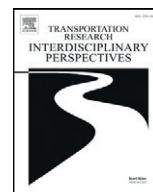




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Does news coverage of traffic crashes affect perceived blame and preferred solutions? Evidence from an experiment



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ABSTRACT

Traffic crashes are one of the leading causes of preventable death in the United States. Nearly 20% of these roadway fatalities are people who were hit and killed while walking or bicycling. Pedestrian deaths increased by 46% between 2009 and 2016. Despite these troubling statistics, there has not been a sustained and widespread public call to action to improve road safety. Researchers and advocates are increasingly focused on how traffic crashes are reported in the media, and whether existing editorial patterns contribute to victim-blaming and distract from systems-level solutions. However, no previous study has examined whether editorial patterns in traffic crash coverage actually influence perceptions. This study conducted an experiment in which 999 subjects were randomly assigned to read one of three versions of a news article describing a traffic crash involving a pedestrian. After reading the description, subjects were asked to apportion blame, identify an appropriate punishment for the driver, and assess various approaches for improving road safety. In comparing the three groups, even relatively subtle differences in editorial patterns significantly affected readers' interpretation of both what happened and what to do about it on nearly every measure. Shifting from pedestrian-focused to driver-focused language reduced victim-blaming and increased perceived blame for the driver. A thematic frame significantly increased support for infrastructure improvements. This study provides strong evidence that efforts to change public perceptions of road safety should include a focus on improving editorial patterns in traffic crash reporting.

1. Introduction

Traffic crashes are one of the leading causes of preventable death in the United States. Nearly a fifth (18%) of these roadway fatalities is people who were hit and killed while walking or bicycling (National Highway Traffic Safety Administration, 2016). Worse still, pedestrian deaths increased by 46% between 2009 and 2016 (Hu and Cicchino, 2018). Despite these troubling figures, there has not been a sustained and widespread public call to action to improve road safety.

One plausible reason for the lack of widespread public concern may be how these traffic crashes are reported in the media. The field of media studies has consistently demonstrated that news coverage meaningfully shapes public perceptions (McCombs and Shaw, 1972; Iyengar, 1994). Seemingly trivial editorial differences have been shown to influence how readers make sense of a story (Iyengar, 1994, 1996). Critically, these changes also influence how readers would like policymakers to respond, in turn influencing which policies are implemented (Boykoff and Boykoff, 2007; Hinchcliff et al., 2010; Jacoby, 2000).

Researchers and advocates are increasingly focused on whether these editorial patterns may help explain the lack of concern about traffic deaths. Thus far, scholars have cataloged the editorial patterns in pedestrian-involved crash coverage over a one-year period in a Canadian city (Magusin, 2017), in 200 local news articles of pedestrian and bicyclist crashes from throughout the United States (Ralph et al., 2019), and media coverage of bicyclist fatalities over a ten-year period in Florida (Scheffels et al., 2019). These three studies collectively demonstrate widespread imbalanced editorial and linguistic patterns, which media and psychology studies identify as contributing to victim-blaming and distracting from systematic issues and solutions.

However, no previous study has examined whether editorial patterns in traffic crash coverage *actually influence perceptions*. This paper fills that gap. Specifically, it asks three research questions:

- 1) Do editorial patterns affect how readers apportion blame for a crash?
- 2) Do editorial patterns affect what punishment readers think is appropriate, and/or how severe that punishment should be?
- 3) Do editorial patterns influence readers' support for various solutions for improving road safety?

To answer these questions, an experiment was conducted. Subjects were randomly assigned to read one of three versions of a news article describing

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Table 1
Editorial patterns in crash coverage.

Status quo	Better practice	Effect of status quo
Accident: “Pedestrian killed in accident on Main Street.”	Crash: “Pedestrian killed in crash on Main Street.”	Obscures preventable nature of crashes
Non-agentive: “A pedestrian was hit and killed.” (no agent)	Agentive: “A pedestrian was hit and killed by a car.”	Obscures role of a human actor
Focus on pedestrian: “A pedestrian was hit and killed by a car.”	Focus on vehicle: “A car hit and killed a pedestrian.”	Increases blame for the focus of the sentence
Object-based language: “A car jumped the curb.”	Person-based language: “A driver drove over the curb.”	Obscures role of a human actor
Counterfactual statements: “The pedestrian darted into the street.”	Not included	Increases perceived blame for the victim
Episodic framing: Treats the crash as an isolated incident.	Thematic framing: “This is the tenth fatal collision this year.”	Prevents readers from connecting the dots between incidents and thus shifts attention to individual-level rather than systematic solutions

a traffic crash involving a pedestrian. After reading the description, subjects were asked to apportion blame, identify an appropriate punishment for the driver, and assess various approaches for improving road safety. In comparing the outcomes across the three groups, we find that editorial patterns significantly affected readers' interpretation of both what happened and what to do about it on nearly every measure.

