



# Factors and Frames that Shape Public Discourse around Road User Safety

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<b>16. Abstract</b> The purpose of this project was to uncover common framing and narrative devices used in covering traffic crash events in televised news. The research team identified relevant TV news stories linked to 36 different new stations' Facebook pages for abstraction. Half of the stations were in Core-Based Statistical Areas with one or more principal cities operating Vision Zero programs, and half were not. Systematically coding 1,156 crash-featuring Facebook posts, the team explored how media framing varied as a function of the crash details included in stories, and how framing and narrative techniques interacted with the public's engagement with crash-featuring news coverage. Results suggest that Facebook posts featuring the people involved in or witnessing crash events tended to attract more and deeper engagement on crash-involved posts. However, posts featuring vulnerable road users, such as older adults, pedestrians, cyclists, and motorcyclists were associated with less engagement among TV news stations' Facebook audiences. Further, a dominant type of crash framing involved describing crashes as something that delays motor vehicle traffic. Promisingly, incorporating quotes from crash witnesses, elected officials, and employing thematic frames and victim narratives was associated with higher level of public engagement with news agencies' crash-featuring Facebook posts. This research ends on a call for those in transportation, public health, and news journalism to reshape the narrative around traffic injury, acknowledging the substantial public health burden of road injury and providing pragmatic insight into the fact that safety investments can improve the safety, health, and well-being of all road users.			
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## Executive Summary

In the transportation field, it is widely known that an average of 40,000 people die in traffic crashes in the United States each year. Despite recent, largely municipal- and state-led efforts to significantly reduce serious and fatal traffic injury, the public has yet to prioritize road trauma as a public health problem. Two inter-related psycho-social factors are likely at play in the general malaise around traffic injury in the U.S:

**compassion fade** and **mindsets**. Compassion fade unfolds once the scale of a problem begins to appear too large and hopeless to tackle. Mindsets refer to tacit means people in a culture process information to make sense of events and experiences, including how we normalize or problematize aspects of the existing social order. Together, compassion fade and the uniquely North American mindsets of “individualism”, “otherism”, and “fatalism”<sup>1</sup> serve to render the large-scale social problem of traffic injury as insurmountable, due predominately to individuals’ poor choices, especially the choices of people unlike ourselves, and hopeless.

**Research Questions.** Considering these barriers to meaningful change, the team decided to explore road injury narratives perpetuated by popular televised news stations and to begin working with professionals in journalism, transportation, and public health to advance narratives that inspire concern and actions among general audiences. Specifically, the team sought answers to three inter-related questions: (1) How had Facebook users’ engagement with TV news agencies’ crash-featuring Facebook posts varied as a function of the crash details and frames included in the posts (e.g., road users involved, the age of the victims, references to the physical environment, use of thematic frames)?; (2) relative to U.S. cities yet to adopt Vision Zero, in what ways have media frames changed within Vision Zero cities from 2012—i.e., prior to Vision Zero adoption in the U.S.—through 2019?; and (3) what are some common types of crash-featuring Facebook posts that vary according to journalistic practices?

**Methods.** To begin, the team selected the top two most viewed TV broadcast news stations across 18 population size- and geographic region-matched core-based statistical areas (CBSAs), nine (9) CBSAs containing one or more principal cities that had adopted a Vision Zero program by 2019, and another nine (9) CBSAs that had not included a Vision Zero adopting city by 2019.

Next, the team brainstormed keywords related to crash-involved road users (e.g., SUV driver, pedestrian), focusing events (e.g., crash, accident, wreck), and event descriptors (e.g., fatal, serious) to identify more than 4,000 candidate Facebook posts that featured traffic crashes. Based on relevancy, these posts were whittled down to the 1,156 Facebook posts included in this study.

**Results.** Descriptive analyses revealed that news covered crashes were roughly evenly distributed across time of day and day of week, with slightly more covered crashes occurring between midnight and 3:59 am and fewer crashes occurring between 4:00 and 7:59 am, as well as relatively more crashes occurring on Thursday and Friday, than on Saturday and Sunday. Car drivers and passengers were involved in more than half of all news agencies’ Facebook posts, followed by SUV and truck occupants who were represented nearly a third of posts. Heavy goods vehicle drivers were next (20% of posts), then pedestrians (16% of posts). Bystanders of crash events and motorcyclists were involved in about six (6) percent of posts, whereas trains, cyclists, city bus occupants, off road vehicles, as well as moped and scooter riders were featured in fewer than four (4) percent of Facebook posts in the study. SUV and truck drivers, motorcyclists, and car drivers were more likely to be considered “at fault” for crashes than drivers of heavy good vehicles, pedestrians, and cyclists. Adults younger than 65 years of age were most likely than children, teens, and older adults to be featured in Facebook posts.

Nearly half of the posts covered fatal crashes, and a fifth of posts referenced the legal consequences crash-involved road users faced, with car drivers facing legal action more than other road user groups. Crashes

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<sup>1</sup> American anthropologist, Kendall-Taylor (2019) identifies “individualism”, “otherism”, and “fatalism” as prevailing North American mindsets—culturally specific ways of organizing lived experience (Oyserman, 2015). Individualism is the notion that the outcomes of people’s lives are a sole result of choices individuals make; otherism advances a perpetual zero-sum competition among people perceived as different from one another; and fatalism is the idea that many problems are simply unpreventable, especially given the ineptitude of governing bodies.

tended to be attributed to high travel speeds, faulty judgment, alcohol use or abuse, and hit and run incidents. Fewer than one percent of posts attributed crashes to features of lighting or the roadway.

With respect to Facebook users' engagement with news agencies' crash-featuring posts, two-level mixed-effects negative binomial regression models revealed that people were more likely to react to stories involving youth, victim narratives, one or more crash witnesses or elected officials quoted, agentic drivers—journalistic incidents of referencing drivers who actively contributed to crashes—, and use of victim narratives. They were less likely to react to posts featuring pedestrians, cyclists, motorcyclists, train crashes, and references to at fault car drivers. Facebook users were more likely to comment on posts featuring youth, quotes from crash witnesses and elected officials, agentic drivers, and references to motorist delay, and less likely to comment on posts featuring pedestrians, cyclists, or motorcyclists.

Mixed effects generalized linear model results indicated that sharing posts on Facebook was positively associated with crashes involving youth, SUVs, trucks, as well as references to the legal consequences crash-involved parties face; sharing was negatively associated posts featuring younger and older adults as well as at fault SUV, truck, and heavy goods vehicle drivers.

In the final analysis step, the team conducted latent class analysis (LCA) to identify unobserved types or "classes" of TV news crash reporting. LCA results revealed the presence of two distinct classes of crash reporting: travel delay focused reporting, and driver and crash victim focused reporting. A post-LCA logistic regression analysis predicting Facebook post assignment to travel delay focused (Class 1) reporting demonstrated that posts focusing on drivers and crash victims were associated with higher degrees of reacting to and commenting on TV news agencies' crash-featuring Facebook posts, whereas sharing Facebook posts was not associated with post class.

**Practical implications.** Having reviewed the patterns of framing and narration of TV news coverage of traffic crashes, the team advocates for transcending the "crash not accident" dialogue by framing crashes as part of a broader culture that privileges speed and automobility over equitable access to and participation in civic life. Moreover, though the tools exist to realize a future with significantly fewer deaths and injuries on our roads without a sufficient proportion (~25%) of the public perceiving road trauma as a pressing social problem, the U.S. is unlikely to witness significant and lasting amelioration of road trauma. What our culture needs is a new discourse, one shaped and perpetuated by people reflective of the U.S. population that challenges compassion fade and prevailing mindsets of individualism, otherism, and fatalism, and that speaks to what is possible and how together, we can get there.

# Factors and frames that shape public discourse around road user safety

## Introduction

Year over year, approximately 40,000 people die while traveling on U.S. roadways (National Safety Council, 2021). Despite a growing awareness of the issue among advocates and politicians in an ever-expanding number of cities and states and the recent rise in cities adopting “Vision Zero”—a coordinated effort to eliminate serious and fatal road injury (Vision Zero Network, n.d.)—by and large, the public appears not to perceive the problem or to be motivated to do much about it (Evans, 2014; Ahangari, Atkinson-Palombo, and Garrick, 2017). Social science researchers have identified a potential mechanism for the general malaise around concern over road trauma: compassion fade. This phenomenon occurs when the public’s focus shifts from individuals to ever larger groups of people or to large-scale crisis, such as climate change (Markowitz, Slovic, Västfjäll, and Hodges, 2013; Butts, Lunt, Freling, and Gabriel, 2019).

Together with compassion fade are what Kendall-Taylor (2019) identifies as prevailing North American cultural mindsets—culturally specific ways of organizing lived experience to normalize or problematize elements of the existing social order (Oyserman, 2015; Frameworks Institute, 2021)—of “individualism”, “otherism”, and “fatalism.” Individualism relates to the notion that the outcomes of people’s lives are an exclusive result of choices individuals make, including those made leading up to a serious traffic crash, which we might call “safety individualism” (Naumann, Sandt, Kumfer, LaJeunesse, Heiny, and Lich, 2020). Otherism advances a perpetual zero-sum competition among people, e.g., where more road space for cyclists necessarily means less road space for drivers. And fatalism is the idea that most of the problems, including road injury are simply not addressable, especially considering given their scope and the ineptitude of our government (Kendall-Taylor, 2019). These social psychological constructions conspire to suppress health information seeking (e.g., Potter, Allen, and Roberto, 2019), concern for victims of traffic violence, as well as calls for corrective action (Wiener, 2016).

Given the hyper-reactivity among large portions of the population to threats to freedom—witness the political discourse surrounding use of masks throughout the COVID-19 pandemic (Ball and Wozniak, 2021)—it becomes difficult to imagine a future where the governmental intervention to incentivize and regulate safer vehicles and safer roadways succeeds without a critical mass of people embracing change in the name of safety, health, and communal well-being.

