Four Paradigms: Traffic Safety in the Twentieth-Century United States
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SPECIAL ISSUE: (AUTO)MOBILITY, ACCIDENTS, AND DANGER

Four Paradigms

Traffic Safety in the Twentieth-Century United States

PETER NORTON

ABSTRACT: Traffic safety, once neglected within the larger history of the automobile in the United States, has finally been getting the attention it always deserved. Nevertheless, historians still sometimes misappraise traffic safety in one era by the standards of another. Ahistorical assumptions have contributed to misinterpretations—for example, that Americans of the 1920s were extraordinarily tolerant of traffic casualties because they did not respond to them as more recent traffic-safety paradigms would prescribe. As a corrective, four paradigms, approximately sequential, are proposed: Safety First, Control, Crashworthiness, and Responsibility. Historians are invited to borrow, modify, or replace them, and to consider their applicability to other countries. Whether these particular paradigms survive review or not, historians who are alert to safety paradigms will produce more reliable scholarship on the history of traffic safety.

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What is "safe traffic"? Whom do we protect from road accidents, and how do we protect them? Whom do we imagine when we hear about "accident victims," and whom (or what) do we hold responsible? In discussions of traffic safety, the answers to these questions are typically implicit or treated as self-evident and consequently go unstated and unexamined. But the answers have varied widely over space and time, and as historians, we cannot afford to let them escape our notice.

The authors of the other articles in this special issue offer answers to these questions—answers that are, to varying degrees, particular in time and space. But what do these particular answers add up to? A reply requires a search for patterns in the development of automobility and safety that cut across boundaries of time and space. And while historians have tended to concentrate their attention on particular countries and periods, they have also given us clues that higher-order patterns exist and are worth seeking.[1] As a historian of automobility and safety in the United States, I am struck, for example, by the similarities between American patterns and those in Europe, documented elsewhere by Brian Ladd, and in this volume by Massimo Moraglio and Donald Weber.[2] In Italy and Belgium, just as in the United States, themes of tradition, justice, and efficiency framed controversies among the social groups that competed for the future of streets and roads, just as athletes compete for possession of a ball in play. And as a historian who has concentrated his attention on the early decades of automobility, I am also intrigued by the recurring patterns in the modes of paradigmatic change evident in later decades in the research of Stève Bernardin and Jameson Wetmore. The African stories presented by Mark Lamont and Rebekah Lee are more distinctive in their particulars, but generalized to a high level, their subjects also reflect such dynamics.

These observations suggest the need for a high-level review of the broadest transnational developments in the history of road safety. Like other ambitious projects, such an undertaking might best be approached by degrees. As a first step, I propose here a high-level overview of traffic safety in the twentieth-century United States, with the suggestion that American patterns were echoed across the Atlantic and perhaps elsewhere as well. The "echo" metaphor is used with reservations. One hears an echo *after* the sound that generated it, and the suggestion that developments in the United States came relatively early is intended. But echoes are also *caused* by the earlier sound, and such a causal relationship is not suggested here. In any case, this overview is presented as an invitation and a challenge. It is not a historiographic review essay, but an invitation to historians to discuss the leading paradigms of safety history, and the extent to which the paradigms reviewed here apply to developments in other countries and during other periods. They are also challenged not only to refine

1. Gijs Mom, *Atlantic Automobilism*.
2. Brian Ladd, *Autophobia*. See also Moraglio and Weber articles in this issue.

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or refute the paradigms, but to affirm more positively any national, cultural, or temporal distinctiveness that outclasses more general patterns. The following overview of the U.S. case is presented in this spirit.

Four Paradigms

Because of its complexity, the evolution of traffic safety in the United States defies definitive classification; nevertheless, it will support a case for four overlapping though approximately sequential paradigms:

1. 1900s–1920s: Safety First
2. 1920s–1960s: Control
3. 1960s–1980s: Crashworthiness
4. 1980s–present: Responsibility

Historians of twentieth-century mobility have recently rediscovered safety and given it the significance that it always merited. This rediscovery has been constrained, however, by insufficient attention to high-level safety paradigms, to their social matrices, and to the processes by which one paradigm displaces another. In the face of this deficiency, histories of American traffic safety tend to assess older eras by the misapplication of later paradigms, or to limit themselves to brief periods in which a single paradigm prevailed. Until recently, the relevant historiography has been too scant to afford us good alternatives. The time has come, however, when we can offer historians a preliminary classification of traffic-safety paradigms.

