eta_p^2 = .006$. For driving habits, there was a significant main effect for time, $F(1, 853) = 8.96$, $p = .003$, $\eta_p^2 = .010$, which was modified by a time by age interaction, $F(1, 853) = 6.80$, $p = .009$, $\eta_p^2 = .008$. For other perceptions, there was a significant main effect for time, $F(1, 853) = 4.89$, $p = .027$, $\eta_p^2 = .006$. See Figure 8 for the overall composite perception scores by time. Additional analyses examined differences in time by age for self-perceptions and driving habits. For self-perceptions, significant decreases from Survey 1 to Survey 2 were noted for participants over the age of 35. (See Figure 9.) For driving habits, significant increases were noted for all age groups, with participants over the age of 45 experiencing the greatest increases. (See Figure 10.)



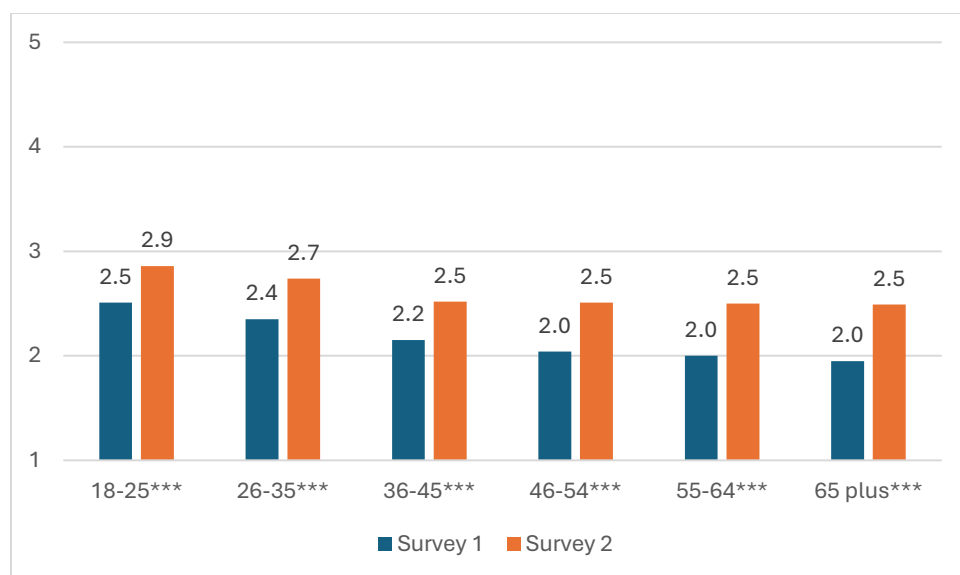
* $p < .05$; ** $p < .01$

Figure 8. Composite Perception Scores by Time



* $p < .05$; *** $p < .001$

Figure 9. Self-Perception Scores by Age and Time



*** $p < .001$

Figure 10. Driving Habits by Age and Time

Taken together, perception results indicate that participants over the age of 35 perceived themselves as less good and safe drivers at Survey 2 compared to Survey 1. Participants across ages reported increased concern about their driving and consideration of changing their driving habits at Survey 2 compared to Survey 1, with the greatest increase among participants over the age of 45. Regardless of age, participants' perception of other drivers as good and safe drivers increased from Survey 1 to Survey 2. However, the theme or stage of messages participants viewed during Survey 1 did not affect their perceptions or change in perceptions over time.

4.3 Discussion

Aggressive driving is a persistent and concerning traffic safety issue. Traffic safety stakeholders often use messages to communicate information and encourage safer driving, but little information exists about effectiveness of, or recipients' reactions to, messages to address aggressive driving. In this study, novel messages to address aggressive driving were developed and tested with a sample of drivers who reported engaging in aggressive driving behaviors in the past month. Findings suggest that messages to address aggressive driving are generally well received by drivers and can help them think differently about their own driving and the driving of others.

Based on previous work (Finley et al., 2024), messages were designed to promote adaptive response, cognitive reappraisal, and prosocial driving. All messages were intended to encourage recipients to think about their own driving without a direct instruction about changing behavior or driving a specific way. Aligning with the

transtheoretical model (Prochaska, 2008; Rio Szupszynski & Ávila, 2021), messages were constructed to support precontemplation or contemplation stages and the study tested whether precontemplation or contemplation alone was more effective than sequencing precontemplation and contemplation messages in pairs.

Participants had the most favorable reactions to the prosocial driving messages, though they had overall positive reactions to all messages.

One week after seeing the messages, approximately half of participants accurately recalled each message they had seen, though recall adjusted by initial false recall is less. During the initial survey, participants were presented with each message twice. Participant recall would be supported by multiple presentations of the messages over time.

Participants agreed that the messages made them think about their driving and motivated them to drive more safely. Participants also agreed that the messages met their intended goals—specifically to have recipients think about the safety or wellbeing of other people on the road, think about what they can control when driving, and react differently to other people on the road. Further, one week after receiving the messages, participants indicated greater concern about their driving and increased consideration of changing their driving habits, reflecting message effectiveness at increasing awareness and motivating recipients to consider behavior change. Some participants (ages greater than 35) also rated themselves as less good and safe drivers one week after viewing the messages, similarly suggesting increased awareness of opportunities to improve driving.

Participants' perceptions of other drivers also changed after viewing messages. One week later, participants' ratings of most other drivers as good and safe increased, suggesting message effectiveness in reducing hostile attributions of other drivers that are common in aggressive driving. Messaging that shifts assumptions about others' intentions may therefore be a promising pathway for reducing escalation during driving interactions.

However, there were no differences based on message type or stage of change, suggesting that messages are similarly effective regardless of theme or stage. Participants' own stage of change was not assessed in this study, as message recipients' stage of change is generally unknown in real-life applications. Results indicate no differences if participants received precontemplation messages only, contemplation messages only, or paired messages. Therefore, traffic safety stakeholders may consider messages of all types – adaptive response, cognitive reappraisal, and prosocial driving – as well as messages aligned with different stages of change (precontemplation and contemplation). The lack of differences across themes

and stages suggests flexibility for practitioners, allowing agencies to select messages based on context, audience, and communication channels without concern that one specific approach is required.

This study's findings must be considered in light of its limitations. First, participants were recruited from an online panel and may not be representative of the general aggressive driving population. While the sample was diverse, older adults were overrepresented in the sample compared to most estimates of aggressive drivers (Finley et al., 2024). Additionally, the sample was relatively evenly split by gender, while aggressive driving is generally more common in men than women. However, since messages are often distributed to the entire population of a state or community, feedback from a diverse sample is useful. A second limitation relates to behavior change. The goal of this study was to assess participants' reactions to messages and the effectiveness of these messages in changing participants' perceptions related to driving. However, actual changes in aggressive driving behaviors were not expected during this study due to limited message dosage and the short study interval of one week. Findings suggest effectiveness in changing beliefs and perceptions, which is an important step toward behavior change, but increased dosage and additional strategies are likely necessary to support consistent engagement in safer driving behaviors.

Despite these limitations, the current study demonstrates that people who drive aggressively have favorable reactions to messages that encourage adaptive responses, cognitive reappraisal, and prosocial driving and that such messages can be effective in supporting changes in beliefs and perceptions. These findings suggest that messaging may influence proximal determinants of behavior, including risk perception, self-reflection, and attributions about other drivers, which are important precursors to behavior change. Results can inform messages created and disseminated by traffic safety stakeholders. In real-world campaigns, repeated exposure across channels may amplify effects observed here, particularly given evidence that message recall is strengthened through repetition.

4.4 Conclusion

This study provides evidence to inform the use of messages to address aggressive driving. Traffic safety stakeholders could use these or similar messages as part of a portfolio of traffic safety culture strategies to reduce aggressive driving and support safer driving behaviors.