This is where understanding and working within the social-political milieu is germane. Part of the social milieu is the stream of social information. A significant part of this information is produced and disseminated by the news media. Promisingly, news coverage of a single, though contextualized crash event can help address compassion fade (e.g., Thomas, Cary, Smith, Spears, and McGarty, 2018). Moreover, use of thematic frames can help address otherism by focusing attention away from individual actions and toward the larger trends and systems at play in reproducing traffic injury (Scheffels, Bond, and Monteagut, 2019). And incorporating “can-do” pragmatism can address fatalism by illustrating that things can and must be done to improve road user safety, and that the needed changes benefit everyone (Thompson, 2016; LaJeunesse, et al, 2020).

Framing theory supports the insight that the experiences and attitudes of individuals toward socio-political issues are influenced by the organization of language that focuses attention on certain aspects of events and themes over other aspects (Lakoff, 2010). Prior work suggests that media frames can shape public attitudes about vehicle biofuels (Delshad and Raymond, 2013) and graduated drivers licensing programs (Hinchcliff, Chapman, Ivers, Senserrick, 2010). Studies also demonstrate how news stories employing “thematic” vs. “episodic” frames—i.e., emphasizing broader trends or background information on a topic vs. describing specific events to illustrate an issue—can enhance compassion toward others, including increasing people’s opposition to mandatory minimum sentencing (Gross, 2008), support for policies to address climate (Hart, 2011), as well as investing in pedestrian safety infrastructure (Goddard, Ralph, Thigpen, and Iacobucci, 2019). Little understood are the ways in which media frames inspire public discourse around traffic injury.

To uncover how media framing of traffic crashes interplays with the public’s engagement with crash-featuring news, a UNC team comprised of HSRC researchers and Journalism and Media school colleagues examined more than 1,100 televised news media stories linked to the news stations’ Facebook pages that featured traffic crash coverage. The overarching goal of the R29 project, “Factors and frames that shape public discourse around road user safety” was to advance more humane public health framing (e.g., Gollust, & Ubel, 2009) surrounding traffic injury and meaningfully address three inter-related research questions:

### Research questions

1. **RQ1:** How had Facebook users’ engagement with TV news agencies’ crash-featuring Facebook posts varied as a function of the crash details and frames included in the posts (e.g., road users involved, the age of the victims, references to the physical environment, use of thematic frames)?
2. **RQ2:** Relative to U.S. cities yet to adopt Vision Zero, in what ways have media frames changed within Vision Zero cities from 2012—i.e., prior to Vision Zero adoption in the U.S.—through 2019?
3. **RQ3:** What are some common types of crash-featuring Facebook posts that vary according to journalistic practices?

## Methods

### Procedures

#### TV news station selection

The study sample consisted of a total of 18 core-based statistical areas (CBSAs), nine (9) CBSAs which contained one or more principal cities that had adopted a Vision Zero program by 2019, and another nine (9) CBSAs that had not included a Vision Zero adopting city by 2019. These “intervention” and “control” CBSAs were matched according to population size and U.S. Census regions of West, Midwest, South, and East. The team considered the presence of a principal city adopting Vision Zero as the act of adoption is often publicized and indicative of elected official endorsement of programming to eliminate serious and fatal roadway injury (Vision Zero, 2018). Based on per-quarter and broadcast station Nielsen viewership figures, the top two TV broadcast news stations with the highest viewership within each CBSA was selected for inclusion in the study. Of interest in this study was the textual content embedded in news agency-delivered Facebook “posts”—a piece of content agencies shared on their agencies’ Facebook profile pages and in their newsfeeds—that featured traffic crash events.

Table 1 illustrates that TV news sources in the study varied according to the number of crash-featuring Facebook posts they distributed between 2012 and 2019, ranging from 0.5 percent (n = 6 posts) of all crash-featuring Facebook posts out of Fox 35 in Orlando, FL to 8.5 percent (n = 98) of all posts out of station KTNV in Las Vegas, NV. A total of 570 (49.3%) Facebook posts came from Vision Zero-adopting CSBAs, and 586 (50.7%) came from non-Vision Zero-adopting CBSAs.

**Table 1.** Study sample of broadcast TV news sources.

TV News Source	Number of crash-related Facebook posts (2012 - 2019)	% of all Facebook posts
<b>Non-Vision Zero CBSAs</b>		
Cleveland (19 News)	40	3.5%
Cleveland (Fox 8 News)	34	2.9%
Dallas (Fox 4 DFW)	50	4.3%
Dallas (WFAA)	36	3.1%
Detroit (WJBK Fox)	34	2.9%
Detroit (WXYZ)	8	0.7%
Erie (Erie News Now)	7	0.6%
Erie (Your Erie)	12	1.0%
Houston (ABC 13)	83	7.2%



TV News Source	Number of crash-related Facebook posts (2012 - 2019)	% of all Facebook posts
<b>Non-Vision Zero CBSAs</b>		
Houston (Fox 26)	26	2.2%
Las Vegas (Fox 5)	36	3.1%
Las Vegas (KTNV)	98	8.5%
Orlando (Fox 35)	6	0.5%
Orlando (WFTV)	36	3.1%
Pittsburgh (Action 4)	18	1.6%
Pittsburgh (WPXI)	25	2.2%
Pittsburgh (WTAE)	15	1.3%
Salt Lake City (Fox 13)	86	7.4%
Salt Lake City (KSLTV)	27	2.3%
<b>Vision Zero CBSAs</b>		
Boston (25 News)	7	0.6%
Boston (WCVB5)	96	8.3%
Charlotte (NBC)	28	2.4%
Charlotte (WSOC TV)	12	1.0%
Denver (9 News)	7	0.6%
Denver (Denver Channel)	43	3.7%
New York (ABC 7)	19	1.6%
Phoenix (ABC 15)	7	0.6%
Phoenix (FOX 10)	16	1.4%
San Antonio (KENS5)	13	1.1%
San Antonio (KSAT)	36	3.1%
San Francisco (ABC 7)	36	3.1%
San Francisco (KTV U)	28	2.4%
Seattle (K5)	20	1.7%
Seattle (KIRO 7)	39	3.4%
Tampa (Fox 13)	37	3.2%
Tampa (WFLA News)	35	3.0%
<b>Total</b>	<b>1,156</b>	<b>100%</b>

### Search and story selection procedure

In the next step of the project, the research team brainstormed candidate keywords and incorporated common keywords found in traffic safety literature—i.e., searching via TRID and UNC’s Summon-powered search technology to access the University libraries’ collections—to guide searching for Facebook posts covering traffic crash events. The team divided keywords into three inter-related categories: (1) crash-involved road users or entities; (2) focusing events; and (3) event descriptors.

- (1) The **crash-involved entities** included pedestrian, walker, person walking, bicycle, bicyclist, cyclist, person riding a bike, person riding a bicycle, driver, motorist, truck, SUV, vehicle, car, motorcycle, train, bus, child, student, man, woman, bike, traffic;

- (2) **focusing events** included: strike/struck, hit, collide/collided/collision, crash, kill/killed, injure/injured, wreck/wrecked, hit and run, fatality, injury, accident, incident, drive/driving drunk driving/drunk driver; and
- (3) the **event descriptors** included: fatal, crash, collision, accident, wreck, severe, serious, dead, death, disabling, disabled.

The team scraped study-included TV news stations' Facebook pages using the Facebook's Graph API, keyword search terms, and Boolean operators (AND, OR) among the crash-involved entities, focusing events, and event descriptors. The procedure returned more than 4,000 candidate posts. Six team members were assigned one or more CBSAs to examine the returned posts for relevancy. They quickly discovered that terms used in covering baseball overlap substantially with posts covering traffic crash events (e.g., hit and run, walked, walk, struck, strike). The process eventually yielded 1,300 posts, from which during initial scanning of news posts, 1,156 were determined to reference unique traffic crash events.

### Codebook development

To develop the coding framework, the project team adapted the content analysis methodology employed by De Ceunynck and colleagues (2015) and Ralph, Iacobucci, Thigpen, and Goddard (2019) to capture media-covered crash attributes and framing devices.

Examples of news covered crash attributes included:

- time of day
- light conditions
- weather conditions
- the age of road users involved
- the travel mode involved persons were using during the crash
- references to drug or alcohol use
- references to physical environment features
- crash attribution, "at fault" parties, and legal ramifications, among others.

Example framing devices included:

- use of thematic vs. episodic frames
- employment of victim narratives
- references to agentic drivers vs. passive vehicles.

Having developed a comprehensive list of crash attributes and framing devices, the project team pilot tested the coding framework, iterating on making clarifying improvements through an inter-rater reliability procedure.

### Inter-rater reliability procedure

A total of four research staff served as Facebook story coders for this study. To ensure each coder developed a shared understanding of the coding procedure and the story elements to code, the team randomly selected 120 (~10 percent) of the collected Facebook posts and requested that the four coders code all 120 stories independently. After about two weeks, the coders abstracted the crash-featuring Facebook posts, and the team calculated Krippendorff's alphas for all 55 coding elements. Based on the percent agreement among coders and the alpha coefficient, seven (7) of the 55 coding elements (e.g., discerning 'active' from 'passive' voice, the number of words in each story) evinced low inter-rater reliability and were revisited in a series of facilitated meetings to develop consensus around how to interpret the elements. After these meetings, all coding elements achieved acceptable levels of inter-rater agreement (i.e.,  $\alpha \geq 0.70$ ). The four coders evenly divided up the 1,156 crash-featuring Facebook posts and abstracted them over a few months' time.