2. Background

Media studies is a field of scholarly inquiry that focuses on how media coverage influences our collective understanding of issues (Marris and Thornham, 2000). This body of work consistently finds that the media exerts influence over public perception (Cobb and Primo, 2004; Frost et al., 1997; Harcup, 2001; Jeanis and Powers, 2017). For instance, “agenda-setting” refers to the media's ability to influence which issues are discussed and which are not (McCombs and Shaw, 1972). Novel or shocking events and those that involve ideal victims—children, the elderly, or people otherwise likely to be unquestioningly accepted as victims—tend to receive much more coverage than events that seem regular and mundane (Christie, 1986; Jeanis and Powers, 2017). This disproportionate coverage on “newsworthy” events heightens public interest in those events and dampens interest in others, thereby subtly shifting public opinion and altering the demands on policymakers (Harcup, 2001). For instance, airline crashes receive much more media attention than road crashes, even though the latter cause vastly more injuries and deaths (Cobb and Primo, 2004).

2.1. Editorial patterns of interest

Table 1 summarizes six editorial patterns of interest, each of which have been shown to influence perceptions and are widely used in crash coverage.

2.1.1. “Accident”

The specific terms used to refer to a crash can influence how readers interpret what happened. For instance, the British Medical Journal banned use of the term “accident” in 2003 because it conveys an undue sense of faultlessness and inevitability (Davis and Pless, 2001). In 2016, the Associated Press Style Guide changed to encourage journalists to use “crash, collision, or other terms” instead of “accident” (Transportation Alternatives, 2016). Eliminating this term would be more in line with the nature of traffic crashes, which are “predictable and preventable” (Davis and Pless, 2001). Nevertheless, the use of “accident” remains widespread, with one study finding the term in 47% of news articles about VRU crashes (Ralph et al., 2019).

2.1.2. Agentive and non-agentive language

The presence or absence of an agent informs how readers perceive blame. “Allison spilled the milk” uses agentive language, while “The milk spilled” describes the same event in a non-agentive way.¹ When it comes to crash coverage, non-agentive sentences are common. In a recent study, one third of the sentences describing VRU crashes were non-agentive (Ralph et al., 2019). This is troubling because sentences that omit an

¹ This linguistic device is distinct from passive voice: “The milk spilled” uses active voice, but the agent that did the spilling has been omitted.

agent obfuscate the perpetrator's role in the action, decreasing apparent blameworthiness (Coates and Wade, 2004). The use of non-agentive language is so powerful that it can even affect how people recall an event that they actually observed takes place (Fausey et al., 2010).

2.1.3. Focus

The concept of focus describes the way that a sentence communicates who (or what) is the center of attention. “Sarah opened the door” focuses on Sarah; it is about what Sarah is doing. “The door was opened by Sarah” focuses on the door; it is a sentence about something that happened to the door.² In crash coverage, journalists overwhelmingly tend to focus on the victim. Ralph et al. found that victims were the focus of sentences 73% of the time (Ralph et al., 2019). By contrast, vehicles and drivers were the focus just 13% and 11% of the time. Focus is important because readers are more likely to attribute blame to the focus of a sentence (Niemi and Young, 2016).

2.1.4. Object-based and person-based language

When authors ascribe agency to inanimate objects, they are using object-based language. In crash coverage, object-based language feels fairly natural (e.g. “A car hit a person”), yet in other settings it sounds strange indeed (“A hammer hit a person”). By keeping the actor hidden, object-based language obscures blame. When rewritten with person-based language, these sentences clearly identify the responsible party (“A man hit a person with a car/hammer”).

Object-based language is widespread in traffic crash coverage. Ralph et al. found that articles referred to a vehicle 81% of the time (when an agent was identified at all) and referred to a driver just 19% of the time (Ralph et al., 2019). Moreover, writers use object-based language unevenly. They tend to describe people in cars using object-based language (e.g. “car” or “traffic”), but use human-based language when describing VRUs (e.g. “bicyclist” or “pedestrian”) (Ralph et al., 2019). A study of driver's perception of other roadway users found this same imbalance in the language people used to describe roadway interactions (Walker, 2005). This practice portrays agency in an uneven way and may implicitly assign greater responsibility to the VRU.