Information about a resource to support message development can be found in the Resources section of this report.

5 Resources

Based on what we learned from the key informant interviews with bystanders and the results of testing the bystander strategies, we developed resources to support bystanders in intervening to reduce aggressive driving. The primary resource is [*Are You Concerned About Someone's Risky Driving? A Conversation Guide for Friends and Family*](#). This resource provides the three steps a bystander can use to have conversations and support safer driving, along with tips and insights. As a companion to the conversation guide, we also developed [*Engaging Bystanders to Reduce Aggressive Driving: A Toolkit for Community Leaders*](#). This toolkit includes communication resources and partner engagement tools to raise awareness about the role of bystanders in reducing aggressive driving and to broadly promote the conversation guide.

Informed by the results of the aggressive driving message testing, we developed [*Guidance for Developing Effective Messages*](#), a resource to support traffic safety stakeholders in developing effective messages.

All the tools and resources are available on the Montana Department of Transportation's Traffic Safety Culture Transportation Pooled Fund website:
<https://www.mdt.mt.gov/research/projects/trafficsafety-ad.aspx>

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Appendix A: Bystander Survey and Intervention

Consent Form

SUBJECT CONSENT FORM FOR PARTICIPATION IN HUMAN RESEARCH AT MONTANA STATE UNIVERSITY (MSU)

Researchers at the Center for Health and Safety Culture (CHSC) at Montana State University are asking you to participate in a research study to help people support others in their lives to drive more safely. This form describes this study to you and explains how you can ask questions. This study is being led by Dr. Bridget Hanson, a researcher at CHSC.

What the study is about

The purpose of this research is to understand how people might help important others in their lives to drive more safely. We have developed a survey designed to learn about driving behaviors of your friends or family and a brief set of strategies that you could use to support someone in your life to drive more safely. The information we learn in this study will help us understand ways to decrease risky driving.

What we will ask you to do

We are asking you to participate in a survey at two different times, approximately two weeks apart. The first survey will take 10-15 minutes, including receiving information. The second survey will take 5-10 minutes.

Risks and discomforts

We anticipate that this study will be minimally disruptive. Participating in surveys and/or reviewing the information may challenge some of your perceptions or give you new information to think about. If you try talking to someone in your life about their driving, you may feel uncomfortable or they may respond negatively. You are not required to have discussions with others in order to participate in this study and you should only do so if you feel safe.

Benefits

You may benefit from learning strategies and tips for supporting others in driving more safely. Information from this study will be used to understand ways to decrease risky driving and help people improve their driving.

Funding

This project is funded through a grant to Montana State University's Center for Health and Safety Culture from Montana Department of Transportation and the Federal Highway Administration (FHWA). There are no costs to you. Your participation will not impact your relationship with Montana State University or the state of Montana.

Compensation for participation

If you choose to participate in the study, you may receive credit or compensation from Qualtrics or their survey partners.

Privacy/Confidentiality/Data Security

All information you provide will be kept confidential. No identifying information will be collected with the research data. Data will be securely stored and access to the data will be limited to Center staff who are working on this project. Results from the study will be reported in aggregate and will not include details that may identify you. After completion of the project, data will be securely maintained and retained for three years.

Taking part is voluntary

Participation is voluntary, and you can choose to not answer any questions you do not want to answer and/or you can stop at any time.

If you have questions

The main researcher conducting this study is Bridget Hanson, PhD, a researcher at CHSC. You may contact her by email if you have any questions about the study at bridget.hanson@montana.edu. If you have any questions or concerns regarding your rights as a participant in this study, you may contact the MSU Institutional Review Board (IRB) at irb@montana.edu. [IRB protocol #2025-2111]

Consent

Proceeding with this survey indicates your consent to participate. Thank you!

Eligibility

What is your age?

- ☐ Under 18 (*ineligible*)
- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65+

Are you comfortable reading and writing in English?

- ☐ Yes
- ☐ No (*ineligible*)

Is there someone in your life whose driving concerns you?

- ☐ Yes
- ☐ No (*ineligible*)

You indicated you are concerned about someone's driving. What is your relationship to this person? **This person is my...**

Note for parent-child relationships: If you are the parent, please select **child** (This person is my child). If you are the child, please select **parent** (This person is my parent.)

- ☐ spouse
- ☐ partner
- ☐ friend
- ☐ child
- ☐ parent (*ineligible*)
- ☐ other. Please describe: _____ (*ineligible*)

What kinds of driving behaviors does this person engage in that you are concerned about? (Select all that apply.)

- ☐ tailgating other vehicles or following too close (*aggressive driving behavior*)
- ☐ responding to other drivers with yelling or rude gestures (*aggressive driving behavior*)
- ☐ weaving in and out of traffic (*aggressive driving behavior*)
- ☐ cutting off other vehicles and/or braking hard (*aggressive driving behavior*)
- ☐ ignoring the right-of-way to "beat" another vehicle (*aggressive driving behavior*)
- ☐ excessive honking or flashing headlights at other drivers (*aggressive driving behavior*)
- ☐ speeding in heavy traffic (*aggressive driving behavior*)
- ☐ purposefully slowing in front of another vehicle (*aggressive driving behavior*)
- ☐ blocking vehicles that are attempting to pass or change lanes (*aggressive driving behavior*)
- ☐ forcing other vehicles onto the shoulder or off the road (*aggressive driving behavior*)
- ☐ running stop signs or red lights (*aggressive driving behavior*)

- purposefully hitting another vehicle (*aggressive driving behavior*)
- speeding (*non-aggressive driving behavior*)
- driving too fast for weather conditions (*non-aggressive driving behavior*)
- driving under the influence of alcohol (*non-aggressive driving behavior*)
- driving under the influence of cannabis/marijuana (*non-aggressive driving behavior*)
- driving under the influence of substances other than alcohol or cannabis/marijuana (*non-aggressive driving behavior*)
- using their phone while driving (*non-aggressive driving behavior*)
- distracted driving other than using their phone while driving (*non-aggressive driving behavior*)
- driving when drowsy or tired (*non-aggressive driving behavior*)
- not wearing their seat belt (*non-aggressive driving behavior*)
- not ensuring passengers use seat belts or appropriate restraints (*non-aggressive driving behavior*)
- unsafe driving due to old age (*non-aggressive driving behavior*)
- unsafe driving due to mental or physical impairment (*non-aggressive driving behavior*)

(Order of responses randomized. Participants needed to endorse at least two aggressive driving behaviors to be eligible.)

Demographics

To ensure we have information from a variety of people, we would like to gather some basic demographic information.

Thinking about your **[Person]** whose driving concerns you...

What is their gender?

- ☐ Man
- ☐ Woman
- ☐ Transgender Man
- ☐ Transgender Woman
- ☐ Non-binary
- ☐ Another gender, describe: _____

What is their age?

- ☐ 15-17
- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65+

We'd also like to know a little more about you.

Are you currently a licensed driver?

- ☐ Yes
- ☐ No

How do you describe your gender?

- ☐ Man
- ☐ Woman
- ☐ Transgender Man
- ☐ Transgender Woman
- ☐ Non-binary
- ☐ Another gender, describe: _____

Choose one or more races that you consider yourself to be

- ☐ White or Caucasian
- ☐ Black or African American
- ☐ American Indian/Native American or Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Other
- ☐ Prefer not to say

Are you of Spanish, Hispanic, or Latino origin?

- ☐ Yes
- ☐ No

What state do you live in?