## Statistical Approach

**RQ1:** How had Facebook users' engagement with TV news agencies' crash-featuring Facebook posts varied as a function of the crash details and frames included in the posts (e.g., road users involved, the age of the victims, references to the physical environment, use of thematic frames)?

After cleaning the data and uploading them into Stata version 16.1 (StataCorp, 2019), the team estimated two-level (i.e., Facebook posts nested with TV news stations), mixed effects models. In fitting the models to the coded data, the team operationalized "engagement" with TV news agencies' crash-featuring Facebook posts in terms of the number of times Facebook users reacted to—using one of the emoticons—, shared, or commented upon the post.

Both the number of Facebook "reactions" and "comments" were over dispersed with standard errors several times larger than the mean number of engagements. As such, reactions and comments were modelled using mixed-effects negative binomial models, whereas Facebook shares adhered to a normal (gaussian distribution around the mean) and thus were regressed onto a matrix of covariates using a mixed-effects generalized linear model with an identity link.

Across means of engagement (reactions, comments, and shares), a random intercept was estimated at the level of the TV news source (N = 36) that distributed the crash-featuring post. A total of 1,156 crash-featuring posts were nested within 36 TV news channel's Facebook pages. Among the 36 TV news channels, the minimum number of posts from 2012-2019 was 6, the maximum number of posts was 98, and the mean number of posts per TV news agency was 32.

The final stage of the statistical analysis involved estimating a series of latent class analysis (LCA) models to discern unobserved patterns in TV news agencies' crash reporting. LCA is widely considered to be a robust means of identifying small sets of underlying subgroups characterized by multiple dimensions (Lanza and Rhoades, 2013) such as journalistic approaches to reporting on traffic crashes.

## Descriptive Results

The majority (72.2%) of study-included Facebook posts on crash events occurred in the latter years of 2017 through 2019, and only six (6) stories were from 2012, the first year of the study's time period. This precluded the team from carrying out a time-series analysis of media framing patterns or discerning any effect of the Associated Press 2016 guidance on journalists' use of the words "crash" or "collision" vs. "accident" in their reporting.

### When news covered crashes occurred

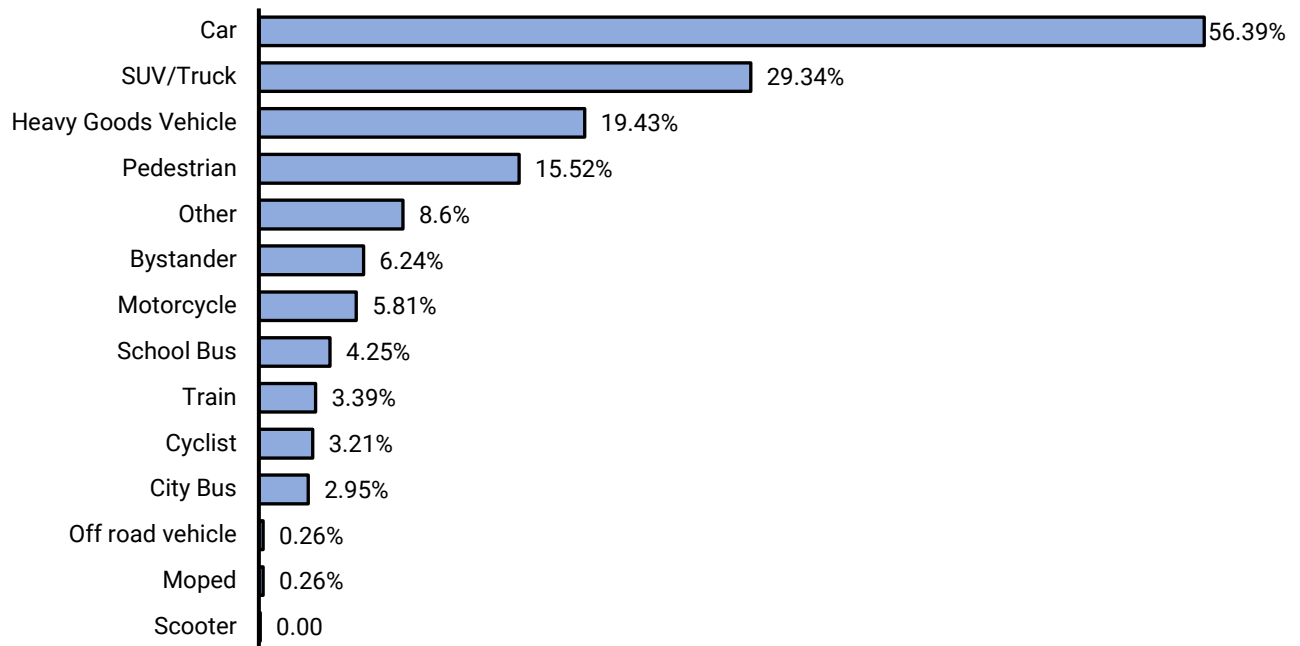
A total of 193 (16.7%) of all reported crashes occurred between midnight and 3:59 am, and a roughly equal number occurred between 4:00 and 7:59 am. Slightly fewer of the crashes featured in news agencies' Facebook posts (15.7%) occurred between 8:00 and 11:59 am, and 15.6% occurred between noon and 3:59 pm. Even fewer crashes occurred between 4:00 and 7:59 pm, whereas crashes picked back up between 8:00 and 11:59 pm representing 11.5% of all reported crashes. In 166 (14.4%) cases, the time of day the crash occurred was unreported. Further, a lower proportion of reported crashes occurred on Saturday and Sunday, whereas higher proportions of covered crashes occurred from Monday through Friday.

### Road users involved in news covered crashes

Regarding the road users involved in crash-featuring TV news posts, car drivers and passengers were involved in more than 56 percent of all crash-featuring Facebook posts. They were followed by SUV and truck drivers and occupants who were represented in nearly a third of posts. Almost 20 percent of posts involved drivers of heavy goods vehicles, and another 16 percent involved pedestrians. Bystanders of crash events were featured in more than six (6) percent of Facebook posts, whereas motorcyclists were involved in 5.8% of posts. Trains, cyclists, city bus drivers and passengers, off road vehicles (e.g., golf carts, all-terrain vehicles

[ATVs]), and moped riders were featured in 3.4, 3.2, 3, 0.26, and 0.26 percent of stories, respectively. One Facebook post featured one scooter rider (Figure 1).

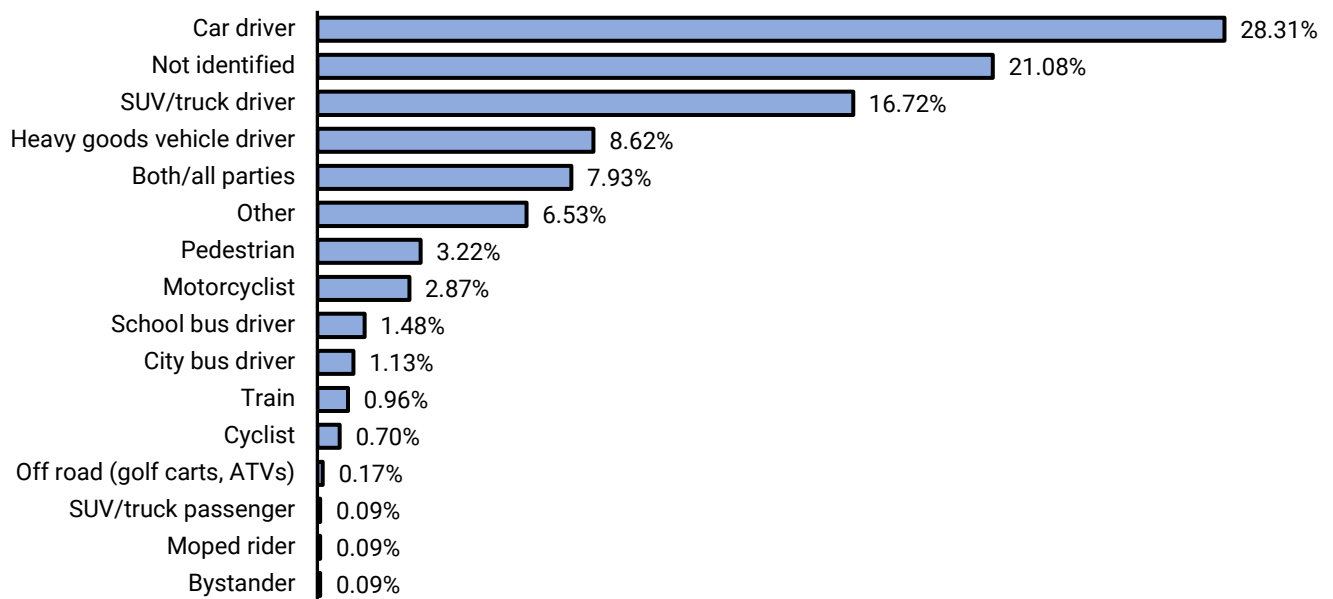
**Figure 1.** The distribution of crash-involved road users.



Aside from being involved in crashes, in 64.7 percent of TV news agencies' Facebook posts, at least one crash-involved party was considered "at fault" for the incident, as indicated by explicit identification of the guilty party (e.g., "The driver who hit pedestrian and fled the scene will face charges"). Figure 2 illustrates the distribution of road users considered "at fault" for crash outcomes in the TV news media's coverage of crashes. Drivers of cars, SUVs and trucks, and heavy goods vehicles were identified as at fault in posts in roughly 28, 17, and nine (9) percent of cases, respectively. Other road users (e.g., emergency vehicle drivers) were identified as at fault in nearly seven percent of posts. Otherwise, additional road users, including pedestrians, motorcyclists, school and city bus drivers, train conductors, cyclists, off road vehicle operators, SUV and truck passengers, moped riders, and bystanders were considered at fault for crash outcomes in less than four (4) percent of posts.