Since Thomas Kuhn's *The Structure of Scientific Revolutions*, explanatory uses of the term *paradigm* have been controversial. Critics have variously faulted paradigms as deterministic governors of history or as radically relativistic.[3] Despite the term's abuse (or its uses in senses that people will disagree about), it remains a uniquely useful term. A paradigm can coexist with other, incompatible paradigms, but is irreconcilable with them; in this way, it is distinguishable from a (technological) *frame*.[4] But *paradigm* is preferred here because diverse frames often coexist in stability—even in the same person; for example, Bob's *recreational-fitness-machine* bike on weekends can be Bob's *commuting-to-work-machine* bike on weekdays. But to turn to the realm of safety, speed cannot be both inherently dangerous and not inherently dangerous at the same time—at least not within the same paradigm. Hence, if the paradigms coexist, they tend to do so antagonistically, with one prevailing over another. While one paradigm predominates, champions of an opposing one must organize. Such periods of paradigm dominance, interspersed with short periods of instability,

3. Work on the controversy is voluminous. For a convenient, recent collection, see Vasso Kindi and Theodore Arabatzis, eds., *Kuhn's* The Structure of Scientific Revolutions *Revisited.*

4. Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs*, 122–27.

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characterize the history of traffic safety in the United States and are indispensable to a clear understanding of it.

The proposed paradigm scheme is an oversimplification. But schemes of classification are useful precisely because they oversimplify the maddeningly complex. The oversimplified classification scheme that proposed *cumulus* clouds and *stratus* clouds helped natural philosophers understand one another. To their credit, they did not force nature to conform to their scheme when a cloud resisted classification, but instead adapted the scheme to what they found—for example, when they made room for *stratocumulus* clouds.[5] The classification scheme that proposed the kingdom of animals and the kingdom of plants helped later scientists to appreciate the distinct attributes of those protists that are both animals and plants—and neither. A preliminary classification scheme for traffic-safety history may promote similar refinements and perceptive innovations; it may also reveal implicit assumptions, making them explicit, and thereby prevent the mis-assessment of one paradigm by the standards of another.

Inattention to paradigms has come at a cost. In retrospect, American drivers and transportation experts of earlier generations can seem to have been remarkably indifferent to traffic safety. Historians have tended to reinforce this misperception. When we observe that Americans of earlier generations did not share cherished components of our safety paradigms, we too hastily conclude that they did not care about safety. But instead, the safety paradigms of the past were so different from our own that we can miss them entirely. Indeed, from the point of view of a century ago, Americans today would seem shockingly indifferent to important aspects of safety. To understand the history of traffic safety we must begin by recovering these lost safety paradigms. A satisfactory comprehensive history of automotive safety in the United States would help us identify the paradigms, but such a work does not yet exist. But perhaps we would be better advised to proceed the other way: with a brief field guide to past auto-safety paradigms, historians would be better equipped to avoid the misapplication of paradigms. Such an outline is presented here as a starting point and invitation to further research.

Misapplications of safety paradigms have been persistent since American auto-safety history began to receive scholarly attention in the 1980s—as may be expected in a young field. In 1984, in the first attempt at a comprehensive scholarly history of automobile safety in America, Joel Eastman searched in vain for national alarm at the high traffic casualties during the 1920s. Finding little concern for vehicular-design aspects of safety, Eastman concluded that there was "a public acceptance of a very high accident rate."[6]

5. Luke Howard proposed the basic cloud nomenclature in 1802; about forty years later, Ludwig Kaemtz proposed *stratocumulus*. See Richard Hamblyn, *The Invention of Clouds*.

6. Joel W. Eastman, *Styling vs. Safety*, 118.

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In point of fact, there was widespread popular outrage (expressed in memorials to accident victims, marches, and macabre publicity) and cooler expert anxiety (especially in the National Safety Council and among automotive interest groups). Eastman missed it because in his search for safety movements, he was guided by Ralph Nader's iconic *Unsafe at Any Speed* (1965), which propounded the traffic-safety paradigm of Eastman's time. This paradigm linked safety to vehicular design, and in this respect had little to do with the safety paradigm of the 1920s. Eastman, equipped with Nader's book, was like a birdwatcher in Australia relying on the *Peterson Field Guide to Birds of North America*. Where were the birds?[7]