- | | | | |
|---|-------------------------------------|--------------------------------------|--------------------------------------|
| ☐ I live outside the U.S. | ☐ Illinois | ☐ Nebraska | ☐ Rhode Island |
| ☐ Alabama | ☐ Indiana | ☐ Nevada | ☐ South Carolina |
| ☐ Alaska | ☐ Iowa | ☐ New Hampshire | ☐ South Dakota |
| ☐ Arizona | ☐ Kansas | ☐ New Jersey | ☐ Tennessee |
| ☐ Arkansas | ☐ Kentucky | ☐ New Mexico | ☐ Texas |
| ☐ California | ☐ Louisiana | ☐ New York | ☐ Utah |
| ☐ Colorado | ☐ Maine | ☐ North Carolina | ☐ Vermont |
| ☐ Connecticut | ☐ Maryland | ☐ North Dakota | ☐ Virginia |
| ☐ Delaware | ☐ Massachusetts | ☐ Ohio | ☐ Washington |
| ☐ Florida | ☐ Michigan | ☐ Oklahoma | ☐ West Virginia |
| ☐ Georgia | ☐ Minnesota | ☐ Oregon | ☐ Wisconsin |
| ☐ Hawaii | ☐ Mississippi | ☐ Pennsylvania | ☐ Wyoming |
| ☐ Idaho | ☐ Missouri | | |
| | ☐ Montana | | |

How would you describe the area where you live?

- ☐ Urban area or large city
- ☐ Suburb near a large city
- ☐ Small city or town
- ☐ Rural

Previous Bystander Intervention

Next we have a few questions about your **[Person]** and their driving that concerns you. When you think about their driving, please think specifically about their risky driving that impacts other people, like **[First endorsed aggressive driving behavior]** and **[Second endorsed aggressive driving behavior]**.

How concerned are you about these driving behaviors?

- ☐ A little concerned
- ☐ Somewhat concerned
- ☐ Very concerned

Have you ever tried talking to your **[Person]** about their driving, specifically **[First endorsed aggressive driving behavior]** or **[Second endorsed aggressive driving behavior]**?

- ☐ Yes, within the last month
- ☐ Yes, more than a month ago
- ☐ No

Thinking about unsafe driving behaviors like **[First endorsed aggressive driving behavior]** or **[Second endorsed aggressive driving behavior]**, which of the following best describes your **[Person]**?

- ☐ They don't know that I am concerned, and I don't think they are aware that it is a problem. (*Not aware; Shows next question*)
- ☐ They know I am concerned, but they don't think it's a problem. (*Aware; Resistant*)
- ☐ They realize their driving is sometimes unsafe or otherwise an issue, but they resist changing. (*Aware; Resistant*)
- ☐ They realize their driving is sometimes unsafe or otherwise an issue, and they are considering changing or trying to improve. (*Aware; Not resistant*)

If you were to bring it up, how open do you think they would be to changing their driving behavior?

- ☐ Very open to change (*Not aware; Not resistant*)
- ☐ Somewhat open to change (*Not aware; Not resistant*)
- ☐ Somewhat resistant to change (*Not aware; Resistant*)
- ☐ Very resistant to change (*Not aware; Resistant*)

How many times have you done each of the following in the past 2 weeks?

	0	1	2	3	4	5	6	7	8+
Expressed concern to your [Person] about their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hinted that their driving is unsafe	☐	☐	☐	☐	☐	☐	☐	☐	☐
Communicated that their driving is unsafe	☐	☐	☐	☐	☐	☐	☐	☐	☐
Used jokes or humor to bring up their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Expressed disapproval of their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐

Had a heated conversation about their driving (for example, with either person shouting or yelling)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Discussed how their driving aligns with their values	☐	☐	☐	☐	☐	☐	☐	☐	☐
Compared their driving to behavior in other settings	☐	☐	☐	☐	☐	☐	☐	☐	☐
Discussed the safety consequences of their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Discussed the financial consequences of their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tried calming the driver while in the vehicle	☐	☐	☐	☐	☐	☐	☐	☐	☐
Threatened to take away driving privileges (<i>shown if person = child</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Limited driving privileges as a consequence (<i>shown if person = child</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Increased monitoring of driving (<i>shown if person = child</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐

How confident are you that you can:

	not at all confident	a little confident	somewhat confident	fairly confident	extremely confident
Communicate effectively with your [Person] about their driving	☐	☐	☐	☐	☐
Influence your [Person] to drive more safely	☐	☐	☐	☐	☐

Transition to intervention:

You said you were concerned about your **[Person]**'s driving. Specifically, you are concerned about behaviors such as **[First endorsed aggressive driving behavior]** and **[Second endorsed aggressive driving behavior]**. We have some suggestions on how to approach the subject with your **[Person]**. This information will be specific to you and your **[Person]** to help you have a meaningful and successful conversation with them about their driving.

Intervention

Introduction

It's normal to feel unsure or nervous about talking to your **[Person]** about their driving. Many people have felt the same — worried about safety, unsure what to say, or afraid of hurting the relationship. You're not alone if you feel frustrated or like nothing is changing.

But what you do still matters. You can help them make safer choices. Your care, concern, and willingness to speak up are important, even if you experience resistance, or things don't change right away. It may not be easy to say something, but your voice can make a difference.

In this three-step process, you will learn from example conversations and simple tips to help you talk to someone you care about who drives unsafely. These tools can help you share your concerns in a calm way, connect to values you both care about (like safety or respect) and show why some driving behaviors don't make sense in other daily situations. You'll also learn ways to bring up common problems like speeding or yelling at other drivers.

Along the way, you'll also be reminded of communication strategies that help the conversation, such as:

- Use "I" statements to talk about how you feel instead of blaming or accusing.
- If emotions are running high, wait for a calmer moment to talk.
- If the conversation gets heated, take a break and come back to it later.
- Speak up early. You don't have to wait until a crash or something else bad happens.

The following example conversations and tips are meant to make it easier for you to speak up and feel more confident.



USING "I" STATEMENTS

Using "I" statements means expressing your thoughts, feelings, and needs by focusing on your own experience. This communication technique promotes clarity, reduces defensiveness, and helps resolve conflict more constructively.

A basic structure you can use is "I feel [emotion] when [situation or behavior] because [impact or reason]. I would like [need or request]."

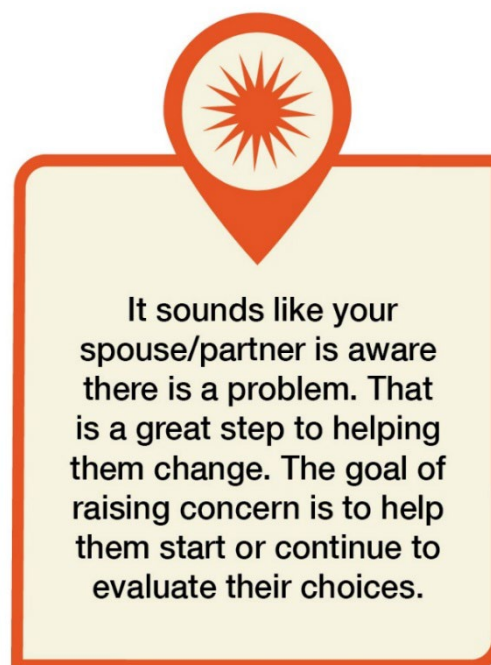
Step 1: Express Concern and Connect to Values

STEP 1 Express Concern and Connect to Values

If this is the first time you are speaking with this person about their driving behavior or you do not think they are aware of the problem, start by expressing concern. Let your **[Person]** know that you are concerned for their safety. You are not trying to nag or annoy them. Even if you've talked about their driving before, it can be helpful to take a step back, clearly express concern, and let them know that you are coming from a place of concern.

Remember to use “I” statements and describe how you feel. This might sound like:

- “Hey, I noticed you get really tense when driving. Everything okay?”
- “I worry about your safety when you drive so fast.”
- “I know you’re a capable driver, but I still worry when I see you **[First endorsed aggressive driving behavior]**.”