While Figure 2 displays the distribution of road users identified as “at fault” for the crashes across all studied Facebook posts, the team also examined the proportion of times different road users were assigned blame in crashes in which they were involved. That is, when involved in Facebook post featured crashes, SUV and truck drivers were considered at fault 51.9 percent of the time, whereas motorcyclists were considered at fault 50 percent of the time, car drivers were 45.1 percent of the time, and heavy goods vehicle drivers were considered at fault 40.4 percent of the time. Pedestrians and cyclists on the other hand, were considered at fault for crashes they were involved in 19.6 and 18.9 percent of time, respectively.

**Figure 2.** The distribution of road users identified as “at fault” for news covered traffic crashes.



The age of crash-involved parties ranged from children younger than twelve years of age to older adults aged 65 years and older. A total of 10 percent of news agency Facebook posts featuring crashes involved people were younger than 12 years of age, a little more than six (6) percent were teenagers between the ages of 13 and 17 years old, whereas young adults aged 18 to 29 years old, and adults aged 30 to 64 years were involved in 18.5 and 22.6 percent of reported crashes, respectively. People older than 65 years of age were involved in 5.2 percent of the sampled crash-featuring Facebook posts.

Among all crash-featured TV news agency Facebook posts, more than 45 percent of the crashes resulted in at least one fatality. Another 17.9 percent resulted in serious injury, and more than 10 percent resulted in minor injury. The maximum injury sustained in each crash was either no injury or unknown/not reported in five (5) and 21 percent of posts, respectively.

In a little more than 20 percent of posts, journalists referenced the legal consequences crash-involved road users faced, with car drivers facing legal action in 41 percent of cases, SUV and truck drivers legally implicated in nearly a third of legal references, and all crash-involved parties facing legal consequences in 14 percent of references to legal consequences. Other road users, such as drivers of heavy goods vehicles, and school bus drivers faced legal consequences for their involvement in crashes in fewer than four (4) and three (3) percent of cases, respectively.

In addition to references to legal consequences, in nearly 57 percent of posts, crash narratives attributed the crash to a specific phenomenon (Table 2). In the other 43 percent of Facebook posts, it remained unclear as to what may have incited the crash. High travel speeds and speeding represented more than nine (9) percent of crash attributions. This was followed by perceptions of “faulty judgment” on the part of the road users. This

attribution was applied in situations where use of alcohol or other substances was not suspected, nor were medical issues, distraction, or mechanical failures to blame; rather, the crash reportedly unfolded because of a questionable choice on the part of a road user (e.g., pulling out of an intersection too late, switching lanes at inopportune times). The next crash attribution was alcohol use or abuse, which represented seven (7) percent of attributions and included both measured and suspected alcohol use. Hit and run crash types constituted nearly seven (7) percent of attributions, and drivers—most often heavy goods vehicle drivers—losing control presented nearly six (6) percent of crash attributions. Other attributions (e.g., fires), operating outside of designated areas (e.g., wrong way driving, running off road or onto sidewalks, crossing outside of a marked crosswalk), evident intention to impart harm on another party, mechanical failures, distraction, medical incidents (e.g., seizure, heart attack), and bad weather constituted between one and 5 percent of crash attributions. Others that represented fewer than one percent—or less than 10 cases in total—of attributions included red light running, emotional distress, failure to yield to pedestrians in crosswalks, drug use or abuse, unsafe street design, sleeping at the wheel, and lack of or poor roadway lighting (Table 2).

**Table 2.** The distribution of crash attributions in crash-featuring Facebook posts.

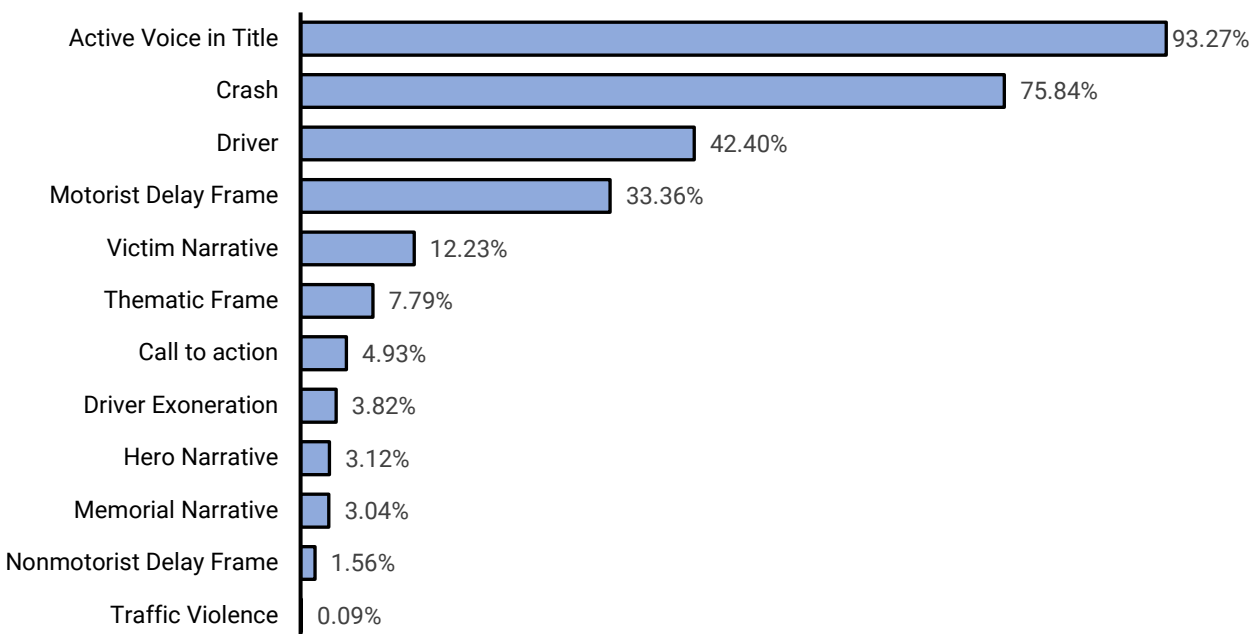
Crash attribution	Number	Percentage (%)
Unclear	499	43.17%
Speeding	108	9.34%
Faulty judgment	102	8.82%
Alcohol use/abuse	81	7.01%
Hit and run	76	6.57%
Lost control	67	5.80%
Other	49	4.24%
Operating outside of designated area/wrong way driving/running off road (sidewalk, crosswalk, bike lane, car lane)	48	4.15%
Intention to impart harm	24	2.08%
Mechanical failures	21	1.82%
Distraction	20	1.73%
Medical incident (e.g., seizure, heart attack)	19	1.64%
Bad weather	18	1.56%
Ran red light	9	0.78%
Emotional distress	5	0.43%
Failure to yield	3	0.26%
Drug use/abuse	2	0.17%
Unsafe road/street design/construction	2	0.17%
Sleeping	2	0.17%
Lack of/poor roadway lighting	1	0.09%
<b>Total</b>	<b>1,156</b>	<b>100%</b>

## Common crash frames and narratives

Figure 3 displays the coded frames and narratives employed in TV new agencies' crash-featuring Facebook posts. Use of active voice in the title (e.g., "a driver struck the cyclist") appeared in 93 percent of posts.

- Collision events were described as "crashes" or "collisions" in 76 percent of new agencies' Facebook posts.
- Posts referenced the vehicles drivers operated rather than the vehicles' drivers in 58 percent of posts.
- Motorist delay frames were common, appearing in more than a third of new agencies' Facebook posts.
- Less common, though still significantly associated with Facebook user engagement with the posts were use of victim narratives and thematic frames. These narratives and frames appeared in roughly 12 and eight (8) percent of TV new agencies' crash-featuring Facebook posts (Figure 3).

**Figure 3.** Crash frames and narratives examined in this study.



## Statistical Modelling Results

As stated previously, to model the number of reactions to and comments on 36 broadcast TV news agencies' crash-featuring Facebook posts, the team estimated mixed-effects negative binomial regression models, fitting a random intercept at the level of the TV news agency (N = 36). Across the 36 TV news agencies, the minimum number of posts from 2012-2019 was 6, the maximum number of posts was 98, and the mean number of posts per channel was 32.

### Reacting to and commenting on crash-featuring Facebook posts

**Table 3.** Mixed-effects negative binomial regression results reported in incident rate ratios for Facebook reactions to and comments on crash-featuring posts.

