

# *The making of driving cultures*

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## **Overview**

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Culture matters. It is the mechanism through which we come to understand ourselves and our relationship to the world. In the U.S., cars and driving are intimately connected to our individual and collective sense of self—who we are, what we believe, value, and aspire to achieve, and how we interact with others. From the promise of Herbert Hoover’s 1928 presidential campaign slogan, “a chicken in every pot and a car in every garage,” to conflicting portrayals of the sport utility vehicle as a means to experience nature or as a “gas guzzling” status symbol, the car and driving have always referenced the American experience of and desire for freedom, individualism, self-realization, prosperity, and progress.

Culture is also inherently material, accounting for how groups identify themselves and interact with their environment through developing, building, and using artifacts. A car’s design is as much a response to drivers’ fantasies of power, control, and speed as it is to the utilitarian components of travel. The choice to drive is affected by people’s beliefs and values regarding appropriate uses of vehicles and the resources required to operate them. And driving itself changes how people understand time and space, altering their perception and experience of distance. Cars as material objects and driving as an embodied experience, therefore, reflect and reinforce our cultural identity.

The preeminence of cars and driving in American culture makes the relative silence on the high number of deaths and injuries due to car crashes a perplexing phenomenon. Although total U.S. fatalities from recent high-profile catastrophes—the Oklahoma City bombing, shootings at Columbine High School, terrorist attacks on September 11, 2001, and Hurricane Katrina—combined have numbered less than 5,000, these deaths and the events that caused them have had considerable influence on the American political, economic, and cultural landscapes. In contrast, the 42,636 lives lost in 2004 *alone* as a result of vehicle crashes on U.S. roadways barely registered in the collective consciousness of the American public. How can we lose an average of 116 lives *each day* in crashes that are largely preventable and not have more public outcry, media coverage, and government intervention?

Our apparent complacency—both individual and organizational—presents a clear challenge that may best be addressed by approaching driving and traffic safety as effects of culture. In order to understand culture's role in shaping driving behavior, however, we must first critically reflect on the concept of "culture." What is culture? Can it change? Who is involved in its construction? In this chapter, we make the case for an explicitly theorized notion of culture. We argue that how the traffic safety community defines culture dictates courses of action taken in the effort to decrease fatalities, injuries, and property loss. We begin by exploring how a focus on culture fits relative to more typical approaches to driving safety research, as well as to research on cars and mobility. Then we reflect on the idea of culture, outlining current debates over its use. Finally, we suggest four theoretical approaches to culture that we believe are critical to any discussion about traffic safety. It is our hope that these suggestions will expand the definition of culture to better address issues specific to driving. We conclude with recommendations for putting theorized driving culture into action.

## **Culture and driving safety**

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A focus on culture contrasts with more typical approaches to driving safety. Historically, designers and policy makers have assumed that mishaps are bound to occur, and that they should thus concentrate on increasing the crash-worthiness of vehicles (Evans 2004). Recently, safety interventions have considered the limits of drivers' perceptual, cognitive, and motor abilities that may constrain their performance when responding to roadway demands (Lee 2006). Interventions include collision warning systems and vehicle control systems designed to compensate for these limits of driver performance.

Driver performance, however, fails to address factors such as attitudes, goals, and priorities of drivers, which have a significant influence on driving safety (Evans 1991). Attitudes and traits are identified by focusing on driver behavior rather than on performance. Research in this area represents an important contribution to understanding driver crash involvement (Parker et al. 1992). For example, most drivers can maintain their speed within the posted speed limits; however, severe crashes often occur when drivers deliberately choose to exceed the speed limit (Reason et al. 1990). Likewise, young drivers have shorter reaction times than older drivers but crash more frequently; in other words, they perform better but, for various reasons, behave worse (Evans 2004).

Driver behavior has been extensively analyzed using surveys such as the Driver Behaviour Questionnaire (DBQ) that identify types of drivers who are disproportionately likely to be involved in crashes. Several large surveys and associated factor analyses have shown that three distinct patterns of behavior have a powerful influence on driver safety: (1) lapses or absent-minded behavior, (2) errors caused by misjudgment of danger or failures of observation, and (3) violations or deliberate neglect of the conventions of safe driving (Blockey and Hartley 1995; Parker et al. 1995).

Research on driver behavior has focused almost entirely on individual differences as contributors to unsafe driving behavior. The five-fold difference in the rate of fatalities between states in the U.S. and the thousand-fold difference in this measure between countries, however, suggests culture has an important influence on driving behavior, as well as playing a critical role in driving safety more generally (Lee 2006). A shift of focus to the cultural forces at play in the wider driving environment provides a means to address the willingness of society to invest in

transportation infrastructure. A focus on culture also highlights the influence of societal expectations on the definition of acceptable transportation risks. Neither of these perspectives is possible within frameworks that focus on driver performance or behavior.

Recently, risk management researchers have recognized the prominent role safety culture plays in influencing organizational practices that lead to mishaps. As a specific example, the Barrings financial catastrophe appears on the surface to be a result of the actions of a single rogue trader; however, a more detailed analysis reveals that the organizational culture contributed to the catastrophe by permitting a persistent failure to balance the accounts (Reason 1998). Now may be the time to consider traffic safety not as an individual issue but rather an organizational and societal one.