It sounds like your spouse/partner is aware there is a problem. That is a great step to helping them change. The goal of raising concern is to help them start or continue to evaluate their choices.

(Example of spouse/partner is aware that their driving is a problem.)

Next, try connecting to what matters to your **[Person]**, what they value.

Values are at the core of how people see themselves. When a message connects to what someone deeply values, it can reveal how their current behavior, like unsafe driving, doesn't quite match who they believe themselves to be. By starting with value-aligned language, you help the conversation feel respectful, less critical, and emotionally safe. Instead of leading with disapproval, you focus on what matters to them, which builds trust and opens the door to change. Take a moment to think about the person in your life whose driving is unsafe. What seems important to them?

Self-focused values might include:

- independence or personal freedom,
- self-control and discipline,
- being responsible,
- strength or safety of self,
- avoiding hassles and negative consequences.

Community-focused values might include:

- protecting others or caring for the family,
- being a role model,
- respecting rules or fairness,
- contributing to the community,
- moral responsibility.

Now that you've thought about what drives them, here's how to frame your message in a way that speaks to those values.

If they value protecting others or being a provider, you might connect with that value by saying something like:

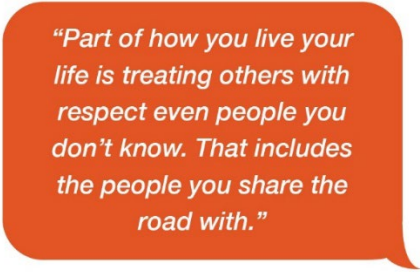
(Example of spouse/partner content.)



"I know you care about keeping your family safe. Driving more calmly can help make sure we all get home."

If they value respecting others, you might connect with that value by saying something like:

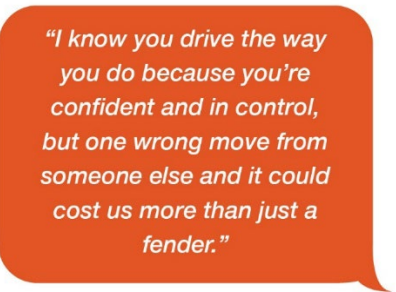
(Example of spouse/partner content.)



"Part of how you live your life is treating others with respect even people you don't know. That includes the people you share the road with."

If they value their individual liberty and freedom of choice, you might connect with that value by saying something like:

(Example of spouse/partner content.)



"I know you drive the way you do because you're confident and in control, but one wrong move from someone else and it could cost us more than just a fender."

Connecting your message to your **[Person]**'s values won't guarantee immediate change, but it helps them listen without feeling attacked. It reminds them of who they are and who they want to be. When your concern is grounded in care and your message reflects what matters most to them, it's more likely to be heard.

Keep the tone calm and genuine, and don't worry about getting the words perfect. If the message doesn't land the first time, that's okay. These conversations are often part of a longer journey. What matters most is that you're showing up with care, respect, and a belief that change is possible.

Step 2: Compare to Other Settings

STEP 2 Compare to Other Settings

When we're behind the wheel, it's easy to forget we're still part of a social world. Driving can feel anonymous and fast-paced and, sometimes, that leads to behavior we'd never accept in other settings.

Imagine doing the same things in a grocery store, walking down the sidewalk, or waiting in line at a coffee shop. Suddenly, what seems normal in traffic feels... absurd. These comparisons can be a powerful tool for bystanders. They help reframe unsafe driving by showing how it clashes with everyday social norms and with the values we usually live by.

The following are example messages you can share with your **[Person]**. These may not match the exact behaviors your **[Person]** engages in, and that's okay. If they don't quite fit, take a moment to think about the specific behaviors you've seen and try creating your own comparison to a real-life situation your person might relate to. A familiar, everyday example can help them see things in a new light.

Here are some examples of what you could say:

(Example of friend content.)

"Imagine if we were in a grocery store and someone was taking a second too long to grab something... would we yell at them to move? It's kind of like laying on your horn."

"If you were walking through a park and someone was inches behind you, breathing down your neck, wouldn't that feel uncomfortable? We give each other personal space when walking, why not when driving?"

"Would you ever walk right up behind someone on the sidewalk and yell at them to move faster? Tailgating is kind of the same thing."



Keep It Light — Use Humor

This section is meant to spark insight, not guilt.

The goal is to share everyday examples that help your spouse/partner see their driving in a new light. Humor can lower defenses and open the door to change. It's not about shaming or scolding; it's about helping them see the disconnect in a way that feels safe, relatable, and even a little funny.

These everyday comparisons don't shame or scold; they invite your [Person] to see their driving from a new angle. By highlighting how certain behaviors would feel out of place in public, you help them recognize that their behaviors while driving aren't just unsafe, it's out of step with how they usually carry themselves. These reframes can spark reflection, reduce defensiveness, and gently challenge habits that may have become automatic.

Use them with curiosity and care, and be open to what resonates. Sometimes, a simple shift in perspective is all it takes to start a meaningful conversation.

Step 3: Choose an Intervention Technique

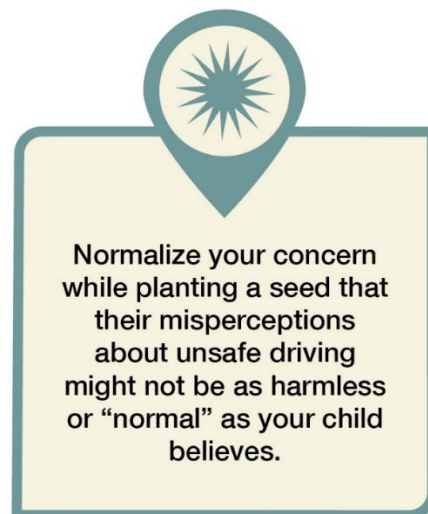
Okay, so we've reviewed connecting to values and pointing out how these kinds of actions aren't normal behavior for your [Person] in other settings. For the last step, please choose one of the following options to get a strategy to try with your [Person].

- (A) Does your [Person] have misperceptions about their driving, like that they are completely in control or that other drivers are the problem and their driving is fine? Choose this to get some suggestions to help correct those misperceptions.
- (B) Does your [Person] react strongly to other drivers? Perhaps they think everyone else is a terrible driver or that other drivers are targeting them purposefully. Choose this for suggestions to help your [Person] respond differently to other drivers.
- (C) Does your [Person] underestimate how risky or dangerous their driving is? Do they think nothing bad will happen? Choose this for suggestions to help your [Person] prevent harm to themselves and others.

Step 3A – Correct Misperceptions

STEP 3 Correct Misperceptions

Correcting misperceptions means helping your **[Person]** understand that what they believe might not be true. It's a way to gently share accurate information so they can see a situation more clearly.



(Example content for child that is resistant to change.)

Here are examples of how to frame your message and help your **[Person]** correct their misperceptions

(Example conversation with child that is resistant to change.)

They may say something like:

“I’m just driving like everyone else. It’s not a big deal.”

You could respond:

“I get that you’re just trying to keep up with traffic, and even small things like tailgating or speeding can increase the risk of something going wrong.”

Or maybe they say things like:

“I’ve got it under control. You don’t need to worry.”

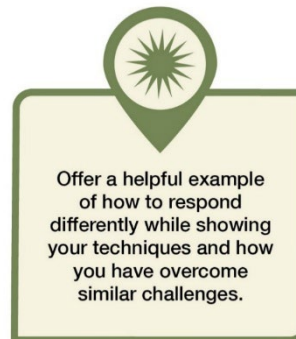
And you could respond:

“I trust that you’re doing your best. I just want to make sure you feel safe and in control, and I want to keep supporting you however I can.”

Step 3B – Respond Differently

STEP 3 Respond Differently

Responding differently means purposely thinking about a situation in a calmer or more helpful way. Instead of assuming someone did something to be rude or mean, it helps to imagine other reasons, like maybe they made a mistake or are having a bad day. Here are examples of how to frame your message and help your **[Person]** respond differently while driving.