2.1.5. Counterfactual statements

Other kinds of statements imply that a victim could have avoided death or injury if they had behaved differently. These “counterfactuals” refer to an implied or perceived possible alternative sequence of events where a change in circumstances prior to an event would make the outcome of that event different (Goldinger et al., 2003). In crash coverage, journalists sometimes include details about the actions or characteristics of the pedestrian—that they were crossing outside of a marked crosswalk, wearing dark clothing, or darting into the roadway. These types of counterfactual statements occur in roughly one-third of articles about crashes (Ralph et al., 2019). The widespread inclusion of counterfactuals is troubling because they are known to shape how readers perceive blame. For instance,

² Note that focus also differs from active/passive-voice. “Jocelyn's wallet was stolen” is an example of passive voice. “Natalie stole Jocelyn's wallet” and “Jocelyn had her wallet stolen by Natalie” both use active voice, but focus on different actors: in the first, the victim, and in the second, the perpetrator.

including counterfactuals in a description of a rape increases reader's tendency to blame the victim (Branscombe et al., 1996). Another study showed that participants serving as hypothetical jurors awarded less money to victims whose incidents were described with a counterfactual (Goldinger et al., 2003). Importantly, evidence suggests that this kind of statements induce counterfactual thinking automatically (Goldinger et al., 2003), without needing the alternative sequence of events and outcome spelled out explicitly.

Notably, the accuracy of the counterfactual statements is not at issue (although comments about the actions of the victim may be subject to survivor's bias (Smith, 2014). Rather it is that details about the VRU tend to get included, while others—like the speed of the driver—are omitted. By asymmetrically drawing our attention, crash coverage subtly shifts blame towards VRUs.

2.1.6. Thematic v. episodic framing

Iyengar, a political science and communications expert, distinguishes between two types of framing in news articles: episodic and thematic (Iyengar, 1994; Scheufele, 1999). Episodic framing portrays events as isolated incidents, whereas thematic framing connects the dots for readers, providing context and identifying other events that are part of a pattern. Generally speaking, readers who encounter episodic framing tend to attribute blame to individuals and tend to support individual-level solutions (Iyengar, 1994). By contrast, readers who encounter thematic framing are more likely to call for broader, systematic changes. Thematic framing remains rare in coverage of car crashes, occurring in just 6% of news stories in one study (Ralph et al., 2019) and in 29.6% of stories in another (Scheffels et al., 2019).

2.2. Hypotheses

In sum, there are a number of editorial patterns that have been shown across multiple fields to influence reader perceptions. Moreover, these patterns are widespread in crash coverage. While editorial patterns may shape public perceptions about crash coverage, it has yet to be confirmed. This project aims to fill that gap.

This project tests the hypothesis that relatively minor changes in the description of a crash will measurably affect how readers perceive blame, select appropriate punishments, and identify preferred solutions. Specifically, this experiment hypothesizes that:

- 1) rewriting the text to focus on the driver will reduce the pedestrian's perceived blame and increase the driver's;
- 2) shifting to driver-focused text will increase support for punishing the driver; and
- 3) thematic framing will lead readers to increase their support for pedestrian infrastructure and decrease their support for educational campaigns that focus on the actions of the pedestrian.

3. Methods

To test these hypotheses, a survey instrument was developed with three experimental conditions. Experiments are widely used to study the effects of linguistic patterns, including counterfactuals (Branscombe et al., 1996; Goldinger et al., 2003), agentive versus non-agentive language (Fausey et al., 2010; Fausey and Boroditsky, 2010), and focus (Niemi and Young, 2016).

3.1. Sampling

Participants were recruited through Prolific.ac, an online data collection tool with a pool of over 35,000 adult US citizens (Palan and Schitter, 2018). Using this research-ready online participant recruitment tool allows for rapid data collection of a large sample with a more diverse population than a convenience sample. Prolific.ac stratifies its participants on age, race, and gender. The sample used in this study is representative of the

United States at large on these three dimensions. Respondents were paid \$1.25 for their participation, which was set by estimating a 10-minute participation at Prolific.ac's rate of \$7.50/h. 999 participants were recruited to attain a statistical power threshold of 0.8 for the three-group, between-subjects experimental design employed here.