Eastman's work was treated as authoritative, and may well have stunted the growth of early-twentieth-century traffic-safety historiography by concealing the history.[8] This problem has persisted into the most recent historiography. A notable exception is Clay McShane, whose *Down the Asphalt Path* (1994) began to give the horror of urban Americans at the mass casualties of the early years of the motor age its due.[9] McShane's lead has not consistently been followed. In his important *Mobility without Mayhem* (2008), Jeremy Packer contends that "it wasn't until the 1930s . . . that traffic safety became a subject of organized concern from academics and engineers."[10] Similarly, Ladd, in an often excellent transnational study of the automobile's social history, finds that "at first [before the 1930s] the growing carnage often induced a helpless resignation"—a position at odds with the mass movements during the 1920s to restrict cars and drivers to protect pedestrians.[11]

The strangely ubiquitous and persistent "love affair" thesis, which maintains that U.S. automotive history can be explained by a distinctively American fascination with cars, is also a retroactive application of the per-

7. Ibid.; Ralph Nader, *Unsafe at Any Speed*. See also Jeffrey O'Connell and Arthur Myers, *Safety Last*. As the title of his book suggests, Eastman viewed the history of automotive safety largely as a matter of vehicle design, culminating in Congress's passage of the National Traffic and Motor Vehicle Safety Act in 1966, which required (among other things) seat belts in 1968 model-year cars. Leading automobile historians have deferred to Eastman on safety questions; see James J. Flink, *The Automobile Age*, 290. Roger Tory Peterson's *Peterson Field Guide to Birds of North America* (2008) began as *A Field Guide to the Birds* (1934).

8. Flink, one of the most recognized historians of the automobile in America, deferred to Eastman on matters of safety; see Flink, *The Automobile Age*, 290.

9. Clay McShane, *Down the Asphalt Path*.

10. Jeremy Packer, *Mobility without Mayhem*, 28. Few historians have been as explicit as Eastman and Packer in alleging that "organized concern" for safety was scant in the 1920s, but the limited scholarly attention to safety during the period is telling. At least two dissertation writers, however, have been explicit on the point: one claims that "widespread national concern about automobile accidents became evident in many media [only] in the early years of the Depression" (Anedith Jo Bond Nash, "Death on the Highway," 5; see also 5–6, 37–38); according to the other, the "public outcry over accidents" began only in the 1930s (Daniel M. Albert, "Order Out of Chaos," 6–12, esp. 7).

11. Ladd, *Autophobia*.

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spective of a later era, and as such it obscures more than it illuminates. Its adherents are many and enjoy good company. This thesis was introduced in 1961 by a source interested in justifying extravagant efforts to accommodate the automobile, and in caricaturing the car's many critics as cranks. While not exactly false, it has distracted serious attention from the most hostile anti-automobile movement of the twentieth century: that of the early 1920s. If there was indeed a love affair, it was matched by a comparably extensive hate. The love affair thesis obscures this movement. Applied to the 1920s, the thesis tends to anachronize earlier subject matter and thereby conceal contemporary safety paradigms.[12]

Study of traffic-safety paradigms offers us more than the chance to rediscover lost perspectives; it will also indicate how safety paradigms compete in a struggle for existence, how they evolve and adapt, and how one paradigm is displaced by another. Safety paradigms thrive in environments in which they can count on popular and institutional support. A paradigm can struggle on without one of these two pillars, but will collapse if it loses both. During transitional periods (1920s, 1960s, 1980s), we can see one paradigm lose in the competition for popular and institutional support while another gains. In practice, institutional bases of support cannot be completely distinguished because popular movements find expression in the institutions they back—and, in turn, institutions secure their positions by cultivating popular support. But as Kuhn pointed out long ago, paradigmatic stability is elusive.[13]

The following synopsis of the four proposed paradigms necessarily purchases its *breadth* at a high cost in *depth*, and no original research findings are presented. Instead, what is offered is a high-level observation point, one that may help historians locate more precise points on the topography of traffic-safety history in the United States. Historians of traffic safety in other countries may also wish to consider the extent to which these paradigms apply transnationally.

