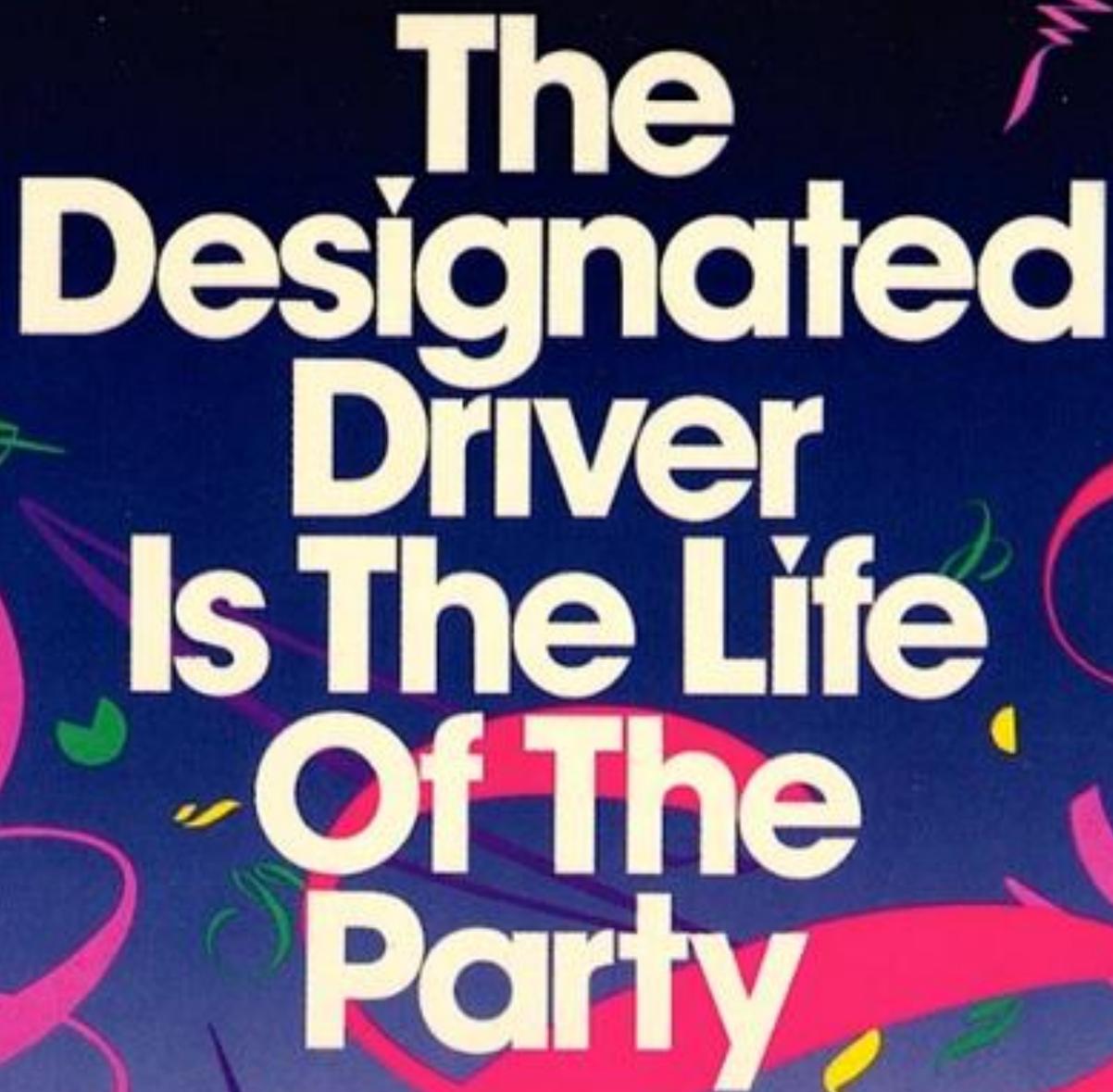




Center for Health Communication
Harvard T.H. Chan School of Public Health



**The
Designated
Driver
Is The Life
Of The
Party**

Snapshot: *Communication 2017*

Media fragmentation: **high**

Public's attention span: **short**

Key challenge: **sustainability**

Snapshot: *Distracted Driving* 2017

Public awareness: **high**

Laws: **ineffective**

Social stigma: **absent**

Behavior change: **none**

Barriers to Behavior Change

“I need/want to stay connected.”