Considered independently, every crash represents mishaps at the scale of the individual, but the annual toll of crashes may best be considered a societal mishap. Reason (1998) examined the consequence of considering mishaps as individual or organizational failures. Important differences include the influence of context and the visibility of safety boundaries. Considered as individual failings, mishaps reflect the behavior of people responding to immediately visible indicators of safety boundaries with little influence from the organizational context. According to this perspective, people are assumed to be in close contact with hazards, and failures occur because of inappropriate choices and cognitive limits. Applying this to driving, individual drivers have a direct view of weather conditions and emerging roadway hazards, and crashes occur because drivers are reckless and error-prone.

A more productive approach may be to consider crashes from an organizational perspective. According to this view, determining the cause of a crash requires a broad consideration of its context and an understanding that safety boundaries may not be immediately visible to the individual. Reason notes that with industrial processes the layers of defense can sometimes allow individuals to inadvertently approach and cross critical safety boundaries without feedback to guide safer behavior, encouraging a culture of non-compliance. We can draw parallels to driving, where the multiple layers of defense and delay in feedback diffuse responsibility, propagate unsafe practices, and increase the risks that society deems acceptable. Despite the parallel with industrial safety, relatively little effort has been made to apply the insights of risk management research to the driving domain.

Driving culture has only recently surfaced as a focus of scholarly inquiry within the social sciences (Featherstone 2004; Miller 2001; Sheller and Urry 2006). Two distinct but overlapping approaches have emerged. The first focuses on the car as a form of material culture, asking the deceptively simple question “what is a car?” as its analytical starting point (Miller 2001). Miller (2001) suggests that we shift our understanding of the car from utilitarian accounts of its use value, or doomsday accounts of its destructive capabilities, to humanist accounts that consider the car as necessarily entangled with our sense of being human. Work within this approach examines the everyday consumption of the car across cultures (Young 2001), and the role cars play in constructing cultural identity. It looks at, for example, youth culture defined through car consumption (Carrabine and Longhurst 2002) and the negotiation of gender identity and politics through everyday engagements with cars and daily mobility (R. Law 1999; Stotz 2001).

The second approach emerges out of what Sheller and Urry (2006) call the “new mobilities paradigm.” This perspective advocates an emphasis on the fluidity, temporality, and motion involved in social exchanges, as well as the activities that occur while (in our case) drivers are on the move. It is concerned not with the destination but rather with the trip itself. Sheller and Urry

(2006) suggest that the absence of a consideration of travel within the social sciences is due to it being perceived as a “black box, a neutral set of technologies and processes predominantly permitting forms of economic, social, and political life that are seen as explicable in terms of other, more causally powerful processes.” They attribute this to a sedentarist approach in the social sciences that favors stability and place while disregarding distance, change, and mobility. They and others counter this with a focus on automobility, with the double meaning of “auto” hinting at the hybrid character of the linked car and driver, simultaneously intertwining humans, machines, infrastructure, and “cultures of mobility.” Research within the new mobilities paradigm examines the embodiment of different forms of travel, “seeing them in part as forms of material and sociable dwelling-in-motion, places of and for various activities” (Sheller and Urry 2006).

Although these approaches have begun to address the culture gap in driving research, relatively few have addressed driving and safety (for exceptions, see Beckmann 2004; Featherstone 2004; Lupton 1999). They do, however, provide insights into how to approach driving culture. In the next section we take a step back to critically reflect on the concept of culture. Taking our cue from the work cited above, we then think through the implications of a theorized culture on driving and traffic safety.

## **Towards a theorized culture**

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Definitions of culture are plentiful and varied<sup>1</sup>, in large part due to the expansive reach of the “cultural turn” across the social sciences and humanities in the past two decades. A common definition of culture is that it consists of the beliefs, values, norms, and things people use, which guide their social interactions in everyday life. Using this definition to understand driving culture, we can, for example, document what people believe is acceptable driving behavior, or the degree to which people believe they can mitigate risk through the vehicles they drive. What is missing, however, is an account of the processes by which society creates, reproduces, and justifies certain values and beliefs while suppressing others. Who defines what is acceptable driving behavior, and with what effect? What constitutes risk for different driving populations, and how do factors such as social status influence how risks are perceived and addressed?

Although the rather insular debate over the meaning of culture may seem esoteric, it has serious implications for the way in which we approach the study of and interventions into driving culture. At the most fundamental level, a consideration of culture as a *structure* or as a *process* points to a tension between an approach that accepts culture as an “unproblematic category that can be used to explain people’s behavior” (Jackson 1989) and one that seeks to understand culture’s mutability. As Mitchell (2004) notes, “culture can never be an explanation: it is what must be explained.” What follows are five points inspired by Mitchell that suggest how we should tackle “explaining” culture.