Paradigm 1: Safety First

The first paradigm prevailed from the beginnings of automotive traffic until the 1920s. It reflected a perception of cars as dangerous newcomers, and of other street and road uses (especially walking) as more legitimate. Drivers bore most of the responsibility for the safety of others. Cars were

12. For a prominent recent example of a work of traffic-safety history in the United States that makes the "automotive love affair" central to its argument, see David Blanke, *Hell on Wheels*. For the case against the "love affair" thesis and for its strange history, see Peter Norton, "Americans' Affair of Hate with the Automobile," and Peter Norton, "Of Love Affairs and Other Stories."

13. Thomas Kuhn's *The Structure of Scientific Revolutions*, whatever its particular deficiencies, is accepted here as a valuable general guide.

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associated with speed, and speed was almost equated with danger; the car was occasionally condemned as an "inherently dangerous instrumentality."[14] Restrictions on motorists, especially very low speed limits, were therefore routine. In this paradigm, the typical traffic casualty was a pedestrian, often a child. The pedestrian's innocence was contrasted with the motorist's guilt—a perspective typical of both popular iconography and legal rulings.[15] *Traffic safety* was the usual term, and its use reflected prevailing assumptions that roads and streets served diverse users.

These perceptions supported a response to rising traffic casualties that might best be termed *safety first*. This phrase, adapted from the industrial safety movement, was not only the most common safety slogan of the time, but it also suggested an incompatibility between safety and other traffic desiderata—speed in particular. Safety-first campaigns routinely condemned speed, often equating it with recklessness.[16] This paradigm was supported by several pillars. Status quo biases unfavorable to automobiles were institutionalized in the courts, where judges routinely held vehicle operators to a higher standard of care than pedestrians. A related assumption, influenced by the concurrent industrial safety movement, was that speed is dangerous, and moreover that operators of fast or powerful machines assume extraordinary responsibility both for their own safety and that of others.[17]

Popular opinion in cities, expressed in newspapers and public events, held cars and their drivers to blame for street casualties. Pedestrians were innocent until proved guilty; motorists, on the other hand, were under suspicion. These popular biases were reflected in the paradigm's institutional support. Police were, above all, upholders of the status quo in city streets. They were less interested in optimum traffic flow than in orderly traffic and making automobiles conform to cities as they were. The greatest source of institutional support for the safety-first paradigm, however, was the National Safety Council and its local affiliates. As safety first won popular support among traffic-safety advocates who were not associated with industry, it took on new features seldom found in industrial safety campaigns: namely, poignant appeals to innocence and guilt, triggered by charged imagery of parents (especially mothers), children, and demonic motor vehicles.[18]

14. In practice, the courts seldom went so far, but the threat of such a designation was taken seriously by those with a stake in the car's future; see, for example, the article "Hog-Tying the Automobile" in *Ohio Motorist*.

15. This case is presented in detail in Peter Norton's *Fighting Traffic*.

16. Ibid., 30–33, 53.

17. Ibid., part 1.

18. Ibid.; on industrial safety, see Mark Aldrich, *Safety First*.

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Paradigm 2: Control

During the 1920s a second paradigm arose as a challenge to the first; by 1930, it had substantially succeeded and remained predominant until the 1960s.[19] It was preeminently a paradigm of safety through accident prevention achieved through expert control. Such control was exerted principally through the "Three Es": (highway) Engineering, Education, and Enforcement.[20] The goal was often called *highway safety*, a term that signified a growing attention to motorists and road design. Pedestrians lost their innocence; safety education gave child pedestrians responsibility for their own safety, while official disapproval and legal penalties had a similar effect for heedless adult pedestrians. Freed from the burden of suspicion that they had borne under the first paradigm, drivers nevertheless retained substantial responsibility for their own safety and that of others. Educational efforts targeted at new drivers, and enforcement efforts directed at reckless drivers, presented incompetence, carelessness, and recklessness as the chief culprits; the car was thereby exonerated from suspicion as an inherently dangerous machine. Speed and carelessness were dissociated; now speed could be safe. Highway engineers promised to reconcile safety with speed. In its ultimate expression, this approach set for itself the ideal of the "fool-proof highway," the road "built in such a way that accidents will be impossible."[21] The stereotyped casualty was no longer a pedestrian, but the occupant of a car—the victim of another driver's carelessness.

This paradigm elevated the expert to an almost priestly authority. Highway and traffic engineers sought safety through expert control, and, above all, they directed their efforts at three targets: the jaywalker (or undisciplined pedestrian); the "nut behind the wheel" (the reckless driver); and the "dead man's curve" (the poorly designed road).[22] Institutions, some new and others newly mobilized, promoted efforts on each of these fronts. Most were directly associated with the automobile industry and were spurred to action during the 1920s and '30s by the perception that safety first was a constraint on the future of the car.[23]

19. For a detailed treatment of paradigm 2, especially in its early formative years, see Norton, *Fighting Traffic*, chap. 8.