“I can handle it. *I'm* not the problem.”

Serious crash = low probability event

Distracted Driving 2.0

Comprehensive Strategy

Technological Innovation

Legislation

Regulation

Litigation

Communication

Community Mobilization

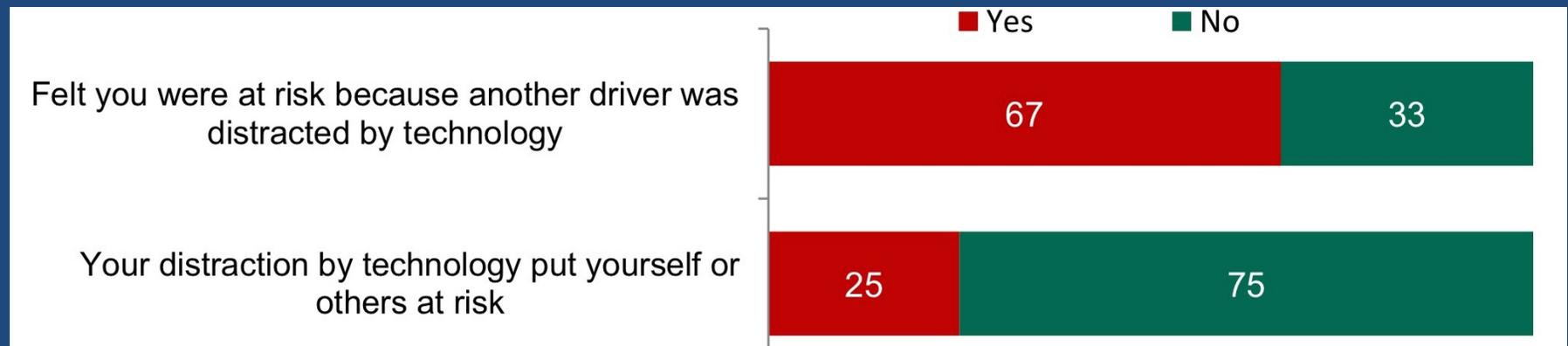
2nd Generation Media Campaign

“Actionable Insight”

“I worry about being hurt in a car crash.”

“It will probably be the other driver’s fault.”

NSC Teen Survey 2016



Allstate 2015 Survey:

46% of teens say they drive defensively

--suggesting they may be receptive to further strengthening their defensive driving skills

Defensive driving >>

Attentive driving

The Promise

“Attentive Driving” will help protect you against threats posed by *other* drivers”

Messaging shift:

“Distracted” Driving

>> “Attentive” Driving

Package and market the concept of attentive driving **as a defensive strategy.**

“Attentive” Driving

=umbrella for addressing
full gamut of distractions

Attentive driving

= pro-active message

= don't >> do

= taps into pre-existing fear

Make attentive driving “cool”

Targets:

Teens

Parents

Children (as influencers)

Key element of attentive driving:

Maintaining “Situational Awareness”

Situational awareness (SA)

State of readiness to respond to potential safety threats in the driving environment

SA = integrated set of behavioral and psychological processes, starting with **active visual scanning** of the driving environment

Situational Awareness

Aviation

Emergency response management

Surgical operating rooms

Military operations

Workplace health and safety

Research Workshop:
Role of SA in *Traffic Safety*

NHTSA, Harvard, Toyota

August 2016

Situational Awareness

Detection (Surveillance)

Assessment

Projection

“Critical Reason” in Crashes

Inadequate surveillance: 20%

National Motor Vehicle Crash Causation Survey (NMVCCS), 2005-2007

“Critical Reason”: Intersection Crashes

Inadequate surveillance 44%

National Motor Vehicle Crash Causation Survey (NMVCCS), 2005-2007

Campaign focus:

Systematic surveillance
through **active scanning**

Introduce concept of *tunnel vision*
to explain need for active scanning

Focus on Active Scanning in Hot Zones

- *Four-way intersections
- *School crossings
- *Work zones
- *Blind curves

Messaging concepts

“Expect the Unexpected”

“Scan for Surprises”

“Look Out for Trouble”

Messaging Channels

- *Media

- *Community mobilization

- ***Interpersonal interventions**

Interpersonal interventions

Bring the message directly into the cabin...