(Example content for child that is not resistant to change.)

(Example conversations with a child that is not resistant to change.)

They've admitted getting angry in traffic affects their mood.

They may say something like:

"Ugh, this traffic jam is killing me."

You could respond:

"I get that. I like that you can see how it affects your mood. Sometimes I try to flip it, like, 'Hey, I get a few extra minutes to breathe.' It doesn't always work, but it helps me stay calm."

Or maybe they say something like:

"That jerk saw me coming and did it on purpose! I wish it didn't bother me."

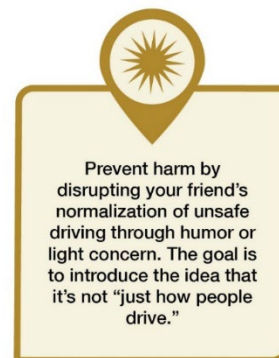
And you could respond:

"Ugh, I can see how that felt personal, but sometimes people really are just distracted. I've noticed when I reframe it like that, it helps me stay a lot calmer. Might be worth a try?"

Step 3C – Prevent Harm

STEP 3 Prevent Harm

Preventing harm (to self or others) means reflecting on how actions could hurt your **[Person]** or someone else. It's about realizing the risks, so safer choices are made before something bad happens. Here are examples of how to frame your message and help your **[Person]** prevent harm to themselves or others.



(Example content for a friend that is resistant to change.)

(Example conversations with a friend that is resistant to change.)

You might say:

"Dude, I trust your driving, but it gets wild sometimes. One wrong move from someone else, and suddenly we're both in the ER. That's not how I want to end the day."

Or you could say something like:

"We've got good stories from the road, but I'd rather not have the 'I totaled my car because some guy cut me off and I flipped out' kind of story."

Choose a Different Strategy

It's okay if the strategy you chose doesn't quite feel right or doesn't make sense for your [Person]. These conversations can take time. If it doesn't feel natural, or you think your [Person] won't respond well, select a different option below. The goal isn't to be perfect. It's to be thoughtful, respectful, and persistent in showing you care. You know your [Person] best; trust yourself to find the message that fits.

- I like the strategy I chose and want to continue.
- Does your [Person] have misperceptions about their driving, like that they are completely in control or that other drivers are the problem and their driving is fine? Choose this to get some suggestions to help correct those misperceptions. *(Shown if not chosen)*
- Does your [Person] react strongly to other drivers? Perhaps they think everyone else is a terrible driver or that other drivers are targeting them purposefully. Choose this for suggestions to help your [Person] respond differently to other drivers. *(Shown if not chosen)*
- Does your [Person] underestimate how risky or dangerous their driving is? Do they think nothing bad will happen? Choose this for suggestions to help your [Person] prevent harm to themselves and others. *(Shown if not chosen)*

Conclusion

Speaking up about unsafe driving isn't always easy, but your voice matters. Whether or not change happens right away, you are making a difference by starting the conversation. Even small steps can help plant a seed for safer choices down the road.

You might not always get the response you hope for, and that's okay. Your **[Person]** may get defensive, brush off your concerns, or push back. That doesn't mean you shouldn't say anything. Here are a few ways to keep the conversation going, even when it gets tough:

- If they dismiss your concerns, you can say:

"I get that you don't think it's a big deal but imagine if people acted like that walking down the sidewalk. It would feel ridiculous, right?"

- If they get defensive, try saying:

"I'm not saying you're a bad driver. I just care about your safety and everyone else's too."

- If they push back against your advice, remind them:

"I'm not saying this to lecture you. I just care about you and want to make sure you're safe."

These kinds of responses can help you stay calm, respectful, and focused on your values — even when the conversation is uncomfortable.

Thank you for being willing to speak up. Your concern, your care, and your words can make a difference. Here is a summary of the information: [\[link to pdf summary\]](#)

Save this link or download this handout to reference as you talk with your friend. We will check back in two weeks to see how it goes.

Before you go now, we have just a few more questions.

Post-Intervention

How confident are you that you can:

	not at all confident	a little confident	somewhat confident	fairly confident	extremely confident
Communicate effectively with your [Person] about their driving	☐	☐	☐	☐	☐
Influence your [Person] to drive more safely	☐	☐	☐	☐	☐
Express concern to your [Person] about their driving	☐	☐	☐	☐	☐
Connect to values that matter to your [Person]	☐	☐	☐	☐	☐
Compare their driving to behavior in other settings	☐	☐	☐	☐	☐
Correct misperceptions your [Person] has about their driving (If 3A was selected)	☐	☐	☐	☐	☐
Help your [Person] respond differently (If 3B was selected)	☐	☐	☐	☐	☐
Help your [Person] understand how to prevent harm (If 3C was selected)	☐	☐	☐	☐	☐

2-Week Follow-Up

Were you able to talk with your **[Person]** about their driving over the past 2 weeks?

- ☐ No. I didn't try to bring it up.
- ☐ No. I tried to bring it up, but we did not talk about it.
- ☐ Yes, we talked about it. How many different times did you mention their driving or talk about it with them, even if just briefly? _____

How many times have you done each of the following in the past 2 weeks?

	0	1	2	3	4	5	6	7	8+
Expressed concern to your [Person] about their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hinted that their driving is unsafe	☐	☐	☐	☐	☐	☐	☐	☐	☐
Communicated that their driving is unsafe	☐	☐	☐	☐	☐	☐	☐	☐	☐
Used jokes or humor to bring up their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Expressed disapproval of their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Had a heated conversation about their driving (for example, with either person shouting or yelling)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Discussed how their driving aligns with their values	☐	☐	☐	☐	☐	☐	☐	☐	☐
Compared their driving to behavior in other settings	☐	☐	☐	☐	☐	☐	☐	☐	☐
Discussed the safety consequences of their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Discussed the financial consequences of their driving	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tried calming the driver while in the vehicle	☐	☐	☐	☐	☐	☐	☐	☐	☐
Threatened to take away driving privileges (<i>Parent</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Limited driving privileges as a consequence (<i>Parent</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Increased monitoring of driving (<i>Parent</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Identified and corrected misperceptions your [Person] has about their driving (<i>If 3A is selected</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Encouraged your [Person] to respond differently while driving (<i>If 3B is selected</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Talked to your [Person] about how to prevent harm while driving (<i>If 3C is selected</i>)	☐	☐	☐	☐	☐	☐	☐	☐	☐

Did you do anything else to try to engage with your **[Person]** about their driving? If yes, please describe:

Overall, thinking about the conversations you had with your **[Person]** about their driving, how would you describe them during those interactions? *(Shown if they indicated they were able to talk to their person)*

	1	2	3	4	5	
Close-minded	☐	☐	☐	☐	☐	Open-minded
Unconcerned about their driving	☐	☐	☐	☐	☐	Concerned about their driving
Withdrawn from conversation	☐	☐	☐	☐	☐	Engaged in conversation
Unwilling to change their driving	☐	☐	☐	☐	☐	Willing to change their driving
Negative attitude	☐	☐	☐	☐	☐	Positive attitude
Angry or upset	☐	☐	☐	☐	☐	Happy

To what extent do you feel you were able to...

	not at all	a little bit	somewhat	a fair amount	very much so
Communicate effectively with your [Person] about their driving	☐	☐	☐	☐	☐
Influence your [Person] to drive more safely	☐	☐	☐	☐	☐
Express concern to your [Person] about their driving	☐	☐	☐	☐	☐
Connect to values that matter to your [Person]	☐	☐	☐	☐	☐
Compare their driving to behavior in other settings	☐	☐	☐	☐	☐
Correct misperceptions your [Person] has about their driving <i>(If 3A is selected)</i>	☐	☐	☐	☐	☐
Help your [Person] respond differently <i>(If 3B is selected)</i>	☐	☐	☐	☐	☐
Help your [Person] understand how to prevent harm <i>(If 3C is selected)</i>	☐	☐	☐	☐	☐

Thinking about your **[Person]** and their driving behaviors that impact other people, such as **[First endorsed aggressive driving behavior]** or **[Second endorsed aggressive driving behavior]**...