*1. Culture is never naturally given.* The push to define what culture is assumes that there is a natural and necessary link between a meaning and the thing (e.g., object, activity, idea) to which it is attached. Essentialist positions such as this have the effect of fixing culture, denying its historical and geographical context because it presupposes the meaning of culture prior to its articulation through everyday practice. Taussig (2004, 308), quoting Strathern (1993), states that

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<sup>1</sup> Mitchell (2004, 156) notes four typical definitions: “ways of life,” “maps of meaning,” “systems of signification,” or “habits and norms.”

culture “lies in the manner in which connections are made [between ideas], and thus in the range of contexts through which people collect their thoughts.” Culture, then, is context dependent, not static or predetermined. This implies two points relevant to traffic safety culture. First, by acknowledging culture as a dynamic process of interaction reproducing meaning and patterns of behavior, not a static entity containing them, we also acknowledge the agency of traffic safety stakeholders to affect social change. Second, taking seriously the notion that culture is context dependent means that attempts to change culture must consider the places and networks of relations in which people are engaged that both create opportunities and limit options for how people make sense of the world.

2. *Culture is never singular.* Many discussions of culture mask the diversity and fragmented character of social life by suggesting that a group has a coherent or unified identity or perspective. While there can be a generic quality to culture, it is experienced, and therefore rearticulated, in varying contexts (see above). At the most intimate scale, an individual driver could embody conflicting emotional connections to her car, experiencing it as her “territory” where she seeks refuge from her daily responsibilities, only in a later context to feel oppressed by its part in fulfilling the domestic obligations her role as mother requires (Sheller 2004). Here, safety may represent the burden of family, and escape, therefore, may translate into unsafe driving practices (Garvey 2001); such nuances would be lost if we approached family carpooling as universally experienced and understood. This suggests that efforts to change driving culture must recognize its plurality and account for the multiplicity of driving practices and populations that constitute specific, localized roadway cultures.

3. *Culture is never neutral.* Contemporary perspectives suggest that culture is constructed and stabilized within intellectual, political, and economic arenas, which reflect and reproduce dominant beliefs and values (Haraway 1991; Latour 1993). This suggests that systems of meanings surface as effects of contestations among and between micro (individual) and macro (institutional) scales of interaction. For example, while exceeding the speed limit is a violation of traffic safety regulations, the consequences of doing so are negotiated between enforcement officials and drivers. Strict enforcement changes how drivers behave, even when law enforcement is not present. Lax enforcement has the opposite effect, creating a driving culture that accepts the additional risks associated with increased speed for the personal benefits associated with faster travel. This suggests that what we recognize as a culture of complacency regarding driving is actually the product of negotiations between different actors with varying interests. As such, efforts to promote a shift in driving culture must move beyond a singular focus on the driving public to include the multiple actors (e.g., law enforcement, policy makers, educators, engineers) involved in negotiating our dominant systems of meaning vis-à-vis driving. Any approach to establish traffic safety culture must reinforce the shared responsibility among individuals and institutions for promoting and practicing safe driving.

4. *Culture is always an effect of power.* Closely related to the previous point, because culture is reproduced through social relations, it is necessarily imbued with power. Power here is not sovereign power, but rather decentered, relational power, following from Michel Foucault’s extensive work on the subject. Examining the social processes at play in the stabilization of culture provides great insight into the way in which power shapes what emerges as “culture.” The transformation of public perception and social practice brought on by the success of the organization Mothers Against Drunk Driving (MADD) after its inception in 1980 illustrates this point. In its first four years of activism, then-President Ronald Reagan announced a Presidential Commission on Drunk Driving, federal highway funds were set aside for state-level anti-drunk driving initiatives, state-level anti-drunk driving bills were enacted, and the Federal 21 Minimum

Drinking Age Law was passed. MADD's early achievements represent a success in promoting driving safety culture through grassroots activism. Such successes demonstrate that while the driving public is often characterized as acquiescent, they are capable of producing radical cultural change. An important point of leverage for national organizations committed to traffic safety is collaborations with community-based initiatives that promote culture's change through local activism.

5. *Culture is best modified through changes in social practice.* Risk management literature suggests that the most productive points of leverage are material in nature, advocating a focus on modifying structures, policies, and controls over attempting to change beliefs, values, and attitudes (Reason 1998). The move many states are making toward graduated licensure for new teen drivers bears this out. While drivers' education is instructive in communicating traffic laws that govern driving, graduated licensure has shown promise in reducing teen driver crash rates through restricting when, how, and with whom teens drive (Insurance Institute for Highway Safety 2006). For the traffic safety community, interventions must value praxis-oriented solutions ranging, for example, from implementing a compulsory "How's My Driving?" program for all motor vehicles (Strahilevitz 2006) to reallocating enforcement funds to increase police presence on roadways. Such approaches can be powerful. Commercial fleets that have placed "How's My Driving?" placards on trucks have seen 20–53% reductions in crash rates. The following section builds on these insights to identify ways in which driving culture might be altered to promote traffic safety.