Covariate	Reactions			Comments		
	IRR	SE	p	IRR	SE	p
Vision Zero	1.555	0.471	0.145	1.738	0.612	0.117
Weekday	0.977	0.072	0.755	1.112	0.098	0.229
Fatality	1.160	0.090	0.055	0.925	0.085	0.396
Accident	0.988	0.080	0.885	1.090	0.106	0.376
Youth ( $\leq 17$ yrs)	2.021*	0.213	0.000	1.897*	0.245	0.000
Young adult (18-29)	1.013	0.101	0.898	0.835	0.098	0.125
Adult (30-64 yrs)	0.896	0.075	0.190	1.089	0.109	0.398
Senior ( $\geq 65$ yrs)	1.243	0.193	0.163	1.451*	0.271	0.046
Car	0.884	0.071	0.123	0.826*	0.078	0.044
SUV	1.049	0.089	0.572	0.998	0.099	0.987
Cyclist	0.455*	0.094	0.000	0.540*	0.135	0.014
Pedestrian	0.624*	0.074	0.000	0.801	0.113	0.116
Bystander	0.932	0.136	0.628	0.984	0.173	0.928
Motorcyclist	0.606*	0.103	0.003	0.791	0.159	0.243
Heavy good vehicle	1.194	0.118	0.072	1.294*	0.150	0.026
School bus	1.158	0.201	0.399	1.366	0.281	0.129
Train	0.648*	0.121	0.020	1.248	0.276	0.316
City bus	0.903	0.187	0.622	0.996	0.243	0.987
Legal consequence mentioned	0.808*	0.079	0.030	0.975	0.117	0.835
Police quoted	0.990	0.091	0.916	1.127	0.126	0.287
Elected/appointed official quoted	2.106*	0.351	0.000	2.188*	0.435	0.000
Witness quoted	1.526*	0.165	0.000	1.822*	0.248	0.000
Crash-involved party quoted	1.164	0.172	0.302	1.112	0.195	0.544
Car and SUV/truck driver focus	0.998	0.093	0.979	1.205	0.136	0.098
Ped, bike, and motorcyclist focus	1.110	0.151	0.441	1.172	0.191	0.332
Motorist delay frame	1.097	0.089	0.250	1.492*	0.146	0.000
Agentic driver	1.319*	0.111	0.001	1.245*	0.127	0.031
Victim narrative	1.724*	0.194	0.000	1.277	0.172	0.069
Thematic frame	1.024	0.132	0.853	0.901	0.139	0.499
constant	251.365*	58.159	0.000	67.146*	18.019	0.000
TV source variance	0.384	0.140		0.517	0.194	



Covariate	Reactions			Comments		
	IRR	SE	<i>p</i>	IRR	SE	<i>p</i>
In alpha dispersion	0.121	0.037		0.458	0.037	
Log likelihood	-7819.787			-6505.011		
AIC	15701.570			13072.023		
BIC	15857.172			13227.610		

Note. IRR = incident rate ratio. SE = standard error of the mean. \**p* <0.05. AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria.

Results displayed in Table 3 illustrate that Facebook reactions to new agencies' crash-featuring Facebook posts positively covaried with stories involving a fatality, youth, quotes from witnesses and elected officials, agentic drivers, and use of victim narratives. Associated with significantly fewer reactions were TV news agency posts featuring pedestrians, cyclists, motorcyclists, train crashes, as well references to the potential legal consequences crash-involved parties face.

Facebook users were more likely to comment on TV news agency Facebook posts featuring youth, older adults, heavy goods vehicles, quoted crash witnesses and elected officials, as well as references to motorists' travel delays. People were less likely to comment on posts featuring pedestrians, cyclists, and at fault car drivers. Conversely, Facebook users were less likely to comment on Facebook posts featuring cars and cyclists.

### Sharing crash-featuring Facebook posts

As sharing of TV news agencies' Facebook posts adhered to a normal gaussian distribution, the team estimated a mixed effects generalized linear model and fit a random intercept by TV news station (N = 36).

**Table 4.** Mixed-effects generalized linear model results for sharing of news agencies' crash-featuring Facebook posts.

Covariate	Shares		
	$\beta$	SE	<i>p</i>
Vision Zero	8.625	8.963	0.336
Weekday	13.099	8.195	0.110
Fatality	-2.837	8.631	0.742
Accident	-1.218	8.755	0.889
Youth ( $\leq$ 17 yrs)	16.003	11.694	0.171
Young adult (18-29 yrs)	-25.504*	10.926	0.020
Adult (30-64 yrs)	-2.310	9.671	0.811
Senior ( $\geq$ 65 yrs)	-32.090	17.438	0.066
Car	13.363	9.151	0.144
SUV	15.812	9.504	0.096
Cyclist	-26.616	24.166	0.271
Pedestrian	11.809	13.558	0.384
Bystander	24.105	16.432	0.142
Motorcyclist	29.108	19.519	0.136
Heavy good vehicle	6.204	11.311	0.583
School bus	13.816	20.080	0.491
Train	-20.949	21.182	0.323
City bus	21.800	23.041	0.344
Legal consequence mentioned	19.043	11.209	0.089
Police quoted	3.340	10.330	0.746
Elected/appointed official quoted	5.615	19.137	0.769

Covariate	Shares		
	$\beta$	SE	$p$
Witness quoted	15.077	12.362	0.223
Crash-involved party quoted	25.741	16.582	0.121
Car and SUV/truck driver focus	-23.967*	10.470	0.022
Ped, bike, and motorcyclist focus	-10.797	15.568	0.488
Motorist delay frame	-8.085	9.081	0.373
Agentic driver	-9.498	9.575	0.321
Victim narrative	-10.371	12.812	0.418
Thematic frame	3.281	14.560	0.822
constant	200.937*	12.044	0.000
TV source variance	66.315	135.014	
In alpha dispersion parameter	15710.490	674.137	
Log likelihood	-6952.012		
AIC	13966.022		
BIC	14121.451		

Note. SE = standard error of the mean. \* $p < 0.05$ . AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria.

Sharing news agencies' crash-featuring posts on Facebook was negatively associated with crashes involving younger adults (aged 18-29 years) and older adults (older than 65 years of age), as well as posts that focused on the drivers of cars, SUVs, and trucks.

The intraclass correlation among the TV news stations was 0.004 with a standard error around the mean of 0.012, suggesting that sharing news agencies' Facebook posts was not strongly correlated within TV news agencies.

### Difference between CBSAs with and without Vision Zero-adopting cities

**RQ2:** Relative to U.S. cities yet to adopt Vision Zero, in what ways have media frames changed within Vision Zero cities from 2012—i.e., prior to Vision Zero adoption in the U.S.—through 2019?

Unfortunately, the crash-featuring Facebook posts the research team identified skewed heavily toward more recent years, i.e., 2018 and 2019. In fact, nearly 70% of the posts included in this study spanning an eight (8)-year period, were published in 2018 or 2019. The limited amount of data from earlier study years, i.e., 2012 and 2013 where only four (4) percent of posts were published, prevented the research team from investigating trends in use of narrative devices and frames over time.

Nonetheless, the team fit logistic regression models estimating the likelihood of employing specific journalistic devices by their placement in a CBSA with or without a Vision Zero adopting city. The journalistic devices of interest included: use of "crash" vs. "accident"; quoting elected officials, crash-involved parties, or police; referencing agentic drivers vs. passive vehicles; employing a motorist delay frame, a thematic frame, or a victim narrative; or focusing Facebook post narratives on drivers of motor vehicles vs. pedestrians, cyclists, and motorcyclists. Logistic regression model results indicate that relative to TV news agencies located in CBSAs without a Vision Zero adopting city, TV news agencies located in **CBSAs with a Vision Zero adopting city differed in three distinct ways:**

1. they were **28 percent less likely** to use the term "accident" to describe a traffic crash;
2. they were **39 percent less likely** to orient Facebook users' attention to the pedestrians, bicyclists, and motorcyclists involved in crashes and instead to the drivers involved and other factors; and

3. they were **2.5 times more likely** than TV news agencies located in CBSAs without a Vision Zero adopting city to quote elected officials in their crash-featuring Facebook posts.

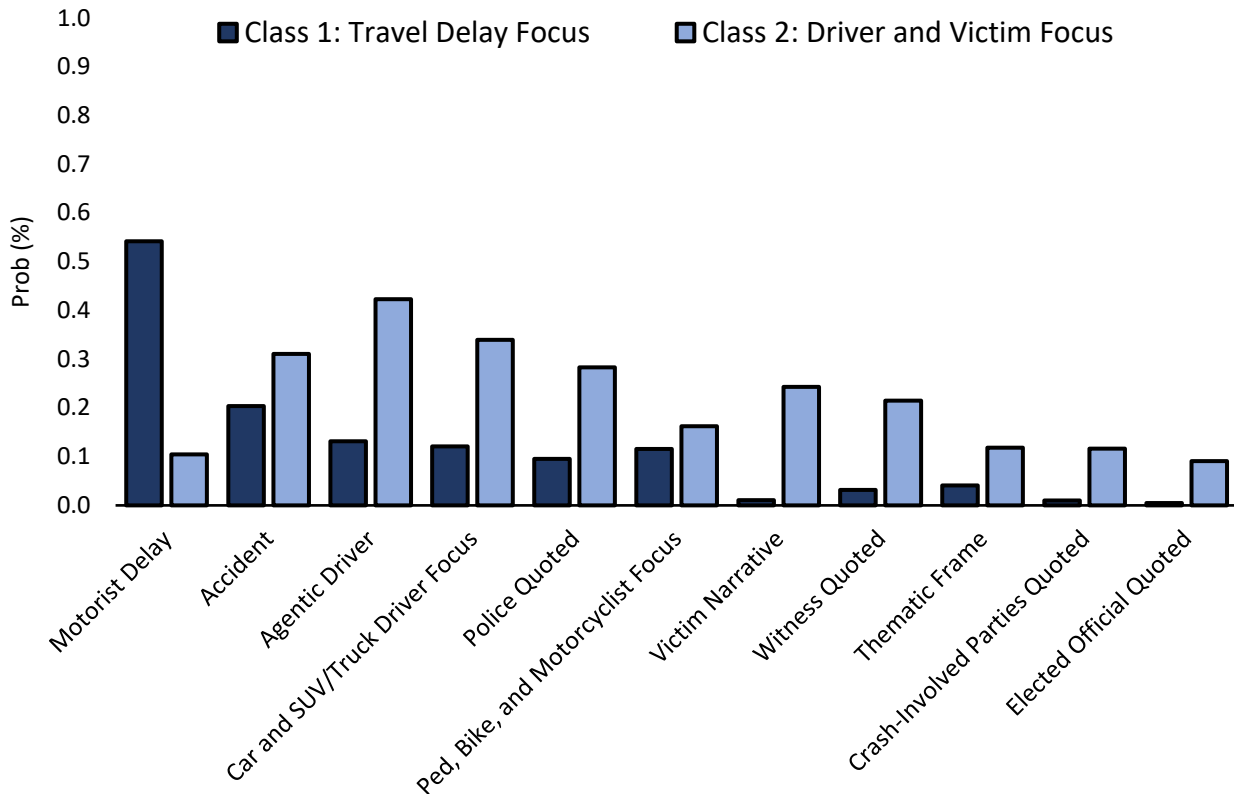
## Story Classes

**RQ3:** What are some common types of crash-featuring Facebook posts that vary according to journalistic practices?

To statistically identify unobserved patterns in traffic crash reporting, the team conducted a Latent Class Analysis (LCA). LCA is a measurement model where individual Facebook posts featuring TV news agencies' coverage of traffic crashes can be classified into mutually exclusive and exhaustive "types" or latent classes of crash reporting, based on the pattern of observations of categorical variables (Hagenaars and McCutcheon, 2009). Model convergence, the Akaike Information Criterion (AIC), and the Bayesian Information Criterion (BIC) were used in determining the number of latent classes in traffic crash reporting.