How has the frequency of those driving behaviors changed in the past 2 weeks?

- ☐ They drive this way much less often
- ☐ They drive this way somewhat less often
- ☐ They drive this way about the same
- ☐ They drive this way somewhat more often
- ☐ They drive this way much more often

How has your [Person]'s driving safety changed in the past 2 weeks?

- ☐ A lot better
- ☐ Somewhat better
- ☐ About the same
- ☐ Somewhat worse
- ☐ A lot worse

Currently, how concerned are you about these driving behaviors?

- ☐ A little concerned
- ☐ Somewhat concerned
- ☐ Very concerned

How likely do you think it is that your [Person] will change their driving behavior in the future to be more safe?

- ☐ Not at all likely
- ☐ A little likely
- ☐ Somewhat likely
- ☐ Quite likely
- ☐ Extremely likely

How likely are you to try talking to your [Person] about their driving in the future?

- ☐ Not at all likely
- ☐ A little likely
- ☐ Somewhat likely
- ☐ Quite likely
- ☐ Extremely likely

What else will you do in the future to support your [Person] to drive more safely?

Finally, we have a few questions about the information you received to support you in talking to your [Person] about their driving.

Were you able to apply the information in interactions with your [Person]?

- ☐ Not at all
- ☐ A little bit
- ☐ Somewhat
- ☐ Quite a bit
- ☐ Very much

Overall, how helpful was the information?

- ☐ Not at all helpful
- ☐ A little helpful
- ☐ Somewhat helpful
- ☐ Very helpful
- ☐ Extremely helpful

Did you look at or use the one page summary during the past two weeks?

- ☐ Yes Approximately how often or how many times? _____
- ☐ No

What other information would have been helpful?

What other feedback do you have about the information or materials?

Appendix B: Bystander Behaviors

Bystander Behaviors at Pre-Intervention and Follow-Up by Relationship

	Parent						Friend						Spouse/Partner					
	Pre-Intervention			Follow-Up			Pre-Intervention			Follow-Up			Pre-Intervention			Follow-Up		
	0	1-2	3+	0	1-2	3+	0	1-2	3+	0	1-2	3+	0	1-2	3+	0	1-2	3+
Behavior	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
(Step 1) Expressed concern to your [person] about their driving.	1 (6.7)	7 (46.7)	7 (46.7)	3 (20.0)	6 (40.0)	6 (40.0)	7 (15.9)	18 (40.9)	19 (43.2)	4 (9.1)	25 (56.8)	15 (34.1)	2 (4.7)	11 (25.6)	30 (69.8)	0 (0)	11 (25.6)	32 (74.4)
Hinted that their driving is unsafe	0 (0)	9 (60.0)	6 (40.0)	5 (33.3)	4 (26.7)	6 (40.0)	3 (6.8)	15 (34.1)	26 (59.1)	5 (11.4)	18 (40.9)	21 (47.7)	0 (0)	6 (14.0)	37 (86.0)	2 (4.7)	9 (20.9)	32 (74.4)
Communicated that their driving is unsafe	2 (13.3)	6 (40.0)	7 (46.7)	5 (33.3)	4 (26.7)	6 (40.0)	9 (20.5)	17 (38.6)	18 (40.9)	8 (18.2)	17 (38.6)	19 (43.2)	4 (9.3)	6 (14.0)	33 (76.7)	0 (0)	9 (20.9)	34 (79.1)
(Step 2) Used jokes or humor to bring up their driving	6 (40.0)	4 (26.7)	5 (33.3)	3 (20.0)	5 (33.3)	7 (46.7)	17 (38.6)	10 (22.7)	17 (38.6)	13 (29.5)	15 (34.1)	16 (36.4)	10 (23.3)	5 (11.6)	28 (65.1)	3 (7.0)	5 (11.6)	35 (81.4)
Expressed disapproval of their driving	2 (13.3)	7 (46.7)	6 (40.0)	7 (46.7)	3 (20.0)	5 (33.3)	7 (15.9)	17 (38.6)	20 (45.5)	11 (25.0)	16 (36.4)	17 (38.6)	3 (7.0)	9 (20.9)	31 (72.1)	NA	12 (27.9)	31 (72.1)
(Step 1) Discussed how their driving aligns with their values	11 (73.3)	0 (0)	4 (26.7)	7 (46.7)	3 (20.0)	5 (33.3)	21 (47.7)	7 (15.9)	16 (36.4)	18 (40.9)	13 (29.5)	13 (29.5)	8 (18.6)	6 (14.0)	29 (67.4)	7 (16.3)	8 (18.6)	28 (65.1)
(Step 2) Compared their driving to behavior in other settings	9 (60.0)	3 (20.0)	3 (20.0)	6 (40.0)	4 (26.7)	5 (33.3)	20 (45.5)	11 (25.0)	13 (29.5)	16 (36.4)	15 (34.1)	13 (29.5)	6 (14.0)	8 (18.6)	29 (67.4)	6 (14.0)	6 (14.0)	31 (72.1)
Discussed the safety consequences of their driving	5 (33.3)	5 (33.3)	5 (33.3)	4 (26.7)	6 (40.0)	5 (33.3)	12 (27.3)	15 (34.1)	17 (38.6)	7 (15.9)	21 (47.7)	16 (36.4)	4 (9.3)	9 (20.9)	30 (69.8)	1 (2.3)	10 (23.3)	31 (72.1)
Discussed the financial consequences of their driving	6 (40.0)	3 (20.0)	6 (40.0)	5 (33.3)	5 (33.3)	5 (33.3)	18 (40.9)	13 (29.5)	13 (29.5)	14 (31.8)	15 (34.1)	15 (34.1)	5 (11.6)	9 (20.9)	29 (67.4)	3 (7.0)	9 (20.9)	30 (69.8)
Tried calming the driver while in the vehicle	8 (53.3)	3 (20.0)	4 (26.7)	7 (46.7)	2 (13.3)	6 (40.0)	13 (29.5)	15 (34.1)	16 (36.4)	16 (36.4)	13 (29.5)	15 (34.1)	3 (7.0)	12 (27.9)	28 (65.1)	3 (7.0)	13 (30.2)	27 (62.8)
Threatened to take away driving privileges	9 (60.0)	2 (13.3)	4 (26.7)	11 (73.3)	4 (26.7)	0 (0)												
Limited driving privileges as a consequence	10 (66.7)	3 (20.0)	2 (13.3)	13 (86.7)	2 (13.3)	0 (0)												
Increased monitoring of driving	8 (53.3)	2 (13.3)	5 (33.3)	6 (40.0)	3 (20.0)	6 (40.0)												
(Step 3A) Identified and corrected misperceptions your [person] has about their driving				6 (60.0)	1 (10.0)	3 (30.0)				2 (11.8)	9 (52.9)	6 (35.3)				1 (3.8)	4 (15.4)	21 (80.8)
(Step 3B) Encouraged your [person] to respond differently while driving				0 (0)	0 (0)	2 (100)				1 (7.7)	4 (30.8)	8 (61.5)				0 (0)	3 (30.0)	7 (70.0)
(Step 3C) Talked to your [person] about how to prevent harm while driving				0 (0)	2 (66.7)	1 (33.3)				6 (42.9)	6 (42.9)	2 (14.3)				1 (14.3)	0 (0)	6 (85.7)

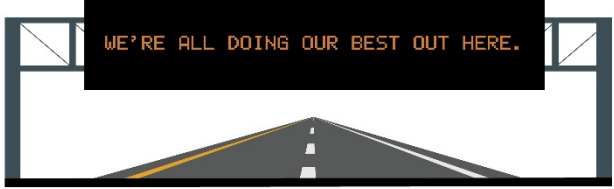
Appendix C: Messages

Messages are coded by theme and stage. Themes are adaptive response (AR), cognitive reappraisal (CR), prosocial driving (PD). Stages are precontemplation (p) and contemplation (c).