## **Theory-based interventions informing a culture of safe driving**

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In this section we present snapshots of four approaches to culture's construction and stabilization that we believe are useful to understand driving as a complex and multi-dimensional cultural practice. These approaches are multidisciplinary in nature. They were developed in conversations between fields including geography, cultural studies, science studies (broadly drawn), organizational studies, and risk management. Each is fundamentally relational, advocating an approach that understands culture as a process, generated through relationships between drivers, vehicles, roadways, and the institutions involved in driving. They also share a commitment to broadening what traditionally falls under the purview of culture, expanding our understanding of how culture is generated. In each section we briefly describe the approach, provide concrete examples to illustrate how it relates to promoting traffic safety culture, and identify points of leverage made possible through its application.

### ***A place-based approach***

Motor vehicle travel is the primary means of transportation in the U.S., yet as Sheller and Urry (2006) note, little attention is paid to the cultural forms engendered through the "dwelling-in-motion" that characterizes the car trip. In cars, drivers interact with passengers, talk on wireless phones, read, listen to music, eat and drink, groom themselves, even watch movies and use wireless remote-access Internet service (The Gallup Organization 2003). While driving, drivers communicate with each other using turn signals, horns, hand gestures, etc. They also build and

strengthen associations with their driving environments through repeated patterns of activity and behavior. Cars, then, become more than a form of transportation, and the roadway more than just a surface upon which we drive. They come to constitute part of life's geography, or the ways in which social practices make spaces, such as the filling station, the Interstate, the rest stop (Normark 2006), and vehicles themselves (Laurier 2004), into unique places imbued with meaning.

Perhaps because of the familiarity of car travel and its instrumental role in our daily lives, crashes are accepted as unavoidable consequences of the convenience of car travel. At the societal scale, crashes are seen as aberrations, or worse, as banal events worth little public attention beyond voyeuristic curiosity (Featherstone 2004). Yet they are not experienced as such by those most closely affected by crashes: drivers, passengers, and pedestrians killed or injured in a crash, friends and family mourning the loss of loved ones, and communities grappling with a crash's aftermath. As with car travel, responses to crashes are emplaced or imprinted on local landscapes. Impromptu road-side memorials or sobriety checkpoints, for example, produce for many a momentary slip in how they perceive the spaces in which they live and the things, such as cars, that they use and embody on a daily basis.

These examples suggest that place plays a role in how we experience and shape traffic safety culture. Following from Massey (1994), we define place as a constellation of socio-spatial relations that intersect at a particular time and place. State-level responses to the 1998 Transportation Equity Act for the 21st Century (TEA-21) help unpack this definition. As part of the authorization of Federal surface transportation programs for highways and highway safety, the law required states to adopt acceptable open-container laws in order to receive their federal highway construction funding. While many states passed open-container laws, several states refused to adopt the provision. In testimony before the Montanan legislature in 2003, then-Governor Judy Martz characterized her constituents' opposition to the open-container bill as entrenched in a place-based identity: "there is a myth in Montana that drinking and driving is part of being a Montanan" (Martz 2003). Here "being a Montanan" describes the localized, "particular" response of resistance to government intervention that is ingrained in Montana's autobiography, or the stories Montanans tell themselves about who they are in relationship to their sense of place. The invocation of place extends beyond their identification as Montanans to also include the place-making that occurs in their vehicles and on the roadway, as these are the everyday sites in which such forms of resistance are enacted.

A place-based approach provides a framework within which we can examine vehicles and roadways as "places-in-the-making," or spaces where meanings are continuously redefined through repeated engagement. Considering cars as "places" for the hanging-out activities of teenagers, for example, expands the work of others who have shown how teens' identities are shaped through their use of cars. Dunkley (2004) documents the role male teens' emerging masculinity plays in the social geographies of rural youth who drive across the Canadian border in order to drink in bars. Extending her thesis to include the socio-spatial relations unfolding in teens' cars would provide another angle from which we can analyze the behaviors that contribute to or challenge sensation-seeking and risk-tolerance among teens. Carrabine and Longhurst (2002) examine how the ability to drive, and car consumption itself, affords participation in extended networks of sociability. A place-based approach that considers the social practices occurring in cars could provide stakeholders with a richer understanding of the conflicting pressures teens must negotiate (e.g., to socially "fit-in" or to drive safely) while driving and how that affects their behavior and performance.

From these examples we see that places are defined by and in turn define people's identities, and that cars and driving play an important role in how people experience the places through which they travel. This suggests our first point of leverage: that we approach traffic safety culture by addressing the way driving cultures are reproduced through practices that take (and conversely, make) "place" (Jackson 1989). The specificity of place provides insight into the influence on driving behavior of the micro-cultures of the car and the roadways on which drivers travel on a daily basis. For example, ethnographic field methods could be used to document how teens use their cars, what activities occur in their cars, and what car travel means in relationship to social status and identity construction. Such analyses could inform culture-based interventions to risky driving behavior by, for example, implementing restrictions that limit activities that pose the greatest risk for teens while driving (e.g., driving at night or with teenaged passengers). A place-based approach also can account for the unique identities certain roadways acquire. Broadly drawn, urban roadways have a different set of norms related to communication and acceptable risk-taking strategies than do rural roadways. Such differences suggest that uniform initiatives that disregard the specificity of place may not be relevant to particular segments of the driving public.