...via **interpersonal interventions**
by vehicle passengers.

Initial behavioral goal:

Passenger speaks up, when necessary,
to prompt active visual scanning by
driver as vehicle approaches hot zone.

Create Brand Mascot

Create *animated* brand mascot to *model* interpersonal interventions inside the vehicle.

Brand Mascot

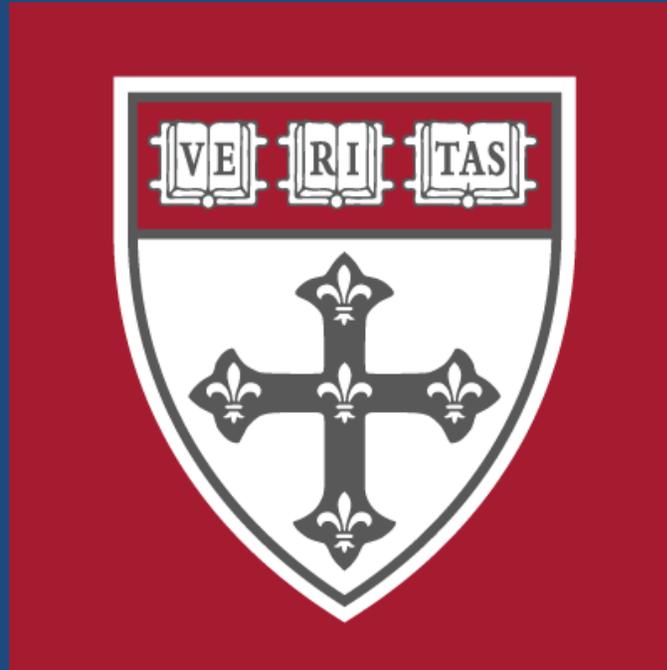
Campaign's identity & personality

Continuity over time

Community-based extensions

Summing Up

- *Tap into pre-existing fear of “other” drivers
- *Promote attentive driving as solution
- *Introduce SA as key element of attentive driving
- *SA focus: active scanning to avoid tunnel vision
- *Promote interpersonal interventions to prompt
active scanning, especially in hot zones
- *Media + grassroots + interpersonal



Center for Health Communication

Harvard T.H. Chan School of Public Health

Jay A. Winsten, Ph.D., Center Director
Jay_Winsten@harvard.edu

Situational Awareness in Traffic Safety Workshop
Executive Summary
Washington, D.C.
August 10, 2016

Introduction

On August 10, 2016, the National Highway Traffic Safety Administration (NHTSA), in partnership with Toyota and the Harvard T.H. Chan School of Public Health (Harvard Chan School), convened a workshop to examine the enhanced roles that Situational Awareness (SA) could play in improving traffic safety. The premise behind the workshop was that there could be a “high payoff” from improvements in driver SA, and that a convened group of researchers might be able to identify a path toward the development of innovative interventions to improve SA across a broad range of road users.

The workshop follows a March 2016 meeting convened by NHTSA to address the worrisome increase in traffic fatalities during 2015, which reversed the previous 10-year downward trend. During the March meeting, the agency led a review of its current slate of countermeasures to assess whether the current range of evidence-based programs was sufficient to respond to increasing fatalities. While meeting participants generally expressed confidence in the efficacy of the current range of proven traffic safety approaches, attendees also felt a need for continued innovation and program evaluation so that the collection of evidence-based countermeasures could be expanded.

SA is an example of a promising and innovative traffic safety countermeasure. The concept of SA is well established in aviation and other fields, but its application in traffic safety is yet to be thoroughly tested.