Code	Message Set	Code	Message Set
ARp1	My stress level while driving used to depend entirely on what other drivers were doing. It's weird - I'd never let strangers at the mall or waiting in line at a concert ruin my whole day, but somehow I'd given random drivers complete power over my mood. Now I'm experimenting with focusing on what I can control - my music, my breathing, my route. Can't control traffic, but I can control my response to traffic. Still figuring it out, but it's interesting how I'm treating driving more like any other time I have to wait for other people. 	ARc1	You can't control traffic, but you can control your response to it. Think about it - you'd never lose your mind waiting in a long line at a concert or festival. Traffic is just a line of people. Leave earlier, choose alternate routes, play calming music, practice deep breathing. Having a plan for stressful situations leads to safer, less stressful drives. 

ARp2	Started keeping a stress ball in my car for when I feel road rage building up. Sounds silly, but having something to grip instead of honking the horn has actually helped. Sometimes the simplest solutions work best. Who knew? TRY SQUEEZING A STRESS BALL INSTEAD OF TAKING IT OUT ON THE HORN.	ARc2	The next time you feel anger rising while driving, try this: take three deep breaths and ask yourself, "How do I want to handle this?" That pause before reacting is where your power lies. You have the skills to choose patience over aggression, safety over speed, calm over chaos - it just takes practice. PAUSE BEFORE REACTING.
ARp3	Had a revelation during a traffic jam - I was getting worked up about something completely out of my control. So I tried focusing on my breathing instead of the brake lights ahead. Three deep breaths, and suddenly driving felt like a shared experience instead of me versus everyone else. Simple but effective. We're all together on the road. THREE BREATHS BEAT ROAD RAGE.	ARc3	When you feel the urge to speed, weave, or tailgate, pause and ask: "Is this worth the risk?" Most aggressive driving saves only seconds but increases crash risk significantly. A few extra seconds is worth your safety and the safety of everyone around you. A FEW SECONDS CAN SAVE A LIFE.

CRp1	Someone cut me off today and I instantly thought, 'what a jerk.' Then I caught myself, what if they just got bad news and were rushing to help someone. Thinking that way instantly calmed me down. But five minutes later, another driver merged slowly and I was honking again. I usually try to give people the benefit of the doubt. Remembering that applies in the car too helps me stay calm and the whole drive feels easier. WHAT IF THEY'RE JUST HUMAN? 	CRc1	That "aggressive" driver might be rushing to the hospital. That "slow" driver might be 16 and just learning. That person who cut you off might have just received devastating news. You don't know their story. Assume the best rather than getting furious when someone cuts you off. It'll make your drive more peaceful and keep you focused on what really matters - getting home safely. YOU DON'T KNOW THEIR STORY. 
CRp2	You know that driver who's going "too slow" in front of you? Yesterday I realized that person might be elderly, or learning to drive, or just being extra careful because they have precious cargo. Same situation, totally different feeling when I think about it that way. SAME ROAD. DIFFERENT STORIES. 	CRc2	What if traffic jams weren't obstacles but opportunities? Time to listen to music, practice patience, or just breathe. When you stop fighting what you can't control and start finding value in the pause, even the worst traffic becomes more bearable. Your stress levels will thank you. TRAFFIC JAMS = PATIENCE PRACTICE. 

CRp3	 I realized I was attributing bad driving to bad character - "they're rude," "they're selfish." But what if most driving mistakes are just that - mistakes? What if we're all doing our best with whatever's on our minds that day? Changes everything about how I see other drivers, and myself. 	CRc3	 Before you assume that driver is inconsiderate, consider: maybe they didn't see you, maybe they're distracted by something serious, maybe they made an honest mistake. We all have bad driving moments. Giving others the benefit of the doubt keeps us all calmer and safer behind the wheel. 
PDp1	 Yesterday, I was running late and weaving through traffic when someone actually slowed down to let me merge. Just a simple wave, but it instantly made me feel calmer. Then it hit me: when's the last time I did that for someone else? I like to think of myself as a decent person, but on the road I'm not sure I always am. The truth is, pushing through traffic doesn't just stress me out, it makes me the very driver I complain about. I can do better. 	PDc1	 The driver who cut you off isn't your enemy - they're your neighbor, your coworker, someone's parent or child. We'd never shove past someone in line at the store or curse at them in the hallway, but put us behind a wheel and suddenly we're different people. When we remember we're all part of the same community, driving becomes less about competition and more about cooperation. You're kind and patient in other parts of your life - bring that same person to your commute. How do you want to show up for your community? 

PDp2	 I was stuck in traffic yesterday, getting more and more frustrated, when I noticed the driver next to me wasn't honking or trying to speed around. Just patient. And somehow that calmness was contagious. Made me realize maybe there's a different way to handle these stressful drives. YOUR CALM CAN BE SOMEONE ELSE'S PEACE. 	PDc2	 Think about the drivers you appreciate most - the ones who signal, who let you in, who don't tailgate. They make your drive better just by being considerate. You have that same power to improve someone else's day. Every trip is an opportunity to be that appreciated driver. EVERY DRIVE IS A CHANCE TO BE KIND. 
PDp3	 Been noticing something lately - when I let someone merge or use my turn signal consistently, other drivers seem more chill around me too. It's like kindness spreads. Makes me wonder if the way I drive affects more than just me getting from A to B. Small acts of courtesy actually make the drive better for everyone. Made me realize we're all part of this driving community, and I want to be the kind of driver I'd want to share the road with. KINDNESS IS CONTAGIOUS. START A CHAIN REACTION. 	PDc3	 Every time you let someone merge or choose patience over aggression, you're showing the kind of driving community you want to be part of. Your actions influence others more than you realize. Be the kind of driver you want to share the road with. YOUR COURTESY CREATES COMMUNITY. 

Appendix D: Message Testing Surveys

Screening Questions

Demos.

1. How old are you?
 - a. Under 18 years *(exclude)*
 - b. 18-21 years
 - c. 21-25 years
 - d. 26-35 years
 - e. 36-45 years
 - f. 46-54 years
 - g. 55-64 years
 - h. 65 years or older
2. Do you currently have a valid driver's license?
 - a. Yes
 - b. No *(exclude)*
3. How do you describe your gender?
 - a. Man
 - b. Woman
 - c. Transgender man
 - d. Transgender woman
 - e. Non-binary
 - f. Prefer to self-describe: _____
3. Choose one or more races that you consider yourself to be
 - a. White or Caucasian
 - b. Black or African American
 - c. American Indian/Native American or Alaska Native
 - d. Asian
 - e. Native Hawaiian or Other Pacific Islander
 - f. Other
 - g. Prefer not to say
4. Are you of Spanish, Hispanic, or Latino origin?
 - a. Yes
 - b. No
5. In what state do you currently reside?
 - a. List of 50 states, D.C., and Puerto Rico

Driving Behaviors.