20. The "Three Es" originated in 1915 during the first paradigm, but were adapted for and revitalized in the second; they were devised by Julien Harvey of the Kansas City Safety Council. See Blanke, *Hell on Wheels*, 127; Norman Damon, "The Action Program for Highway Safety," 16–17; and Sidney J. Williams, "Discussion of 'The Pedestrian—Education and Safety,'" 103.

21. Miller McClintock, "The Fool-Proof Highway of the Future."

22. On jaywalking, see Peter Norton, "Street Rivals." In the 1930s, the phrase "the nut behind the wheel" became a common tag for the unpredictable motorist. The earliest appearance of it that I have found is from 1926, when it was attributed to "some wit"; see John P. Hennessey, "Enforcing the Motor Vehicle Law," 102; for the phrase's persistence, see Jeffrey O'Connell (1966), quoted in Paul W. Gikas, "Crashworthiness as a Cultural Ideal," 709.

23. The leading groups included the National Automobile Chamber of Commerce

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By 1930 the American Automobile Association (AAA) had taken the lead on safety education in schools. Children were trained that "the street is for autos" and to accept responsibility for their own safety.[24] Driver-education classes taught older youths the skill of "sportsmanlike driving."[25] And AAA and its member clubs spread the word that pedestrians who did not concede the street to automobiles were lawless jaywalkers.[26] In 1923 the automobile industry founded a second institutional basis of the second paradigm, expanding and reorganizing it in 1937 as the Automotive Safety Foundation (ASF). Thereafter, ASF was the leading national highway safety organization, a constant champion for the principles of the second paradigm.[27]

Fundamental to the institutional support of the second paradigm were gasoline taxes that funded the federal and state "pay as you go" highway funds. This mechanism lavishly funded accident prevention through safe highway design. At the paradigm's apogee, President Eisenhower repeatedly promoted the new National System of Interstate and Defense Highways by citing a claim made by ASF: funded by gasoline taxes, the system would "save four thousand American lives a year."[28]

Paradigm 3: Crashworthiness

A third paradigm emerged in the 1960s as a rebellion against the preceding paradigm and the institutions that supported it. Although its roots reached back to the 1930s, for years it attracted little attention.[29] In the decade preceding the rebellion, however, annual traffic fatalities were high and rising sharply; they exceeded 40,000 for the first time in 1963, then 50,000 in 1966.[30] The second paradigm's emphases on safe speed and accident prevention through control came with neglect of accident mitigation.

(later the Automobile Manufacturers Association), the AAA, the Erskine Bureau of Street Traffic Research, and the Institute of Traffic Engineers; see Norton, *Fighting Traffic*, chap. 8.

24. Ibid., 227.

25. In 1935, the AAA introduced its long-lived driver-education curriculum, best represented in its textbook, *Sportsmanlike Driving*.

26. Norton, "Street Rivals."

27. In 1923, the National Automobile Chamber of Commerce established a Traffic and Safety Bureau; see Norton, *Fighting Traffic*, 208, 247–48.

28. Dwight D. Eisenhower, "Remarks at the Dedication of the Hiawatha Bridge," 781 ("[the system would] save four thousand American lives a year"). Eisenhower repeated this claim in his "Address in Philadelphia at a Rally of the Nixon for President Committee of Pennsylvania," 815. On gas taxes, see John Chynoweth Burnham, "The Gasoline Tax and the Automobile Revolution"; Mark H. Rose, *Interstate*; Norton, *Fighting Traffic*, 197–206; and Christopher W. Wells, "Fueling the Boom" and *Car Country*, 185–93.