The current interest in SA as a potential traffic safety countermeasure is driven by several factors:

- SA has proven to be a key safety factor in human performance in several important domains, including aviation, emergency response management, surgical operating rooms, military operations, and workplace health and safety;
- Studies have found that 94% of motor vehicle crashes are caused by human error, and the critical factor in 41% of these crashes is a “recognition error” (including driver inattention, internal and external distractions, and inadequate surveillance). (National Motor Vehicle Crash Causation Survey (NMVCCS));
- Strategies to improve SA have not previously received a high level of attention in the traffic safety field; and,
- SA consists of a set of psychophysical processes that are amenable to change.

During the workshop, participants discussed the concept of SA, how it is applied in other domains, and its relevance for driving safety, including its increasing significance in the face of emerging vehicle automation and distractions. The group also brainstormed strategies for developing the concept into a measurable evidence-based traffic safety intervention.

Situational Awareness and its Relationship to Driving Safety

Situational Awareness is comprised of three levels:

1. perception (what information do I need?),
2. comprehension (what does it mean?) and
3. projection (what will happen next?).

Simply put, it's having an up-to-date understanding of the world around you.

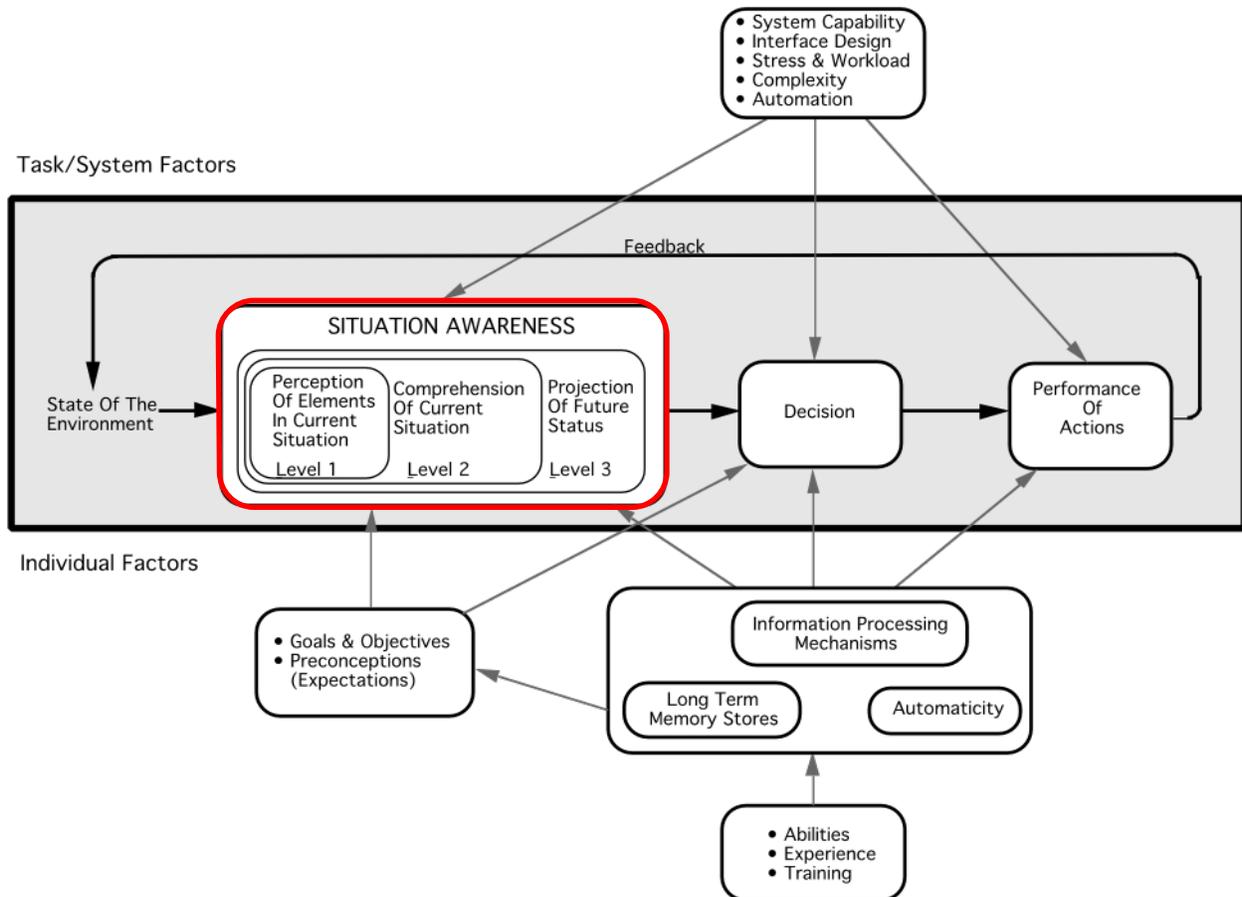


Figure 1. Endsley's model of SA (1988, 1995)