The LCA grouped all Facebook posts into two statistically distinct latent classes (AIC =1395.646; BIC =1409.041; df =20). Alternative 3- and 4-class solutions failed to converge and reported higher AIC and BIC values, indicating the 2-class solution as the preferred one. The two latent classes were distinguished by whether Facebook posts focused viewers' attention on travel delays, or drivers, crash victims, and other persons involved in shaping the crash narrative. Class 1 posts constituted more than 52% of all Facebook posts and differed from Class 2 posts in several ways. First, Class 1 posts maintained a motorist travel delay frame, and were significantly less likely than Class 2 posts to feature a discernable focus on road users, seldom included agentic drivers, rarely involved quotes from police officers, crash witnesses, crash-involved parties, or elected officials, and almost never employed victim narratives or thematic frames. Class 2 posts distinguished themselves from Class 1 posts by de-emphasizing motorist travel delays, more commonly describing crashes as accidents, featuring agentic drivers and a focus on the road users involved in crashes, quoted police, witnesses, crash-involved parties, and elected officials, and employed victim narratives and thematic frames (Figure 4).

**Figure 4.** Probability of narrative device use in crash reporting, grouped by latent classes.



Following the latent class analysis, the team estimated a binomial logistic regression model to examine correlates of a travel delay focus in TV news agencies' crash-featuring Facebook posts (i.e., membership to Class 1). Facebook posts that closely aligned with Class 1 patterns not only focused more on travel delays but were also more commonly co-occurred with weekday crashes, as well as crashes involving heavy goods vehicle drivers, and motorcyclists. Conversely, Class 1 posts were significantly less likely than Class 2 posts to feature a fatal crash, crashes involving young adults and bystanders, as well as references to any legal consequences of the crashes (Table 5).

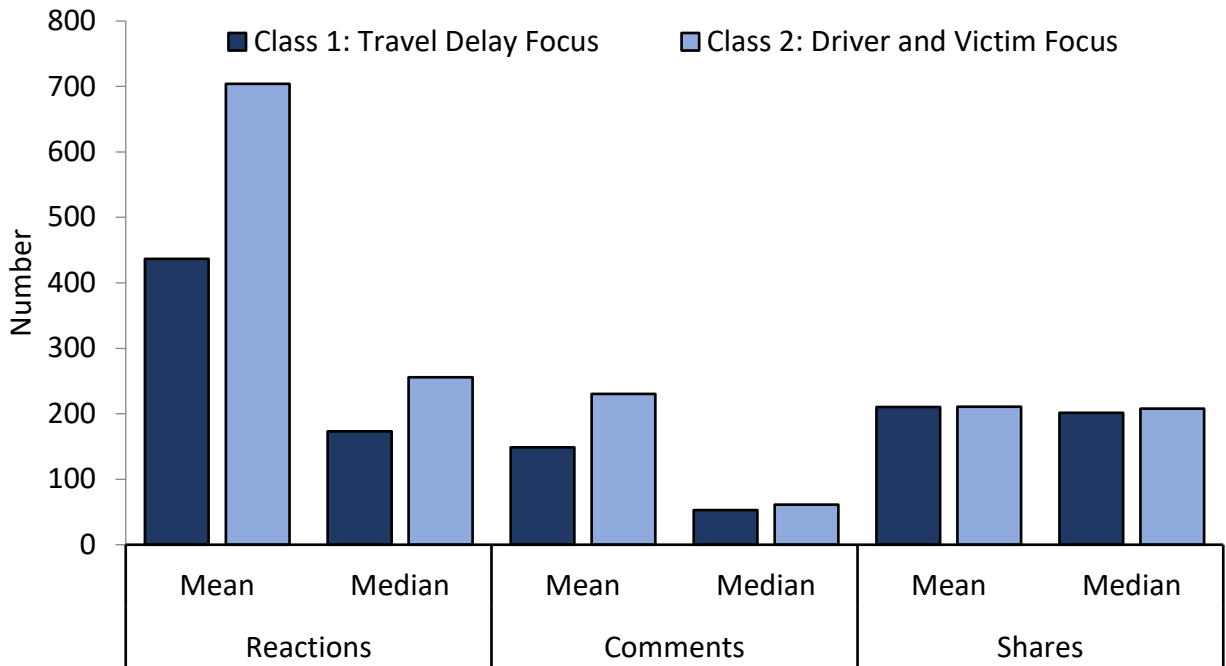
**Table 5.** Logistic regression model results predicting a travel delay focus (i.e., Membership to Class 1, n = 603).

Covariate	OR	SE	p
Vision Zero	0.964	0.188	0.852
Weekday	1.383*	0.200	0.025
Fatality	0.720*	0.113	0.035
Youth ( $\leq 17$ yrs)	0.911	0.188	0.650
Young adult (18-29 yrs)	0.552*	0.110	0.003
Adult (30-64 yrs)	0.742	0.129	0.086
Senior ( $\geq 65$ yrs)	0.959	0.296	0.892
Car	0.864	0.144	0.382
SUV	0.738	0.128	0.079
Heavy goods vehicle	3.164*	0.663	0.000
Pedestrian	1.028	0.211	0.893
Bystander	0.242*	0.079	0.000
Motorcyclist	1.898*	0.594	0.041
School bus	1.066	0.372	0.854
Train	1.491	0.567	0.294
Cyclist	1.033	0.390	0.931
City bus	1.214	0.504	0.641
Legal consequence mentioned	0.284*	0.058	0.000
constant	0.964	0.188	0.852
TV source variance	0.068	0.048	
log likelihood	-614.535		
AIC	1395.646		
BIC	1409.041		

Note. OR = odds ratio. SE = standard error of the mean. \* $p < 0.05$ . AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria.

Despite representing more than half of all TV news agencies' crash-featuring Facebook posts, Class 1 posts were typically associated with less engagement with the posts' material than were Class 2 posts, with fewer mean and median numbers of users reacting to or commenting the Facebook posts. The sharing of Facebook posts, however, was similar between those aligned with Class 1 or 2 (Figure 5).

**Figure 5.** Summary of Facebook engagement, grouped by latent classes.



## Discussion

In response to our first research question—How had Facebook users’ engagement with TV news agencies’ crash-featuring Facebook posts varied as a function of the crash details and frames included in the posts (e.g., road users involved, the age of the victims, references to the physical environment, use of thematic frames)?—our analyses revealed several significant associations. For one, Facebook users were more likely to react to posts featuring youth, one or more quoted crash witnesses or elected officials, agentic drivers, and use of victim narratives. Stories featuring pedestrians, cyclists, motorcyclists, train crashes, and references to at fault car drivers tended to receive significantly fewer reactions than other stories.

Relative to reactions on Facebook, the acts of sharing and commenting arguably involve a deeper level of endorsement of or engagement with the material (e.g., Guo and Sun, 2020). Regarding commenting on Facebook posts featuring traffic crashes, the presence of youth, quotes from crash witnesses and elected officials, and references to motorist delay were associated with significantly more comments than stories without these elements. Conversely, posts featuring pedestrians or cyclists, as well as at fault car drivers were associated with fewer comments than stories not featuring these road user groups. Additionally, sharing posts via Facebook was positively associated with posts featuring crashes involving youth, SUVs and trucks, bystanders, as well as references to the legal consequences crash-involved parties might face. Negatively associated with sharing activity were posts featuring younger adults (aged 18-29 years) and older adults (> 65 years of age), as well as implications that heavy goods vehicle and SUV drivers were at fault.

The notion that audiences engaged significantly less with news agencies’ Facebook posts featuring pedestrians, cyclists, motorcyclists, and train crashes, suggests that members of the American public, many of them Facebook users, may identify less readily with users of their less commonly used travel modes, such as cycling and walking (Andronis, Mavridis, Oikonomou, and Basbas, 2019) or riding e-scooters and other micromobility devices (Bielinski and Wazna, 2020). This finding may reflect an “othering” of those traveling outside of motor vehicles, which can portend negative attitudes and aggressive behavior toward these road users (e.g., Fruhen, Rossen, and Kanse, 2021). Further, the finding that TV news agency Facebook posts of traffic crashes featuring people 17 years of age and younger were associated with more frequent and deeper engagement is consistent with a study by De Ceunynck and colleagues (2015), wherein crashes involving children were significantly more likely than events not involving young people to be featured on TV news. They surmised the overrepresentation of youth-featuring crash stories may contribute to the societal shift toward chauffeuring children to school in wealthier countries. This slow, steady decline in children’s participation in active school travel (e.g., bicycling and walking to and from school) has also manifested in the United States in recent decades (Kontou, McDonald, Brookshire, Pullen-Seufert, and LaJeunesse, 2020).