## ***Cyborg interventions***

Advances in vehicle design and technologies have brought to the American consumer increasingly "smarter" vehicles. Such vehicles provide greater protection to occupants during crashes, detect critical driving situations, and adapt to these situation without driver input (Lee and Kantowitz 1997; Walker, Stanton, and Young 2001). One element of smart vehicle technology is its ability to "learn" the driver's preferences and behaviors, adapting its function to the driver and driving environment. Sophisticated in-vehicle safety systems exemplify this trend, featuring driver-state monitoring systems able to determine the driver's workload and distraction level and temporarily disable carry-on technologies when distraction presents too high of a risk (Donmez, Boyle, Lee, and McGehee in press). Such enhanced safety systems more readily reveal the blurred distinctions between the driver, car, and roadway that have always existed but have rarely been acknowledged. This is a far cry from early approaches to driving and traffic safety, which assumed that cars are inert and passive and that driving is something the human does to the car and the road (Dant 2004). How "car" and "driver" have been separated reflects western philosophical traditions that uphold the separation of mind from matter, a separation that does not have ontological grounding. What happens—epistemologically, ontologically—when we reject the distinction between the driver and the car and instead attempt to understand the qualities of an emergent car-driver hybrid?

The metaphor of the cyborg (Haraway 1991) sheds light on the influence of technology on culture, and is particularly useful in our attempt to understand the car-driver hybrid as an effect of and agent in the construction and stabilization of driving culture. Part human, part machine, the cyborg recognizes a social reality that has emerged out of the increased proliferation of technology in our daily lives. The cyborg metaphor has the potential to change what influences culture precisely because of how it reconceptualizes what counts as agents in culture's construction. Much of Haraway's *Cyborg Manifesto* (1991) reexamines commonly accepted boundaries: organisms and machines, nature and culture, and physical and non-physical entities. On close examination, Haraway demonstrates that all of these boundaries are porous. Cyborgs embody transgressed boundaries, constituting a complex set of partials—partial knowledges, partial experiences, and partial viewpoints.



Reconceptualizing driving as a relational activity performed by a car-driver assemblage provides another lens through which we can understand driving behavior as rooted in culture. In this framework, driving is the combined effect of couplings between people and machines. Using a cyborg approach, Lupton (1999) analyzes the phenomenon of road rage, going beyond systemic explanations (e.g., roads are too congested) to explore how “the embodied ontology of the car-driver relationship is constructed, negotiated and experienced.” She notes that cyborg subjectivities are not only about one individual’s interaction with his car, but also about how that cyborg coupling interacts with other cyborgs on the roadway. In her analysis of interviews with drivers, Lupton notes the dehumanizing tendencies that accompany the emerging cyborg subjectivity. The pseudo-private space afforded by the “metal cocoon” of the car permits some drivers to act against social order, with the effect of justifying violent and dangerous driving by denying the humanity of other roadway occupants. In turn, the car enables the driver to become a “monster” whose emotional reactions to the driving environment are exacerbated by the increased physical force of the car-driver coupling.

Lupton’s re-imagining of road rage from a cyborg perspective does not add nonhumans to the mix, but rather it accounts for the shared experience, the commingling that is integral to understanding the complex dynamics of driving culture. It recognizes that driving is an embodied experience, and, thus, that the emergent material and discursive qualities of the car-driver are unique to its coupling, not solely the experience of the driver independent from her car. This suggests our second point of leverage: by accepting the agency of the car-driver hybrid, we can influence driving behavior in new ways that can change driving culture and promote greater safety. For example, speed selection was once governed by the driver. Emerging technologies place increasing agency in the car-driver hybrid, such that intelligent speed adaptation and adaptive cruise control make speed choice very much the product of a cyborg rather than a person. Understanding how to influence this evolving agency to achieve even modest reductions in speeding could save many lives.

To date, vehicle technology has been developed without regard for how it might influence driving culture, but this does not have to be the case. Possible interventions include equipping vehicles with technology specifically designed to promote a safety-oriented driving culture. Vehicles, for example, could record instances of risky behavior that force other drivers to compensate. A summary of such instances could provide consistent feedback regarding the risks that drivers take but often fail to recognize. Such information, summarized across a community, could become a point of pride for the individual and the community, eventually promoting a safety-oriented driving culture.

## ***A network-based approach***

Vehicles rely on more than just the driver’s inputs for safe mobility to occur. While the cyborg metaphor implies an inward-looking view that accounts for the permeable boundaries between entities, dissecting the operation of a car exposes the vast networks that coalesce to produce the driving event. Vehicle operation depends on the electro-mechanical network of the vehicle and the neuro-physiological network of the driver. The driver must have some degree of driver education and training to learn how to drive. She also must have the financial resources needed to operate and properly maintain her vehicle according to manufacturer guidelines and government regulations. At a macro level, extended networks of vehicle manufacturers, petroleum producers and transporters, road crews, and regulatory and enforcement organizations

must be adequately funded, safe-guarded, and managed. And future design requirements and driving regulations depend in part on the work of accident investigators and reconstructionists, who generate accident reports that transform the car-driver from a mobile assemblage to data (Dant 2004).