6. On average over the past month, how often have you driven a motor vehicle?
 - a. Never *(exclude)*
 - b. Less than once a week *(exclude)*
 - c. About once a week
 - d. A few days a week
 - e. Most days each week
 - f. Every day or nearly every day

7. Over the past month, how often have you done each of the following while driving?

	Never	Just once or twice	A few times	Regularly	Often
Tailgated another driver					
Yelled or made an angry gesture at another driver					
Overtook traffic by weaving in and out of lanes					
Cut off and/or braked hard in front of another driver					
Ignored the right-of-way to "beat" another driver					
Honked or flashed headlights when another driver did something inappropriate					
Driven 15 miles per hour faster than the normal flow of traffic					
Slowed in front of another driver on purpose					
Blocked another driver that was attempting to pass or change lanes					
Forced another driver onto the shoulder or off the road					
Sped up when the traffic light was changing from yellow to red					
Hit another vehicle on purpose					
Driven too fast for weather conditions					
Driven within 2 hours of consuming alcohol					
Driven within 2 hours of using cannabis/ marijuana					
Used your phone while driving					
Worn your seat belt					
Used mirrors and checked blind spots when changing lanes					
Obeyed posted speed limits in a school zone					
Driven with extra care around pedestrians					
Came to a complete stop at a stop sign					
Used turn signals ("blinkers") to notify other drivers of my intention to turn					

{Items are randomized. Must endorse two or more of the bold items to satisfy inclusion criteria.}

Survey 1

Please indicate the extent to which you disagree or agree with each of the following statements.

{Strongly Disagree, Disagree, Neither Disagree nor Agree, Agree, Strongly Agree}

Randomize 1-8.

1. I am a good driver
2. I am a safe driver.
3. I am a polite driver.
4. I treat other people on the road with respect.
5. Even when other drivers drive poorly, I don't let it bother me.
6. I do not think my driving habits are a problem.
7. Sometimes I think my driving could put myself or others at risk.
8. I am considering making changes to how I drive.

Randomize 9-13.

9. Most drivers are good drivers.
10. Most drivers are safe drivers.
11. Most drivers are polite drivers.
12. Most drivers treat other people on the road with respect.
13. When drivers do things that seem rude, it is usually just a mistake.

Next we have some messages about driving that we'd like you to view. For each, please read the first message and imagine hearing it on the radio. Imagine seeing the second message on a roadway sign.

Messages appear. After each...

14. Have you seen this message before? Y/N

15. I found that message to be...

Positive

Likeable

Understandable

Irritating

Appealing

Weak

Useful

Boring

Convincing

Motivating

Informative

Relevant to me and
my driving

Negative

Unlikeable

Confusing

Pleasant

Unappealing

Strong

Not Useful

Interesting

Unconvincing

Not motivating

Not informative

Not relevant to me
and my driving

Now we're going to show you the same messages again and ask two final questions about each.

**each message appears, followed by a matrix.*

{Strongly Disagree, Disagree, Neither Disagree nor Agree, Agree, Strongly Agree}

16. This message makes me think about my driving.
17. This message motivates me to drive more safely.

Survey 2

About a week ago, we showed you some messages about driving.

1. Have you thought about any of those messages over the past week?
 - a. No, not at all
 - b. Once or twice
 - c. A few times
 - d. Quite a bit

{if 1 = b, c, or d....}

1A. What message did you think about most often? Please provide the message or describe it as best as you can remember. {open-ended}

The messages I saw...

{Strongly Disagree, Disagree, Neither Disagree nor Agree, Agree, Strongly Agree}

2. made me think about my driving.
3. motivated me to drive more safely.
4. made me think about the safety or wellbeing of other people on the road.
5. made me think about what I can control when driving.
6. made me think about reacting differently to other people on the road.

Show messages and distractors. For each:

7. Have you seen this message before? Yes/No

{Strongly Disagree, Disagree, Neither Disagree nor Agree, Agree, Strongly Agree}

Randomize 8-15.

8. I am a good driver
9. I am a safe driver.
10. I am a polite driver.
11. I treat other people on the road with respect.
12. Even when other drivers drive poorly, I don't let it bother me.
13. I do not think my driving habits are a problem.
14. Sometimes I think my driving could put myself or others at risk.
15. I am considering making changes to how I drive.

Randomize 16-20.

16. Most drivers are good drivers.
17. Most drivers are safe drivers.
18. Most drivers are polite drivers.
19. Most drivers treat other people on the road with respect.
20. When drivers do things that seem rude, it is usually just a mistake.

Appendix E: Reaction by Message

		Semantic Differential Ratings			Think About Driving		Motivate to Drive More Safely	
Code	<i>n</i>	Composite Cronbach's alpha	Composite <i>M</i> (<i>SD</i>)	% Items Positive Reaction	<i>M</i> (<i>SD</i>)	% Agree or Strongly Agree	<i>M</i> (<i>SD</i>)	% Agree or Strongly Agree
ARp1	302	0.94	3.8 (0.9)	62.8	3.7 (1.1)	64.6	3.8 (1.0)	64.2
ARp2	293	0.94	3.5 (1.0)	50.1	3.0 (1.2)	39.6	3.2 (1.2)	43.0
ARp3	250	0.94	3.8 (0.9)	62.6	3.4 (1.1)	55.6	3.5 (1.0)	56.4
ARc1	291	0.95	3.7 (1.0)	60.0	3.6 (1.0)	61.9	3.6 (1.0)	58.1
ARc2	279	0.94	3.8 (0.9)	63.2	3.6 (1.0)	60.6	3.7 (1.0)	67.7
ARc3	245	0.93	4.1 (0.8)	71.6	3.7 (1.1)	65.3	3.9 (1.0)	73.1
CRp1	297	0.95	3.5 (0.9)	51.2	3.2 (1.2)	49.5	3.4 (1.2)	52.5
CRp2	308	0.95	3.8 (0.9)	61.0	3.5 (1.1)	58.1	3.6 (1.1)	59.4
CRp3	246	0.94	3.6 (1.0)	54.3	3.3 (1.1)	48.4	3.5 (1.1)	52.8
CRc1	305	0.95	3.7 (1.0)	59.2	3.4 (1.1)	56.7	3.5 (1.1)	58.0
CRc2	289	0.95	3.7 (1.0)	58.4	3.4 (1.1)	53.6	3.5 (1.1)	52.6
CRc3	237	0.95	3.7 (1.0)	58.3	3.5 (1.1)	54.9	3.6 (1.1)	56.5
PDp1	283	0.93	4.0 (0.8)	69.6	3.6 (1.1)	66.4	3.8 (1.0)	68.9
PDp2	292	0.93	4.0 (0.8)	68.7	3.7 (1.1)	65.1	3.8 (1.0)	67.5
PDp3	257	0.94	4.0 (0.8)	68.8	3.6 (1.0)	64.2	3.8 (1.0)	68.5
PDc1	268	0.94	3.9 (0.9)	65.2	3.7 (1.1)	64.6	3.8 (1.0)	67.9
PDc2	286	0.94	4.0 (0.8)	68.9	3.8 (0.9)	67.1	3.8 (0.9)	67.5
PDc3	264	0.94	3.9 (0.9)	64.3	3.4 (1.1)	49.6	3.6 (1.1)	58.3

Appendix F: Recall by Message

Code	Accurate Recall % (Survey 2)	False Recall % (Survey 1)	Adjusted Recall %
ARp1	60.8	5.3	55.5
ARp2	52.3	5.0	47.3
ARp3	46.7	3.5	43.2
ARc1	61.3	7.6	53.7
ARc2	46.9	9.3	37.6
ARc3	62.8	28.5	34.3
CRp1	51.5	6.7	44.8
CRp2	54.4	7.2	47.2
CRp3	54.2	8.3	45.9
CRc1	52.4	6.6	45.8
CRc2	53.3	4.5	48.8
CRc3	51.6	3.8	47.8
PDp1	51.8	5.6	46.2
PDp2	55.0	8.1	46.9
PDp3	57.2	11.2	46.0
PDc1	47.9	7.7	40.2
PDc2	50.7	4.4	46.3
PDc3	50.0	7.0	43.0