When applied to traffic safety, drivers with high SA are able to rapidly navigate all three levels, deploying their attention efficiently and effectively as needed. They are constantly projecting, anticipating what could be around the corner and making necessary adjustments to their behaviors.

Drivers with very low SA, such as novice drivers, often struggle with all three levels. They may over-scan their environment -- as they cannot isolate what information is relevant -- or they might misdirect their attention. They are slower to discern the meaning of sensory cues, as they do not have expectations or correct mental models to project what may happen next.

All drivers, regardless of experience and skill level, can have impaired SA when their ability to identify and process information is compromised by manual, visual and cognitive distractions, or by stressors such as fatigue, emotional distress, workload, alcohol/drugs, and medical conditions.

Emerging automated vehicle features can change SA demands. In many ways, these new technologies represent a double-edged sword. On one hand, features like adaptive cruise control, navigation systems and lane-keeping assist can help by allowing drivers to focus their attention on the tasks at hand and reduce their workload. However, at the same time, increasingly sophisticated automation may lead drivers to think they can divert their attention away from the driving task to secondary tasks (i.e., reading, texting, watching a movie), which can make it difficult to quickly re-engage in the driving process when necessary.

Application of Situational Awareness in Other Domains and Potential Transfer to Traffic Safety

Examples of established application of SA in other domains offer models for applying SA that could potentially be imported to traffic safety. The aviation industry, for instance, is rich with examples. The aviation field has institutionalized an approach to training that helps pilots manage their SA capacity so they are better able to perform at an appropriate level.

Pilot operating procedures include a system of policies and checklists to help ensure that they are physically and mentally prepared to exercise their full SA potential. Examples include the “8 hours from bottle to throttle” rule regarding time from alcohol consumption to flight, and I’M SAFE, the FAA’s pre-flight checklist where flight crews assess themselves for issues that may impair their SA.

I’M SAFE Checklist
Illness - Symptoms
Medication - Prescription or OTC
Stress - Job, Financial, Health, Family
Alcohol - 8 Hrs? 24 Hrs?
Fatigue - Adequately rested
Eating - Adequately Nourished

Figure 2. FAA I’M SAFE checklist ([The Pilot's Handbook of Aeronautical Knowledge, FAA-H-8083-25.](#))

Pilots also undergo regular and extensive SA training, including mental model enhancements, scanning techniques, multitasking exercises and contingency planning.

The transfer of aviation techniques to traffic safety, however, faces inherent challenges and limitations. In comparison to drivers, pilots are highly-regulated. They are required to undergo

regular training and face financial and professional consequences for non-compliance. This enhances their motivation to make safety their primary goal.

Since driving a car is less technically demanding than flying an airplane, drivers are generally less focused on vehicle operational tasks or environmental factors. Furthermore, since driving is less strictly regulated, there is a great diversity in skill, experience, training and motivation among drivers, and little opportunity for continuing education once an individual has his or her license.

These factors present a challenge to identifying a generalizable solution to enhancing SA among road users. Instead, they call for a multi-dimensional approach with a variety of strategies tailored to reach a broad range of driving populations.