29. Gikas, "Crashworthiness as a Cultural Ideal," 707.

30. U.S. Department of Transportation, *Highway Statistics Summary to 1995*, table FI-200.

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High and rising casualty trends helped outsiders, long excluded, to obtain a hearing—for example, in Congress and the popular press—where they could contend that accident prevention through control was insufficient. Such outsiders were critics unaffiliated with the prevailing safety institutions and were consequently free of their governing assumptions; persistently rising traffic casualties gradually armed them with an anomaly with which they could challenge the prevailing paradigm.[31] Because accidents clearly could not always be prevented, cars would have to be redesigned for "crashworthiness," to protect their occupants even during a crash. Under this paradigm, education, enforcement, and highway engineering could never entirely control or banish the "nut behind the wheel." If collisions were inevitable, experts would have to find ways to mitigate the "second collision"—that between the vehicle occupants and the interior of the crashing car. Pedestrians receded still further in importance and were often entirely absent from the discussion. Safety experts inherited concerns for road design and driver education from the previous paradigm, supplementing them with a new concern for vehicle design.[32]

The crashworthiness paradigm is epitomized in the proliferation of driver-restraint systems. Seat belts alone indicated an interest in protecting vehicle occupants from the second collision. Equally important, however, were related systems intended to ensure that occupants wore the belts; these systems reflected doubts inherent in this paradigm that vehicle occupants could be trusted or that education could change habits sufficiently.[33] Instead, regulators and safety experts sought to automate restraints to render them passive.[34] The crashworthiness paradigm coincided with declining legal drinking ages, and the association is surely not entirely coincidental.[35]

Although "passive restraints" (automatic seat belts and airbags) were not mandatory until 1989, airbags were introduced in the 1970s in part as a response to the perception that motorists could not be trusted to wear seat belts. In the third paradigm, these bags were conceived of as an eventual substitute for seat belts—a safety system that did not depend on vehicle occupants to do anything at all.[36]

31. See Kuhn, *The Structure of Scientific Revolutions*, chap. 6.

32. Jameson M. Wetmore, "Redefining Risks and Redistributing Responsibilities," 382–89; see also Eric Dumbaugh, "Safe Streets, Livable Streets," 286–87.

33. Wetmore, "Redefining Risks and Redistributing Responsibilities," 384–85.

34. See, for example, Leon S. Robertson, "Safety Belt Use in Automobiles with Starter-Interlock and Buzzer-Light Reminder Systems."

35. From 1970 to 1976, thirty states lowered their legal drinking ages, most from age 21 to 18; see Mike A. Males, "The Minimum Purchase Age for Alcohol and Young-Driver Fatal Crashes," 183.

36. Wetmore, "Redefining Risks and Redistributing Responsibilities," 390. Crashworthiness was not limited to vehicle design. Highways and roadside fixtures were redesigned to supplement crash prevention (inherited from the second paradigm) with crash mitigation. For example, the introduction of breakaway light poles in the late 1960s reflected an assumption that some drivers would leave the roadway, despite the

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Paradigm 4: Responsibility

A fourth paradigm emerged during the 1970s, matured in the 1980s, and persists to this day. As with the third paradigm, it did not entirely displace the previous one, but overlaid and transformed it.[37] Its expert and lay founders held diverse positions, but all agreed that safety systems, although necessary, were no substitute for driver responsibility.

Like other new paradigms, the fourth emerged in response to the excesses of its predecessor. Its many founders may be represented by an expert outsider, Sam Peltzman, and a lay reformer, Candace Lightner. In 1975, Peltzman, an economist, found that drivers respond to safety innovations similarly to traders in a market: when it suits them, they exchange an abundant good, such as safety, for a scarce commodity that they value more, such as time—hence speed. The result, Peltzman claimed, was disappointing improvement in the safety of vehicle occupants and greater danger for pedestrians.[38] His thesis was predictably controversial, but thereafter safety experts' vocabulary included "risk compensation," and an old-fashioned emphasis on driver responsibility came back into fashion.[39]

In 1980 Lightner's 13-year-old daughter was killed by a drunk driver. A judge, acting consistently with the third paradigm's low estimate of driver responsibility, gave the driver a light sentence. Lightner's response was to found Mothers Against Drunk Drivers (MADD) in order to return responsibility to drivers; it was as a rebellion against the diminished responsibility of drivers in the third paradigm.[40] If the leaders of the crashworthiness revolution of the 1960s and '70s had maintained that recklessness could never be entirely suppressed, MADD stood for the position that crashworthiness could not negate the destructive effects of reckless driving or inebriated drivers. The organization was also an early leader in the fourth paradigm's trend of direct lay participation in traffic safety. Nader's lay rebellion was a call for government regulation. MADD's rebellion was also very interested in regulatory techniques, but it directed much of its energy directly at road users.[41]

Through renewed stress on education and enforcement, the fourth paradigm has assigned drivers more responsibility for their own safety and the safety of others. Seat-belt use became mandatory in forty-nine states

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best combined efforts of highway engineers, safety educators, and enforcement agencies (see "Breakaway Poles Life Savers," 138).