3.2. Experimental treatments

The survey began with a brief description of a traffic crash. Participants were randomly assigned to see one of three versions of the text (Table 2). Version #1 (the pedestrian-focused text) is typical of local new coverage of crashes. It refers to the incident as an "accident", uses non-agentive language, focuses on the victim, uses object-based language, and includes a counterfactual about the victim. Version #2 (the driver-focused text) describes the same crash but has been rewritten slightly. It refers to the incident as a "crash", uses agentive language, focuses on the driver, uses person-based language, and does not include a counterfactual. Version #3 (the thematically-themed text) includes all of the previously mentioned changes as well as contextualizing information and thematic framing.

3.3. Variables

After reading one of the randomly assigned news articles, participants answered several questions grouped into three topics: apportioning blame, selecting appropriate punishments, and identifying preferred solutions for improving safety.

Table 2
Article text.

Version #1 Pedestrian-focused	Version #2 Driver-focused	Version #3 Thematically-framed
Pedestrian struck and killed on east side	Driver hits, kills pedestrian on east side	Driver hits, kills pedestrian on east side as pedestrian deaths continue to increase city-wide
Police are investigating a fatal accident on the east side Saturday evening. Shortly before 7 p.m., police were called to the 2500 block of North Main Street on a report of a pedestrian struck by a car . Police say a 46-year-old man wearing dark clothing was attempting to cross Main Street when he was struck . The injured pedestrian was unresponsive at the scene and reportedly died on the way to the hospital. Police say the driver was not impaired and remained at the scene.	Police are investigating a fatal crash on the east side Saturday evening. Shortly before 7 p.m., police were called to the 2500 block of North Main Street on a report of a driver striking a pedestrian . Police say a 46-year-old man was attempting to cross Main Street when the driver struck him with his car . The injured pedestrian was unresponsive at the scene and reportedly died on the way to the hospital. Police say the driver was not impaired and remained at the scene.	Police are investigating a fatal crash on the east side Saturday evening. Shortly before 7 p.m., police were called to the 2500 block of North Main Street on a report of driver striking a pedestrian . Police say a 46-year-old man was attempting to cross Main Street between a bus stop and the Walgreens when the driver struck him with his car . The injured pedestrian was unresponsive at the scene and reportedly died on the way to the hospital. Police say the driver was not impaired and remained at the scene.
		<u>This is the eighth death of a pedestrian in the city this year, an increase of 20% from last year at this time. Three pedestrians have died on this stretch of Main Street, which, despite being a busy shopping area, has high traffic speeds and a lack of streetlights.</u>

Note: Words or phrases that differ between article types are denoted in bold for demonstrations purposes. Thematic elements in article #3 are denoted with underline. In the actual experiment, all three articles had plain text.

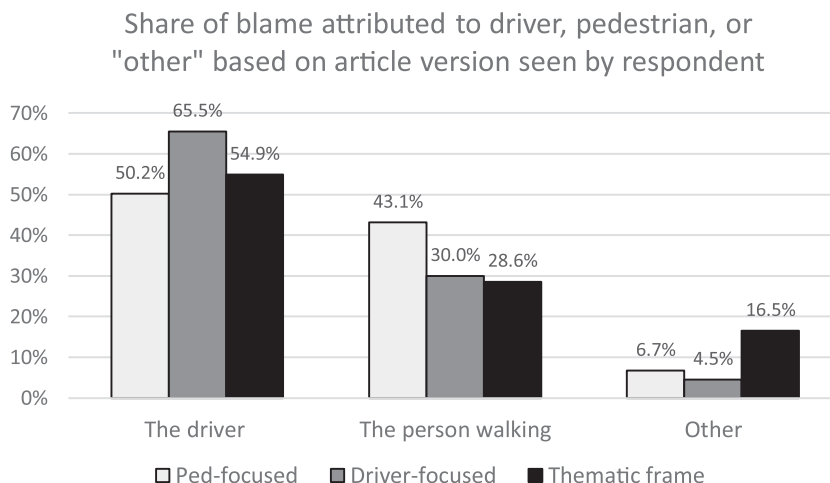


Fig. 1. Shifting focus and frame significantly affects how people apportion blame in a hypothetical traffic crash.

3.3.1. Apportioning blame

Participants were asked to assign responsibility for the crash to “the driver of the car”, “the person walking”, or “other”. Responses were required to sum to 100%. Respondents who indicated “other” were asked to provide details via a text box.

3.3.2. Selecting appropriate punishments

Next, respondents were instructed to imagine that the driver described in the article was on trial and to indicate the type of punishment that would be appropriate: community service, a fine, jail time, vehicle impounded, or no punishment. Respondents could select more than one punishment (unless they selected “no punishment”).