Actor-network theory (ANT) (Latour 1987; J. Law 1994) provides a theoretical and methodological resource for understanding how complex networks of people, vehicles, organizations, and infrastructure influence driving culture. Like cyborg perspectives, ANT forces a rethinking of the relationship between people and things, extending agency to vehicles and the built environment as a way to account for the influence inanimate objects have on the interactions among people and between people and things. The example above documents the heterogeneous associations between human and nonhuman entities, including drivers, cars, money, accident reports, engineers, and so on. Actor-network theory proposes that these entities, called *actants*, take and keep their material and discursive shape through relations with others in their network (Murdoch 1997; Whatmore 2002). The emphasis of ANT is less on explaining why something occurs in favor of tracing how networks emerge and are maintained and justified, or abandoned and dissolved.

Barnes (2001) highlights several insights developed under the rubric of ANT. First, networks are not static entities but are always in the process of becoming. Their dynamism does not, however, mean that they are not durable. To the extent that actors are committed to the network's linkages, the network maintains stability. This implies that networks also are modifiable and potentially fragile, with the ever-present possibility of breaking down. When one network disintegrates, the web holding the actors in place reconfigures, changing the relations, and therefore the meaning, of the actors. Simply stated, according to ANT, context matters in discerning what a thing, like a vehicle, means. Second, as a consequence, knowledge and "truths" that emerge are specific to a network; they are not universal. Third, following from this, actors possess no essential meaning. Rather, meaning is continuously generated within the network of relations of which an actor is part. An intact car "is" something wholly different than a car in the scrap yard or the car as it is represented in an accident report, yet each instance shares the same moniker (Beckmann 2004). Fourth, actors are enrolled into a network through a process called translation, which, much like its use in linguistics, involves creating convergences between actors by relating things that were previously different (Gherardi and Nicolini 2000).

Actor-network theory has held particular sway within risk management and public health literatures, especially in the collective effort to better understand how knowledge about safety is translated between actors. Gherardi and Nicolini (2000) use ANT to disrupt the presumed stability of "safety knowledge" within the construction industry. They document how safety is performed through often divergent daily practices, such as a site foreman avoiding unwanted attention from inspectors by placing scaffolding only on a new construction's exposed side. The foreman's performance of safety circuitously demonstrates that he has developed cultural competence regarding "official" safety knowledge while at the same time subverting it. The interplay between site foremen and safety inspectors illustrates how competing perspectives on safety coexist, not in a consensus or compromise, but in constant negotiation.

Lloyd and Roen (2002) document a similar fluidity of knowledge between fire-safety experts and their interactions with households participating in fire-safety programs. The authors document variations in firefighters' assessment, advice, and training as they evaluate residents' fire-safety preparedness, including testing fire alarms and discussing escape routes. Firefighters noted that the guidelines they are required to follow seem idealistic when actually applied to residents'

homes, especially for households with limited financial resources. As a result, instead of offering uniform feedback, firefighters provided assessments that they deemed appropriate given the household's specific set of circumstances. Lloyd and Roen found that for fire-safety knowledge to work (i.e., reduce injuries and fatalities), it has to be made meaningful for those whose responsibility it is to enact it. Safety knowledge is not something that can be universally applied, but rather it is continually performed and, therefore, transformed through adaptation in the various contexts in which it is put to use.

As demonstrated through these examples, safety knowledge is not delivered and accepted or rejected, but rather generated through complex social interactions between networks of actors. In driving, a safety culture emerges through a similarly complex network. Revealing the vast networks of actors supporting what we recognize as U.S. driving culture thus reverses the tendency to ascribe behavior to overly simple linear causation. This suggests our third point of leverage: what emerges as "driving culture" is necessarily situated in networks of ongoing social practice. As a concrete example, just as speed choice depends on the cyborg combination of the driver and vehicle, it also depends on the speed of the traffic that surrounds them. Actor-network theory provides a methodology for tracing how specific behaviors like speed choice and cultural concepts like "safety" are valued or devalued and propagated through everyday driving practices, a point we believe is critical in attempts to construct and promote a traffic safety culture. A network approach provides a critical lens through which to discern how, for example, complacency in U.S. driving culture has been held in place among a variety of actants. It also reveals what practices already exist that promote traffic safety culture but have yet to comprise a robust network.

One of the insights of ANT is that the more robust the network, the more influential its hold on society. To affect large-scale cultural change, individuals and organizations at the local, state, and national scales (e.g., Students Against Destructive Decisions, Mothers Against Drunk Driving, the National Highway Traffic Safety Administration, AAA Foundation, and the Insurance Institute for Highway Safety) need to work together to enroll actors into a traffic safety network. This can be achieved through activism that translates "traffic safety" in such a way as to make it relevant to inhabitants of different driving cultures. Knowledge and social norms then circulate through this network according to the topology of the network connections, which may differ dramatically. Specifically, social network analyses could reveal particularly influential members of the network. Recent studies have shown that relatively few nodes of a network often have a disproportionate influence on the whole (Borgatti and Foster 2003; Watts 2004; Watts, Dodds, and Newman 2002).