37. Implicitly, in "Safe Streets, Livable Streets," Eric Dumbaugh has made a strong case that in actuality, the third paradigm is still dominant.

38. Sam Peltzman, "The Effects of Automobile Safety Regulation."

39. For an early rebuttal from a third-paradigm expert, see Leon S. Robertson, "A Critical Analysis of Peltzman's 'The Effects of Automobile Safety Regulation.'"

40. On MADD, see Craig Reinarman, "The Social Construction of an Alcohol Problem."

41. Ibid.

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(New Hampshire was the lone holdout). Automatic seat belts were tried, but largely as a placeholder until airbags were introduced. And when airbags finally became standard equipment in the 1990s, they were represented to drivers as supplements to seat belts, not substitutes for them.[42] Educational efforts followed the public health model, promoting behavior change through fear appeals, although more often through appeals to responsibility.[43] Road-design innovations such as traffic calming (road design features intended to rouse drivers' attention to slow them down) shifted responsibility to drivers, often for the benefit of pedestrians.[44]

Conclusion

The distinguishing features of the four paradigms stand out (see table 1). The fourth paradigm is showing early symptoms of the fragmentation that precedes paradigmatic shift. Recent trends toward the removal of road-safety infrastructure in the name of driver responsibility may be interpreted as indications of the paradigm's vigor, or may someday be judged as the symptomatic excesses that precede such change; conversely, there has been growing interest in a kind of superautomation of road safety that would, according to its advocates, absolve drivers of responsibility—an old idea with growing (but uncertain) technical feasibility.[45] In any case, the shifts between all the paradigms reflect underlying changes in popular perceptions, such as those about what streets and roads are for, and about who is a "good" driver and who "bad." They also reflect changing bases of institutional authority and funding. Such institutional and popular factors interacted to produce and support paradigms, and to subvert one in favor of the next. All four paradigms indicate a constant interest in safety, although each constructed *safety* distinctly. A better appreciation of these paradigms and their changing bases of support and a more historicist approach to their study will help historians understand how safety paradigms evolve and serve those who explore this growing field.

42. Wetmore, "Redefining Risks and Redistributing Responsibilities," 390–92.

43. For example, in the 1980s, MADD and other groups used public health techniques to instill the term *designated driver* and the slogan "Friends don't let friends drive drunk" in most Americans' vocabularies; see William Dejong and Charles K. Atkin, "A Review of National PSA Campaigns for Preventing Alcohol-Impaired Driving."

44. Other indications of such change include New Urbanism, "livable streets," "complete streets," and "walkability." That these terms are indefinite, evolving, and contested (many experts would put at least some of them in quotation marks; capitalization practice varies) and often oppose established experts against outsiders is all the more indication that the third paradigm persists in tense coexistence with the fourth.

45. See, for example, Tom Vanderbilt, "The Traffic Guru"; and William J. Mitchell, Christopher E. Borroni-Bird, and Lawrence D. Burns, *Reinventing the Automobile.*

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TABLE 1

The Four Paradigms of Traffic Safety in the Twentieth-Century United States

Paradigm	*Speed*	*Construction of victims*	*Road design*	*Vehicle design*	*Drivers*	*Crashes*
Safety First (1900s–1920s)	Crucial: Inherently dangerous	Innocent pedestrians	Peripheral factor	Peripheral factor	Chiefly responsible	Inevitable with speed
Control (1920s–1960s)	Can be safe (with good road design)	Vehicle occupants; responsible pedestrians	Crucial: Design to prevent accidents	Peripheral factor	Recklessness: The "nut behind the wheel"	Preventable ("the Three Es")
Crashworthiness (1960s–1980s)	Can be safe (with good road and vehicle design)	(Innocent) Vehicle occupants; pedestrians almost absent	Design to make accidents safe	Crucial: Design to make accidents safe	Secondary: Many factors beyond drivers' control	Inevitable: Too many factors to control
Responsibility (1980s–present)	Can be safe (with above, plus responsible drivers)	(Responsible) Vehicle occupants; pedestrians returning?	Design to involve drivers	Design to make accidents safe	Drivers must be involved	Inevitable, but responsibility will prevent many

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