In addition, respondents were asked to indicate the *severity* of punishment a judge should administer (e.g. “If the judge sentenced the driver to PAY A FINE, in your opinion how much should the fine be in dollars?”). This question was repeated for hours of community service, dollar value of a fine, and jail time in years.

3.3.3. Assessing preferred solutions

The survey included two metrics for assessing preferred solutions. First, respondents were asked to indicate their level of support for three options for improving safety on the hypothetical Main Street:

- 1) a Walk Safe! Campaign to train pedestrians to cross the street more carefully;
- 2) increase enforcement of traffic laws, especially speeding, distracted driving, and reckless driving; and
- 3) improve safety by widening the sidewalks, adding a new crosswalk, and lowering the speed limit.

Respondents indicated their support using a five-point scale ranging from “strongly oppose” to “strongly support”. Second, respondents were asked to assess two proposed alternatives for a newly constructed roadway. The options were modeled after similar work by Mouter et al. and were designed to force participants to trade off two competing outcomes: higher vehicle speeds and fewer traffic deaths (Mouter et al., 2018).

3.3.4. Other personal information

In addition to the outcome variables of interest, participants also indicated how often they drive, ride in a car as a passenger, walk, or bicycle in a typical week. Demographics reported by the recruitment company included age group, gender, and the simplified race categories used in the US Census.

3.4. Statistical testing

Since experimental conditions were randomly assigned, the three groups should be relatively similar in terms of personal characteristics. To

test this, one-way ANOVA and chi-squared tests were run for age, sex, race, and travel mode (Table 2). While the three groups were broadly similar, they did differ with respect to age and extent of driving. The statistical models below account for these important differences between the experimental groups.

To test the hypotheses, a series of linear regression models were estimated for each outcome variable. In all cases, the independent variable of interest was the experimental group (i.e. did the respondent read Version #1, #2, or #3). To test for differences in the coefficients for the experimental group variables, a linear hypothesis tests was performed using the finite-sample F statistic (with approximate F distribution).

4. Results

4.1. Q1: apportioning blame

Editorial patterns significantly influenced how readers apportioned blame for the hypothetical crash (Fig. 1, Table 3). Shifting from the pedestrian-focused text (Version #1) to the driver-focused text (Version #2) caused readers to assign 30% more blame to the driver and 30% less blame to the pedestrian.

Shifting to the thematically framed text also influenced how readers apportioned blame. Relative to readers of Versions #1 and #2, readers who encountered the thematic frame were less likely to blame the pedestrian and much more likely to blame “other” factors (about 150% more than Version #2 and over 250% more than Version #1).

4.2. Q2: selecting appropriate punishments

Editorial patterns also shaped readers' perceptions about punishments (Table 4). Whereas nearly one third of those who read the pedestrian-focused text thought the drivers should not be punished, just 19% of those who read the driver-focused text agreed. Specifically, readers of the driver-focused text were more likely to support jail time, a vehicle impound, and a fine. Moreover, these readers supported more severe punishments for drivers (30% more hours of service, 30% higher fines, and double the amount of jail time).

Shifting to a thematically-framed text also meaningfully altered opinions about punishment. Relative to those who read the pedestrian-focused text, readers who encountered the thematically framed text were more likely to approve punishment for drivers (jail time and vehicle impound) and approved stricter punishments (24% more service, 22% higher fines, and double the amount of jail time).

Finally, there was no difference in punishment between the driver-focused and thematically-framed texts.

Table 3
Personal characteristics and travel behaviors of the experimental groups.