## ***A multi-level control approach to enhancing driving safety***

The network of interactions that contribute to driving culture described above often will adapt and evolve in a manner that promotes driving safety. However, this is not always the case. In driving, as in other domains, the network of actors involved can emerge in a configuration contrary to safety (Reason 1998). To guide adaptation that favors safety requires a degree of control. Figure 1 shows a framework of risk management developed for complex socio-technical systems that places driving in a broader, multi-level control process (Rasmussen 1997). The framework identifies specific actors and relationships that define the network associated with

driving safety. This structure highlights distances in time and association between drivers at the bottom of the diagram and the government at the top.

An important challenge highlighted by Figure 1 is that of control in the face of the diverse range of environmental stressors shown on the right of the figure. These stressors, and the associated time constants of the various processes, present a substantial challenge to controlling driving safety. For example, the rate of information technology development is quite rapid, with major innovations occurring on a timescale of months. The pace of regulatory intervention, however, has evolved to address the relatively slow pace of the traditional automotive industry. In addition, the information flow from traffic incidents and accidents upwards to those making regulatory decisions is imperfect and delayed. The safety consequences of new information technology illustrate this problem. A distracting product might be used for years and kill thousands of people before the loop is closed and regulatory control is enacted. One approach to this challenge uses emerging in-vehicle technology to provide more sensitive and timely measures of driving safety than those afforded by the national crash databases. The output of collision warning systems, driver behavior, and in-vehicle device interactions could be monitored, combined, and aggregated at the individual, community, and national levels to provide a clearer signal for how behavior at all levels influences safety.

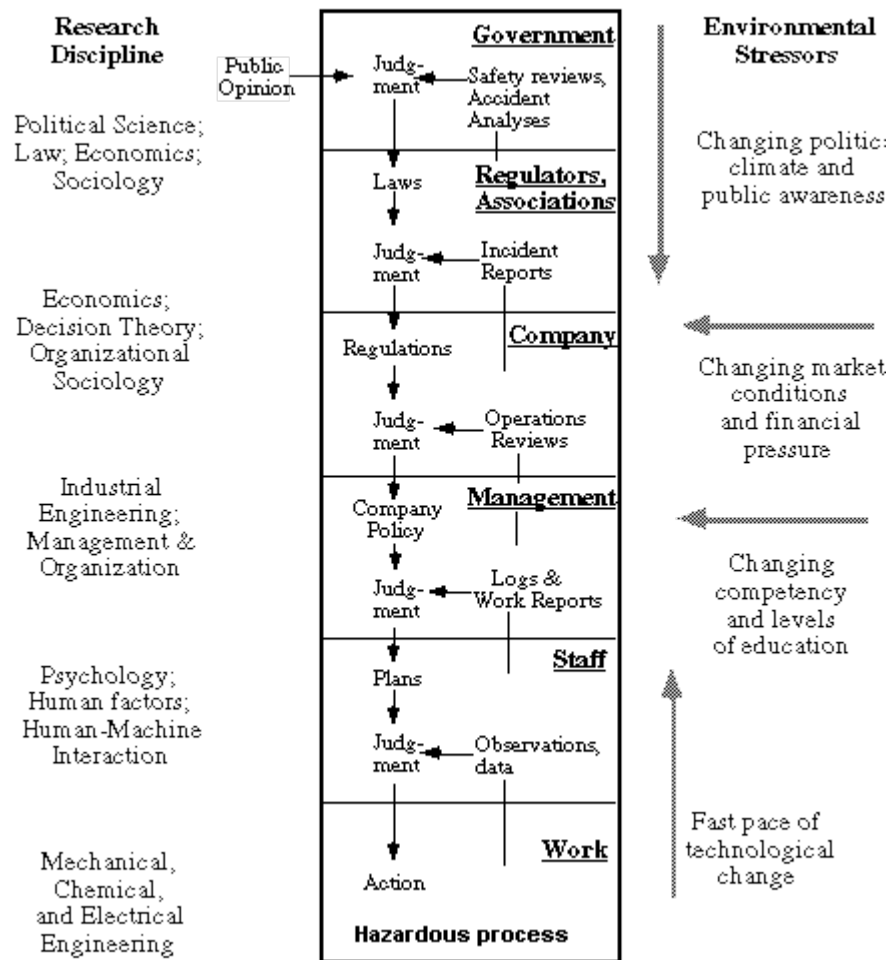


Figure 1. Driving safety as a societal risk-management challenge (Rasmussen 1997)

Another important challenge in addressing driving safety issues is the heterogeneity of the network influencing driver behavior. The left side of Figure 1 shows the range of disciplines that may be involved in enacting control. Because driving safety emerges out of the network of interconnections that span these levels of controls, it cannot be enacted as if the levels were independent. As an example, the engineering expertise needed to develop collision warning systems is not sufficient to ensure that such systems actually enhance driving safety (Deering and Viano 1998). Successful control depends on expertise spanning all levels in Figure 1. At the highest level, driving safety depends on political decisions and governmental priorities. Linking the effects of political decisions to the features of in-vehicle technology presents a substantial challenge. This suggests our fourth point of leverage: promoting a safety-oriented driving culture requires multi-disciplinary expertise to understand how the effects of controls at various levels propagate through the network of factors affecting driving safety.