Regarding the team’s second research question—Relative to U.S. cities yet to adopt Vision Zero, in what ways have media frames changed within Vision Zero cities from 2012 through 2019—due to the skewed sample of crash-featuring Facebook posts from latter study years, the team was unable to examine journalistic trends over time. However, the team was able to cross-sectionally detect differences in journalistic practices between TV news agencies located in CBSAs with and without Vision Zero adopting cities. Binary logistic regression models illustrated how relative to TV news agencies located in CBSAs without a Vision Zero adopting city, TV news agencies located in CBSAs with a Vision Zero adopting city differed by using the term “accident” less often to describe crashes, less frequently focusing reporting on the pedestrians, cyclists, and motorcyclists involved in crashes, and more frequently incorporated quotes from elected officials in their crash reporting.

Detected differences between TV news agencies in CBSAs with vs. without Vision Zero-adopting cities largely make sense. For years, Vision Zero advocates have framed traffic deaths as preventable, deliberately calling these events “crashes, not accidents” and framing crashes not as the result of individual road user failings, but as systemic (Ecola, Popper, Silbergliitt, and Fraade-Blanar, 2018). And case studies of Vision Zero-adopting cities reveal the often central, organizing presence of elected officials in local safety coalitions

(Naumann, et al, 2019), which might explain their more frequent presence in TV crash coverage within CBSAs inclusive of Vision Zero cities.

With respect to our third and final research question— What are some common types of crash-featuring Facebook posts that vary according to journalistic practices? —we find evidence of two latent classes of traffic crash coverage. Class 1 Facebook posts were organized around travel delays, whereas Class 2 posts oriented their audiences' attention to the road users involved in crashes, crash witnesses, elected officials, and road injury themes. And whereas Class 1 reporting patterns more commonly appeared on weekdays and featured heavy goods vehicles and motorcyclists, Class 2 patterns were more often associated with fatal crashes, crashes involving young adults and featuring bystanders, and references to the legal consequences road users face. In brief, Class 1 posts tended to frame traffic crashes as isolated effects that impart travel delays for motorists, and Class 2 posts tended to frame traffic crashes as common, often preventable tragedies affecting road users, their families, and communities. Moreover, Class 2 posts were associated with greater numbers of reactions and comments than Class 1 posts, though the sharing of Facebook posts was similar between Class 1 and Class 2 posts.

Motorcyclists more commonly featuring in Class 1 Facebook posts—i.e., framing crashes as events that delay traffic—is suggestive. Perhaps attributable to their competing for road space, many drivers appear to harbor negative attitudes toward motorcyclists (Crundall, Bibby, Clarke, Ward, and Bartle, 2008). This may partially explain why motorcyclists were unique among other road using groups—apart from heavy goods vehicles—to feature in Class 1 (i.e., travel delay-focused) posts. Promisingly, Shahar, Clarke, and Crundall (2011) discovered that drivers who assumed motorcyclists' perspectives in mixed traffic simulations expressed greater empathy and understanding of motorcyclists' difficulties navigating complex traffic environments.

Journalists and the transportation and public health professionals with whom they engage can inspire empathy among their audiences in the practice of producing news about traffic crashes and injuries. For example, in the process of discerning what “actually happened” journalists often aim to establish a holistic intersubjective perspective on a subject (Gluck, 2016). It is telling that Class 2 Facebook posts in this study were strongly associated with the featuring of quotes from crash-involved parties, witnesses, and elected officials. Many of the Class 2 posts can be construed as attempts to mine what may have transpired during a crash, as well as to create a shared appreciation for what social phenomena, like traffic injury, mean to individuals and communities (Bogaczyk, 2017).

Regarding journalists' use of frames and narrative in their crash reporting, at least one overarching finding is worth further discussion. More than a third of all crash-featuring news agency Facebook posts framed the occasion as something that caused travel delays for motorists. Indeed, an entire class of posts (Class 1) were framed around travel delays. A few TV news agencies appeared to adhere to Class 1 patterns of crash reporting, patterns which often lacked crash victims, featured vehicles rather than agentic drivers, and implied that the isolated crash events “simply happened.” The notion that more than half of posts adhered to Class 1 reporting patterns is troubling. The majority of Class 1 Facebook posts described unpreventable events that simply occurred, yet in 38.4 % of Class 1 posts one or people more suffered a fatal injury.

More recent work on media framing of road user of traffic injury tends to focus on road user culpability. Scholars and advocates call for use of “crash”, a preventable event, over “accident”, one that by definition is unpreventable (e.g., Choi and Lee, 2018). They also request that journalists evoke the agency of road users, especially those with greater amounts of power, and thus duty to care, rather than use passive language “was struck by” operator-less vehicles (e.g., Ralph, Iacobucci, Thigpen, and Goddard, 2019). These are necessary corrections to the discourse around traffic injury. Yet staging of road trauma as solely an interaction among mode using groups tethers the conversation to the actions of individuals at the scene of the crash. Beyond describing collisions as crashes rather than accidents, transportation, public health, community leaders, and journalists can “lift up” the road injury narrative to speak more broadly about the physical and socio-political systems that privilege speed and motor vehicle transportation over equitable access to vitalizing destinations and community life.



Transportation, land use, injury prevention professionals, and policymakers can create safe systems to travel within and through. They can channel resources and sensible policies toward establishing and maintaining safe system elements: safer vehicles for those inside and outside them, streets that afford modal options that harmonize with proximal land uses, and timely, responsive surveillance and emergency systems. Yet buttressing all these system elements is the encompassing cultural milieu. For example, short of at least a quarter of the population (see: Centola, 2021) perceiving road trauma as a pressing social problem, understanding it not as the sole result of faulty or irresponsible individual choices and behaviors, but of complex, nonlinear interacting factors, and avoiding the natural slip into fatalism, it is unlikely that the United States will see significant and lasting amelioration of road trauma.

Required at a broad, coordinated scale is a new discourse about transportation and safety; one that reaches into the mainstream and social medias, into schools, and workplaces, among interest groups, and across diverse networks of increasingly coordinating professional groups. This discourse must feature people who reflect the diversity of this country and who struggle to safely move about in the current system. A suite of policies (e.g., land use context-appropriate speed-limit setting), procedures (e.g., local news coverage of traffic impact analysis methods that incorporate safety assessments), and practices (e.g., service-learning integrating urban planning) known mainly by professionals today must become part of the broader communal dialogue around community design and function. Over time, the public must learn about and contribute to the development, implementation, and appraisal of equitable safety interventions (e.g., safe pedestrian crossings at transit stops). They must perceive these interventions as benefiting everyone, including themselves and those they most care about. Creating truly safe systems can and must involve the people, both current and future generations, who must live with system changes. The mainstream media is merely one forum within which to begin this work of shifting the discourse to the people.

## Study Limitations

Despite the revelations of this study, it possesses a few notable limitations. For one, the team was unable to examine trends over time, as most crash-reporting Facebook posts derived from the final three years in this 8-year study. Thus, we fell short of being able to address our second research question—"Relative to U.S. cities yet to adopt Vision Zero, in what ways have media frames changed within Vision Zero cities from 2012—i.e., prior to Vision Zero adoption in the U.S.—through 2019?" Further, few TV news agency Facebook posts (<12%) reported the sex or race of the road users, precluding analysis of potential gender or race effects in crash reporting. Not only that, given time constraints, the team was unable to further explore the nature of Facebook comments, especially important dimensions such as the apparent sentiment of each comment and whether Facebook commentors systematically placed blame on some road user types over others. As such, this study represents a cross-section of media reportage on traffic crashes and general levels of public engagement with TV news agencies' crash-featuring Facebook posts. It does not provide a necessary analysis of trends in reporting.

## Conclusion

In this study of media frames of traffic crashes, the team discovered that broadcast TV news agencies' Facebook posts featuring the people involved in or witnessing of crash events were associated with more frequent and deeper engagement with the material on Facebook. However, not all road user groups were associated with greater public engagement with crash-featuring news agencies' Facebook posts. Posts featuring more vulnerable road users, such as older adults, pedestrians, cyclists, and motorcyclists were associated less engagement among TV news agencies' Facebook audiences. Further, a dominant framing of crashes in new agencies' Facebook posts presented them as phenomena that delay motor vehicle traffic (Class 1 reporting patterns). Such framing holds the potential to orient the public's attention away from the grim and inequitable reality of road trauma in the United States. Promisingly, however, were study findings that the employment of victim narratives and thematic frames—elements more common in Class 2 reporting patterns—was associated with more engagement with posts. This study illustrates that if the United States is to ameliorate road trauma, members of the news media, and professionals in transportation and public health can and must coordinate their actions. One place to start might be telling inspiring and pragmatic stories about how safety investments can benefit everyone and in copious ways.

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# Appendix A. Keyword glossary

## **Agentic driver**

A journalistic device that uses active voice coupled with references to drivers who contribute to traffic crashes. In news media frames, an “agentic driver” is one who hits or strikes other road users while driving.

## **Compassion fade**

A phenomenon that unfolds when the public’s focus shifts from individuals to ever larger groups of people or to large-scale crisis, such as climate change (Markowitz, Slovic, Västfjäll, and Hodges, 2013; Butts, Lunt, Freling, and Gabriel, 2019).

## **Episodic vs. Thematic frame**

Where an episodic frame would focus on an individual, a thematic frame would focus on the social issue. An episodic frame focuses on a single, concrete instances; a thematic frame focuses on social and physical contexts, and trends over time (Boukes, 2021).

## **Message frame**

Defines the packaging of a piece of rhetoric in such a way as to encourage certain interpretations and to discourage others.

## **Mindsets**

Less conscious patterns of thinking that shape how we make sense of the world and how we normalize or problematize aspects of the existing social order (FrameWorks Institute, 2020).

## **Pragmatism**

A practical, commonsensical approach to addressing problems or issues.