	#1 – pedestrian focused (N = 334)	#2 – driver focused (N = 332)	#3 – thematically framed (N = 333)	Total (N = 999)	p value
Age (mean)					*
Mean (SD)	45.4 (16.0)	44.1 (15.5)	42.5 (16.1)	44.0 (15.9)	
Min - max	18.0–79.0	18.0–77.0	18.0–76.0	18.0–79.0	
Gender: female	157 (47.0%)	182 (54.8%)	173 (52.0%)	512 (51.3%)	n.s.
Race					n.s.
White	267 (79.9%)	238 (71.7%)	248 (74.5%)	753 (75.4%)	
Black	37 (11.1%)	43 (13.0%)	48 (14.4%)	128 (12.8%)	
Asian	21 (6.3%)	26 (7.8%)	19 (5.7%)	66 (6.6%)	
Mixed	4 (1.2%)	15 (4.5%)	9 (2.7%)	28 (2.8%)	
Other	5 (1.5%)	10 (3.0%)	9 (2.7%)	24 (2.4%)	
Typical mode					
Drive					**
1–2 times	39 (11.7%)	48 (14.5%)	37 (11.1%)	124 (12.4%)	
3–4 times	38 (11.4%)	55 (16.6%)	51 (15.3%)	144 (14.4%)	
5–6 times	73 (21.9%)	48 (14.5%)	48 (14.4%)	169 (16.9%)	
7+ times	127 (38.0%)	127 (38.3%)	120 (36.0%)	374 (37.4%)	
Never	57 (17.1%)	54 (16.3%)	77 (23.1%)	188 (18.8%)	
Passenger					n.s.
1–2 times	150 (44.9%)	150 (45.2%)	145 (43.5%)	445 (44.5%)	
3–4 times	62 (18.6%)	44 (13.3%)	63 (18.9%)	169 (16.9%)	
5–6 times	24 (7.2%)	25 (7.5%)	32 (9.6%)	81 (8.1%)	
7+ times	16 (4.8%)	24 (7.2%)	24 (7.2%)	64 (6.4%)	
Never	82 (24.6%)	89 (26.8%)	69 (20.7%)	240 (24.0%)	
Walk					n.s.
1–2 times	116 (34.7%)	113 (34.0%)	122 (36.6%)	351 (35.1%)	
3–4 times	46 (13.8%)	38 (11.4%)	37 (11.1%)	121 (12.1%)	
5–6 times	22 (6.6%)	20 (6.0%)	26 (7.8%)	68 (6.8%)	
7+ times	38 (11.4%)	44 (13.3%)	50 (15.0%)	132 (13.2%)	
Never	112 (33.5%)	117 (35.2%)	98 (29.4%)	327 (32.7%)	
Bike					n.s.
1–2 times	32 (9.6%)	32 (9.6%)	24 (7.2%)	88 (8.8%)	
3–4 times	8 (2.4%)	8 (2.4%)	14 (4.2%)	30 (3.0%)	
5–6 times	6 (1.8%)	5 (1.5%)	3 (0.9%)	14 (1.4%)	
7+ times	5 (1.5%)	5 (1.5%)	10 (3.0%)	20 (2.0%)	
Never	283 (84.7%)	282 (84.9%)	282 (84.7%)	847 (84.8%)	

Note: One-way ANOVA and chi-squared tests, at statistical significance levels: *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

4.3. Q3: assessing preferred solutions

The use of thematic framing significantly influenced readers' preferred approaches for improving safety (Table 5). Shifting to a thematically-framed text clearly increases support for pedestrian infrastructure (relative to both the pedestrian- and driver-focused texts) (Fig. 2). This result is consistent with the work of Iyengar who found that thematic framing increases demand for systematic public policy solutions (Iyengar, 1994, 1996).

The other results were inconsistent across groups (Table 4). For instance, the thematically-framed text increased support for enforcement and willingness to trade off slower speeds for fewer deaths, but only relative to the pedestrian-focused text (i.e. there was no difference relative to the driver-focused text). Similarly, the thematically-framed text decreased support for a pedestrian safety campaign, but only relative to the driver-focused text.

There was no difference in preferred approaches between the pedestrian-focused and driver-focused texts (not shown).

Table 4
Influence of editorial patterns on assessment of blame and punishment.

	#1 Ped-focused	#2 Driver-focused	#3 Thematic frame	Ped v. driver 1 v. 2	Ped v. thematic 1 v. 3	Driver v. thematic 2 v. 3
Share of blame (mean (SD))						
The driver	50.2 (27.2)	65.5 (25.0)	54.9 (27.6)	***	*	***
The person walking	43.1 (26.7)	30.0 (23.6)	28.6 (24.7)	***	***	n.s.
Other	6.7 (18.7)	4.5 (13.4)	16.5 (22.1)	n.s.	***	***
	100	100	100			
Type of punishment (% approve)						
None	31.4	18.7	22.2	***	**	n.s.
Community service	46.1	47.6	46.2	n.s.	n.s.	n.s.
A fine	38.6	46.7	44.4	*	n.s.	n.s.
Jail time	23.4	37.3	37.2	***	***	n.s.
Vehicle impound	13.2	22.9	19.8	***	n.s.	n.s.
Severity of punishment (mean)						
Hours of service	101.4	132.2	125.7	***	***	n.s.
Amount of fine	\$535.30	\$698.10	\$653.30	***	***	*
Years of jail time	1.03	2.05	2.08	***	***	n.s.