## **Conclusions and recommendations**

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The laws of physics limit how much increasing vehicle crashworthiness can enhance safety. Likewise, vehicle warning systems can compensate for the cognitive and perceptual constraints that affect driver performance, but they cannot override a driver's attitudes, goals, and priorities. Driver behavior, then, may ultimately have the most influence on traffic safety. Culture provides the subtext to driver behavior by shaping the beliefs, values, and ideas people bring to the driver's seat each time they get behind the wheel. On a larger scale, cultural forces also give form to "driving safety" by defining social norms regarding acceptable numbers of driving-related deaths and the amount of resources that should be devoted to driving safety research, regulation, and enforcement. As a consequence, changing driving culture may be the most effective means of enhancing driving safety. Unfortunately, transforming culture presents a substantial challenge, in no small part because many believe that culture cannot change.

In this chapter, we suggest that how we think about culture affects how we might promote driving safety. We make the case for re-conceptualizing culture as dynamic and flexible, and we offer four approaches to culture that we believe capture important aspects of the complex interplay between people, vehicles, roadways, driving regulations, and stakeholders involved in defining and promoting traffic safety. Although these approaches stand alone, they share several goals. First, each takes the stance that culture is a process, not a taken-for-granted category that can be uncritically deployed to explain human behavior. Second, each expands what falls under the rubric of culture, with the effect of broadening our understanding of how culture is generated. Third, each advocates a materialist approach to culture's construction and stabilization by addressing where and how people live, their embodied experiences of driving, and the social practices that transform their engagement with things, institutions, and ideas. The final approach suggests that we, as stakeholders in the traffic safety community, have an important role in changing driving culture, but that crafting effective safety policies in a timeframe that is appropriate for the rapidly changing world of technology requires a multidisciplinary, inter-organizational approach not yet embraced by the various actors in the safety network. These insights constitute points of leverage that are available to promote a safety-oriented driving culture.

Many research plans and intervention strategies could be pursued using these suggested approaches, as evidenced in the potential applications peppered throughout the chapter. Although these approaches provide independent contributions to our analysis of driving culture, the

elements that they share imply a certain power in their convergence. With this in mind, we propose a participatory action research program designed to promote traffic safety culture to a broad range of communities across the U.S. Participatory action research involves shared participation and ownership in research projects among a community of co-researchers, with the focus of research defined by analyses of social problems at the local level. It also typically involves community action to address issues raised through the research process (Kemmis and McTaggart 2005). Because it is action oriented, it prioritizes transformations of social practice over attempts to change culture through ideological shifts alone. However, many who participate as co-researchers experience consciousness raising—about their position vis-à-vis the institutions that shape their lives, as well as their agency to affect change—through the process of defining and addressing social problems. Finally, for members of the traffic safety community, it reframes social research as a powerful form of public engagement (Gibson-Graham 1994).

The program's goal would be to facilitate collaborations between researchers and regional and national organizations with select local communities in order to identify and address local issues regarding driving and traffic safety. Together, they would develop an action plan to address local driving issues and participate in its implementation. Co-researchers would then evaluate their community-based effort by developing criteria and a process to assess its success. The program would be user driven and place specific in order to ensure relevancy for and cooperation with local driving populations. At the same time that “knowing subjects” (Gibson-Graham 1994) participate in shaping their local driving cultures, site-specific data will be collected for comparative case studies analyzing (1) traffic violations and accidents reports, (2) driving practices across populations, (3) organizational effectiveness among state, city, and private institutions involved in shaping local driving practices, (4) the range of issues identified, (5) the types of action plans developed and implemented, and their effect on driving practices, and (6) the ways in which plans were evaluated and the results of evaluations. The comparative case studies provide an assessment of the project as a whole, as well as identifying “best practices” developed by drivers for drivers. Because local projects are place specific, their application across a range of driving environments will not be seamless. Yet they will shed light on the complexity of driving culture in the U.S. and how people in particular places balance the risks and benefits of car travel. When identified, those expressions of driving culture that transect driving populations across the U.S. can be incorporated into national campaigns designed to augment local responses.

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## **Biographical statements**

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**John D. Lee** is a professor of Industrial Engineering at The University of Iowa and has appointments in the Department of Neurology, the Public Policy Center, the Injury Prevention Research Center, and the Center for Computer-Aided Design. He has a background in engineering and psychology, with a Ph.D. in mechanical engineering and an M.S. degree in industrial engineering from the University of Illinois at Urbana-Champaign and degrees in mechanical engineering and psychology from Lehigh University. His research enhances the safety and acceptance of complex human-machine systems by considering how technology mediates attention. Much of this work concerns emerging technology for cars and trucks, where it focuses on technology that can distract drivers and technology that can mitigate distraction. He is a member of the National Academy of Sciences committee on human factors and the National Academies committee on the preventing teen motor vehicle crashes. Dr. Lee serves on the editorial boards of *Cognitive Engineering and Decision Making*, *Cognition, Technology and Work* and *International Journal of Human Factors Modeling and Simulation* and is the associate editor of transportation for the journal *Human Factors*.