## **Safe Systems**

A systems-based (or holistic) strategy which recognizes that crashes, injuries, and deaths ultimately result from a larger system of interacting factors. Implementing a Safe Systems approach means that there is a focus to actively understand the “whole” and to strategically intervene between interconnected factors in a way that optimizes safety. Taking a Safe Systems approach is to: 1) design for the humans in the system; 2) recognize the importance of speed and energy transfer in safety; 3) employ proactive tools to manage risks across an entire roadway network or population; and 4) foster integrated, collaborative, and coordinated action.

## **Victim narrative**

A form of storytelling that focuses on the life of the victim of a crime or incident.

## **Vision Zero**

A coordinated effort to eliminate serious and fatal road injury, while providing equitable mobility for all road users (Vision Zero Network, n.d.).

## Appendix B. Post Coding Dictionary

Variable	Code	Definition	Example
Object ID		unique identifier applied to media story	
CBSA	1 - 18	Reference VZ and Non VZ cities and CBSAs tab for Intervention and Control CBSA lists	
Date of story		calendar date of story	
Date of crash		calendar date of crash	
Story URL		http(s) link to story	
Facebook message		pre-populated	
Story title		exact title of story	
Story length (# words)		number of words used in the media story.	
Visual used?	1 = Yes; 0 = No	whether a picture or video was used.	
Visual description		a brief description of the thumbnail of the picture's or video's contents.	Example: "damage to pickup truck"
Crash Location		City/County, State	
TV Broadcast News Source		name of TV news outlet covering crash story; should be pre-populated.	
Day of week of crash		day of week the crash occurred.	
Time of day/night		time of day the crash occurred in AM and PM format.	
Weather conditions (in title or text)	Options: Not mentioned, Rain, Sleet, Snow, Windy		
Light conditions (in title or text)	Options: Not mentioned, Daylight, Dusk, Dawn, Dark		
Term "accident" used	1 = Yes; 0 = No		
Term "crash" used	1 = Yes; 0 = No		
Term "traffic violence" used	1 = Yes; 0 = No		
# Involved persons exact	exact # of all injured and uninjured (i.e., "involved") in the crash		
Additional involved persons text (post's description [several, few, dozens, etc.])	term used in the post to describe number of crash-involved persons (e.g., several, dozens, etc.)		

Variable	Code	Definition	Example
Max injury severity	Options: Not mentioned, Fatality, Serious injury, Minor injury, No injury, Unknown/Unclear		
Child involved (0 - 12 yrs old)	1 = Yes; 0 = No		
Teenager involved (13-17)	1 = Yes; 0 = No		
Young adult involved (18-29)	1 = Yes; 0 = No		Examples: truck rollover, driver hits building or tree, etc.
Adult involved (30 - 64)	1 = Yes; 0 = No		
Senior involved (65+)	1 = Yes; 0 = No		
Bystander involved	1 = Yes; 0 = No		
Car involved	1 = Yes; 0 = No		
City bus involved	1 = Yes; 0 = No		
Cyclist involved	1 = Yes; 0 = No		
Heavy goods vehicle involved	1 = Yes; 0 = No		
Moped involved	1 = Yes; 0 = No		
Motorcycle involved	1 = Yes; 0 = No		
Off road vehicle involved (golf cart, ATV)	1 = Yes; 0 = No		
Pedestrian involved	1 = Yes; 0 = No		
School bus involved	1 = Yes; 0 = No		
Scooter involved	1 = Yes; 0 = No		
SUV/truck involved	1 = Yes; 0 = No		
Train involved	1 = Yes; 0 = No		
Other mode involved (list)	1 = Yes; 0 = No		
Victim(s) treated on scene	1 = Yes; 0 = No		
Victim(s) taken to hospital	1 = Yes; 0 = No		
Single road user crash	1 = Yes; 0 = No	crash involving only one road user.	Examples: truck rollover, driver hits building or tree, etc.
Police officer/agency quoted	1 = Yes; 0 = No	one or more police officers are quoted OR a statement from a local law enforcement agency is used.	

Variable	Code	Definition	Example
Planner/engineer/agency quoted	1 = Yes; 0 = No	one or more planners/engineers are quoted OR a statement from a planning/engineering agency is used. one or more public health professionals are quoted OR a statement from a public health agency is used one or more doctors are quoted OR a statement from a hospital/trauma center is used. one or more safety/travel modal group advocates are quoted OR a statement from a traffic safety organization is used. one or more elected or appointed officials are quoted OR a statement from one or more elected or appointed officials is used.	one or more witnesses of the crash are quoted. one or more parties involved in the crash are quoted. references to motorist travel delays as a result for the crash. references to nonmotorist (pedestrian, cyclist, etc.) travel delays as a result for the crash.
Public health professional/agency quoted	1 = Yes; 0 = No		
Doctor/hospital quoted	1 = Yes; 0 = No		
Advocate/safety org quoted	1 = Yes; 0 = No		
First responder (EMS, Fire) quoted	1 = Yes; 0 = No		
Elected/appointed/legal official quoted	1 = Yes; 0 = No		
Witness quoted	1 = Yes; 0 = No		
Crash-involved parties quoted	1 = Yes; 0 = No		
Motorist travel delay mentioned	1 = Yes; 0 = No		
Nonmotorist (pedestrians, bicyclists) travel delay mentioned	1 = Yes; 0 = No	references to one or more road users receiving fines or legal charges	
Legal consequence mentioned	1 = Yes; 0 = No	Options: Both/all parties, Bystander, Car driver, Car passenger, City bus driver, City bus passenger, Cyclist, Heavy goods vehicle driver, Heavy goods vehicle passenger, Moped rider, Motorcycle passenger, Motorcyclist, Pedestrian, School bus driver, School bus passenger, Scooter rider, SUV/truck driver, SUV/truck passenger, Train, Other, Unclear	
Legal consequence for whom?	Options: Car driver, Car passenger, SUV/truck driver, SUV/truck passenger, Pedestrian, Cyclist, Scooter rider, Moped rider, City bus driver, City bus passenger, School bus driver, School bus passenger, Heavy		



Variable	Code	Definition	Example
	goods vehicle driver, Heavy goods vehicle passenger, All parties, Bystander, Pedestrian, Train, Other		
Legal consequence text (misdemeanor death by vehicle, manslaughter, civil suit, etc.)			
Which road user(s) is/are the "focus?"	Options: Car driver, Car passenger, SUV/truck driver, SUV/truck passenger, Pedestrian, Cyclist, Scooter rider, Moped rider, City bus driver, City bus passenger, School bus driver, School bus passenger, Heavy goods vehicle driver, Heavy goods vehicle passenger, All parties, Bystander, Pedestrian, Train, Other		
Road user(s) "focus" text		text used illustrate how the post focused the story on one or more road users.	text used to illustrate how the post placed fault for the crash on one or more road users.
Road user(s) "at fault" text			
Crash attributed to... (text)	Options: Not mentioned, Unclear, Alcohol use/abuse, Bad weather, Dark clothing, Distraction, Drug use/abuse, Emotional distress, Faulty judgment, Intention to impart harm, Lack of/poor roadway lighting, Medical incident (e.g., seizure, heart attack), Operating outside of designated area/wrong way driving/running off road (sidewalk, crosswalk, bike lane, car lane)	text used to explain the "cause" of the crash.	Example: "The teenage driver turned out in front of the SUV, causing the SUV driver to swerve out of the way and hit a telephone pole."
Call to action	Options: Not mentioned, Unclear, Educating road users ('don't drive distracted!'), Enforcing laws (speeding, drunk driving, crossing in crosswalks, cyclists running red lights), Improving infrastructure (ped crossings,		

Variable	Code	Definition	Example
	bike lanes, lighting, traffic signals), Advocacy (more funding, better safety policies)		
Call to action text (indicate if more than 1 call to action)	call issued from citizens, elected officials, or town/city department to take some corrective action to prevent future crashes		Example: "Don't text and drive', warn local police."
References "driver" vs. "vehicle"	1 = Driver; 0 = Vehicle	first story reference; does the story mention the driver of the motor vehicle or the vehicle itself?	
Active vs. passive voice (in Title)	1 = Active; 0 = Passive		Active voice: "Driver/SUV strikes pedestrian"; Passive voice: "Pedestrian struck by driver/SUV."
Active vs. passive voice (1st mention in Post)	1 = Active; 0 = Passive		Active voice: "Driver/SUV strikes pedestrian"; Passive voice: "Pedestrian struck by driver/SUV."
"Hero narrative" used	1 = Yes; 0 = No	Story describes the smarts or bravery of an involved party without whom the outcome would likely have been worse	Example: "she arrived on the scene in the nick of time, performing CPR on those injured in the crash, thus saving their lives."
"Victim narrative" used	1 = Yes; 0 = No	Story describes one or more non-crash related attributes of one or more of the crash victims	Example: "he was a local pastor, a gifted musician, and well-liked by many in the community."
"Memorial narrative" used	1 = Yes; 0 = No	Story memorializes one or more crash victims through its coverage of a vigil or similar service	Example: "Dozens of family members, friends, and neighbors gathered to remember..."
Exoneration language used	1 = Yes; 0 = No	Story language that removes fault from the driver of the vehicle in the crash.	Example: "the sun was in his eyes and he could not see the pedestrian crossing"
Thematic vs. episodic frame	1 = Thematic; 0 = Episodic	Thematic frames draw connections between crashes and focus on broader, institutional factors; Episodic frames describe crashes as isolated incidents and focus on the role of individuals.	Example Thematic frame: "this is the 3rd in a series of fatal crashes on this road this year. In response to this latest fatality, the town is looking into ways to improve road user safety along this entire stretch of roadway."
Notes	General observations or notes worth documenting that are not captured in the coding categories		



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