Note: Using a linear hypothesis test, with the finite-sample F statistic (with approximate F distribution), at statistical significance levels: *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$. Models control for age and extent of driving.

Table 5
Influence of editorial patterns on preferred approaches for improving safety.

	#1 Ped-focused	#2 Driver-focused	#3 Thematic frame	Ped v. thematic 1 v. 3	Driver v. thematic 2 v. 3
Share who support					
Wider sidewalks, marked crosswalk, lowered speed limit	85.3	85.2	93.4	***	***
A <i>Walk Smart!</i> Campaign to “train pedestrians to cross the street more carefully”	76.9	80.7	75.1	n.s.	*
More enforcement for drivers, including speeding and distracted driving	84.4	88.3	89.2	*	n.s.
Share willing to trade lower speeds for fewer traffic deaths	88.3	91.6	94.3	***	n.s.

Note: Using a linear hypothesis test, with the finite-sample F statistic (with approximate F distribution), at statistical significance levels: *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.10$. Models control for age and extent of driving.

5. Discussion

To recap, minor changes in crash coverage can shift a reader’s perceptions of what happened and what to do about it. The results confirm that sentence level editorial patterns do indeed shape perceptions about blame, punishment, and preferred solutions. Specifically, shifting from a pedestrian-focused to a driver-focused text increased perceived blame for the driver. In turn, shifting to a thematically-framed text slightly reduced blame on the driver and increased blame on “other” factors.

The results about preferred policy solutions are consistent with the work of Iyengar who found that thematic framing increases demand for systematic public policy solutions (Iyengar, 1994, 1996). The present study finds that thematic framing increases support for pedestrian infrastructure, enforcement, and lower speeds—all of which are systems-level solutions—and reduces support for an educational campaign, an individual-level solution.

At the moment, the default setting is for crash coverage to blame the pedestrian (Magusin, 2017; Ralph et al., 2019; Scheffels et al., 2019). In most cases, it is premature to assign blame because an investigation is inconclusive, still underway, or was never even started. Despite the lack of evidence, writers rarely break from the practice of blaming the victim. In fact, the default is so powerful that writers often use it even when the driver was either charged with or convicted of a crime related to the crash (Ralph et al., 2019). Moreover, writers rarely make corrections to shift the blame away from the pedestrian when exculpatory evidence comes to light (Flax, 2018). And, as this study shows, how an article is written affects how readers perceive crashes. Given all of this, as a general rule, it is a good idea to shift away from pedestrian-focused texts.

Driver-focused texts represent an improvement over pedestrian-focused reporting. Some drivers are clearly responsible for crashes, such as when they drive distracted, at excessive speeds, or in a reckless manner. In these cases, using driver-focused text instead of standard practice of focusing on the pedestrian, is associated with an increased assessment of blame and greater willingness to justly punish drivers. Even when fault is not

clear, focusing on the actor with the ability to cause harm may help shift focus to potential solutions instead of victim-blaming. Journalists may be understandably wary of assigning blame to drivers; however, an article can focus on the driver without making any assignment of fault.

In some cases neither the pedestrian nor the driver were acting illegally in the moments leading up to the crash. Drivers traveling within the posted speed limit routinely crash and pedestrians crossing legally are routinely hit by drivers. In these cases, it is often the system, not individuals, that is primarily responsible. In these cases, thematically-framed articles are the best option, and writing in this manner also aligns with the Vision Zero traffic safety movement (Johansson, 2009). These articles do not unduly blame the driver, and they provide context that serves as a call to action. In short, if the goal is to call public attention to external circumstances that cause road deaths, thematic framing helps to accomplish this goal.

In this study, readers encountered just a single article, which was enough to measure altered perceptions. The magnitude of the differences is remarkable given the simplicity of the differences in text. The cumulative effect of shifting to driver-focused and thematically-framed crash coverage could result in powerful cultural change related to traffic crashes.

Of course, changing editorial patterns is somewhat difficult. In addition to plain old inertia, there are many structural pressures in the news industry. There is considerable pressure for overstretched journalists on tight deadlines to simply parrot police reports. To the extent that it is feasible, journalists should take a few steps to move towards best practices (listed below in ascending order of the effort required to implement them).