Possible Interventions to Improve Situational Awareness in Drivers

With the understanding that addressing driver SA requires a multi-dimensional approach, the group brainstormed a range of possible interventions across the SA model, and a three-pronged approach was outlined:

1. *Interventions to Manage SA Capacity (Readiness)* – This could involve education or training that helps an individual assess whether they are ready to operate at full SA capacity before they get behind the wheel. The goal would be to help individuals self-regulate their behavior (*e.g.*, not drive) in the face of issues that may affect their SA, such as fatigue, stress, intense emotions, alcohol and drug use, medical conditions, etc. This approach could be supported by a media campaign that reinforces the importance of driving only when you are fully capable.
2. *Methods to Manage Demands on SA* – This could involve awareness and education efforts to help drivers avoid environmental distractions (both inside and outside the vehicle) which are not relevant to safe driving. It could also include strategies to manage the demands placed on driver SA through enhanced design of in-vehicle systems, such as vehicle/driver interfaces that help drivers recognize and avoid hazards (*e.g.*, blind spot warnings, collision breaking, lane departure warnings). These system designs could incorporate technology to detect – and compensate for - lapses in driver alertness. Roadway design is also important for controlling attentional demands on drivers. Clear and unambiguous traffic flow patterns, signage, and signals can reduce the amount of information a driver must gather and/or make it easier for the driver to access the information they need to drive safely.
 - o *Interventions to Enhance Performance* -- A large body of research on latent hazard anticipation has been collected by University of Massachusetts Amherst and others. Training on latent hazard anticipation using still photographs, video, simulators and on-the-road studies has shown positive effects among teens on recognition of hidden hazards. After training, teens are roughly as accurate as adults in the identification of the hazards. In a large NHTSA-funded study, the Risk Awareness and Perception Training (RAPT) program was deployed in California with drivers 16 to 18 years old. The RAPT-trained males showed a significant decrease in crashes

when compared to non-trained males, but this difference was not apparent among females (Evaluation of the Safety Benefits of the Risk Awareness and Perception Training Program for Novice Teen Drivers, January 2016, DOT-HS-812-235). Other potential areas for training include attention management and hazard mitigation.

In addition to these three focus areas, meeting participants identified a number of other strategies for improving SA among drivers that could be considered.

- National Media Campaign – Similar to the U.S. Designated Driving Campaign developed by the Harvard Chan School, explore the feasibility of designing a national media campaign for the general public that raises awareness of the importance of SA and gives people concrete, but simple, messages and actions that have proven to improve performance. Research would be needed to test the effectiveness of messages and communication strategies. This campaign would likely need to be segmented in its approach to target different driving populations that have different motivations.
- Periodic SA Training/Continuing Education – Explore ways to achieve more routine access to drivers for training and retraining. This could include SA-specific training during the Graduated Driving License (GDL) phase for teen drivers, extending GDL to adults who are getting their first license, requiring training for drivers over a certain age, with certain medical conditions or who have received citations. The group recognized that it is harder to get support for programs that address licensed, middle-age drivers.
- Educational Campaigns Targeting Children – Leverage children as change agents by educating them about the importance of SA through targeted promotions, campaigns and initiatives. Examples include partnerships with YouTube stars; edutainment, such as PBS’s Ruff Ruffman; and partnerships with elementary schools.
- Insurance Incentives – Partner with insurance companies to offer incentives for drivers who make efforts to improve or demonstrate they have improved their SA, such as rate reductions for those who undergo SA training.
- Gamification of SA – Design mobile games around SA to tap into people’s interest in healthy competition.
- Safety Culture – Explore strategies for changing attitudes, priorities and actions concerning traffic safety and work to change social norms.
- Detection Technology – Explore the feasibility of incorporating technology in vehicles that could detect driver SA and respond with warnings or other interventions that are shown improve SA performance.

- SA-focused Technology Incentives and Disincentives – Design the driver/vehicle interface or road system with features that motivate desirable SA behavior. Such technologies would encourage behaviors that are consistent with good SA performance and discourage behaviors that are inconsistent with SA. Examples include rumble strips and Faraday cages for cell phones.

Conclusions and Next Steps

The workshop concluded that SA is a critical component of road safety, and recognized that identifying the right mix of countermeasures for improving SA across the driving population, while challenging, offers high potential payoffs for improving road safety and saving lives.

Further research could point to a range of viable awareness and training opportunities across the SA model. Some potential approaches focus on SA readiness, such as helping drivers better manage their SA capacity before they get behind the wheel or deploy their attention more effectively on the road. Others target the perception, comprehension, and projection phases of SA.