- o Avoid non-agentive and object-based language.
- o Shift the focus away from the pedestrian and towards the driver (or if necessary, the vehicle).
- o Be conscious of the counterfactuals that you include. Specifically, if you mention that the pedestrian was outside a crosswalk, check Google Street View to quickly determine whether there are any crosswalks available and note that in many jurisdictions it is legal to cross outside marked crosswalks.

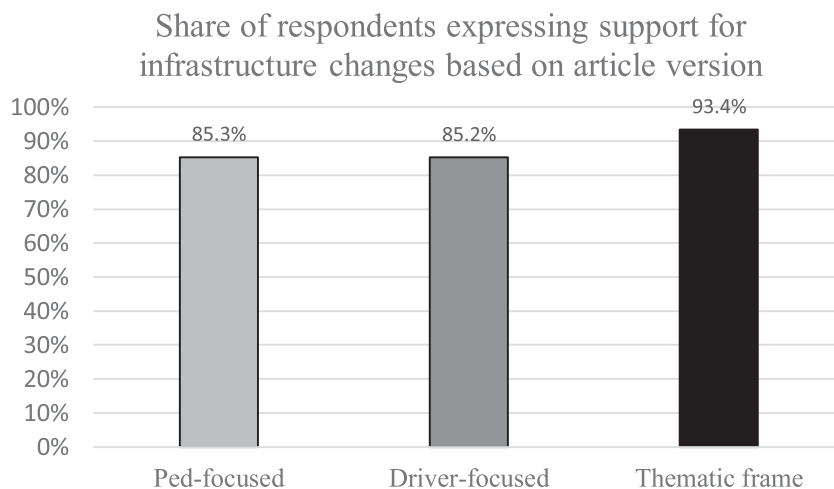


Fig. 2. Thematic frame significantly increases support for safety-related infrastructure improvements.

- o Include data on the number of crashes, injuries or deaths, preferably locally. Time permitting, consider contacting a local transportation, urban planning, or public health expert to provide further context.

5.1. Strengths and limitations

The study design has a number of strengths. In particular, the experimental nature of design enables causal inference. The findings are not merely associations, they are the result of subtle changes in the text. Moreover, respondents only encountered one version of the text so it is unlikely that they could anticipate the purpose of the study and act strategically.

Despite these strengths, some caveats deserve mention. First, use of an online sample is relatively new. Even though the panel was representative of the U.S. public in terms of age, sex, and race, the panelists may differ systematically in some unknown way. Second, there was remarkably broad support for improving safety (>75% support in all cases). In part this may be due to the fact that the proposed changes were purely hypothetical and do not ask respondents to envision changing their own behavior. Thus, respondents may overestimate their willingness to sacrifice slower travel speeds and/or more enforcement for improved safety. There may also social desirability bias if respondents thought we would like for them to approve of these options. On the other hand, the level of support observed here may only appear high relative to the fierce opposition on display at public meetings, which may themselves overstate public opposition to safety improvements. The treatment in this study was a brief encounter with a news article, so the observed effect may be short-lived for experiment participants. This possible limitation could be ameliorated in practice, though, if the majority of crash reporting used driver-focused and thematic reporting techniques.

6. Conclusion

This study provides evidence that editorial patterns in traffic crash reporting influence people's interpretation of what happened and what to do about it. While the media studies and psychology literatures suggested this would be the case, this study is the first to test the power of editorial patterns with respect to traffic crash coverage. The results are particularly concerning given that non-agentive language, a focus on vulnerable road users, object-based language, and episodic framing are commonplace in crash reporting (Magusin, 2017; Ralph et al., 2019; Scheffels et al., 2019). Encouragingly, though, editorial practices are not immutable. It costs little to use agentive language, appropriate focus, person-based language, and—to a lesser extent—thematic framing. Additionally, improved editorial choices do not take any special training or technical understanding of traffic safety. Adopting simple improvements in crash reporting, however, offers a potentially powerful tool in shifting cultural awareness of traffic crashes as a preventable public health issue. Given the potential to save human lives and prevent injury on a large scale, implementing more intentional editorial patterns may be nothing less than an ethical imperative.

Author contributions

The authors confirm contribution to the paper as follows: study conception, experimental design, and survey development: T. Goddard, E. Iacobucci, K. Ralph, C. Thigpen; data collection: T. Goddard; analysis and interpretation of results: T. Goddard, E. Iacobucci, K. Ralph, C. Thigpen; draft manuscript preparation: T. Goddard, E. Iacobucci, K. Ralph, C. Thigpen. All authors reviewed the results and approved the final version of the manuscript.

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Declaration of competing interest

None.

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