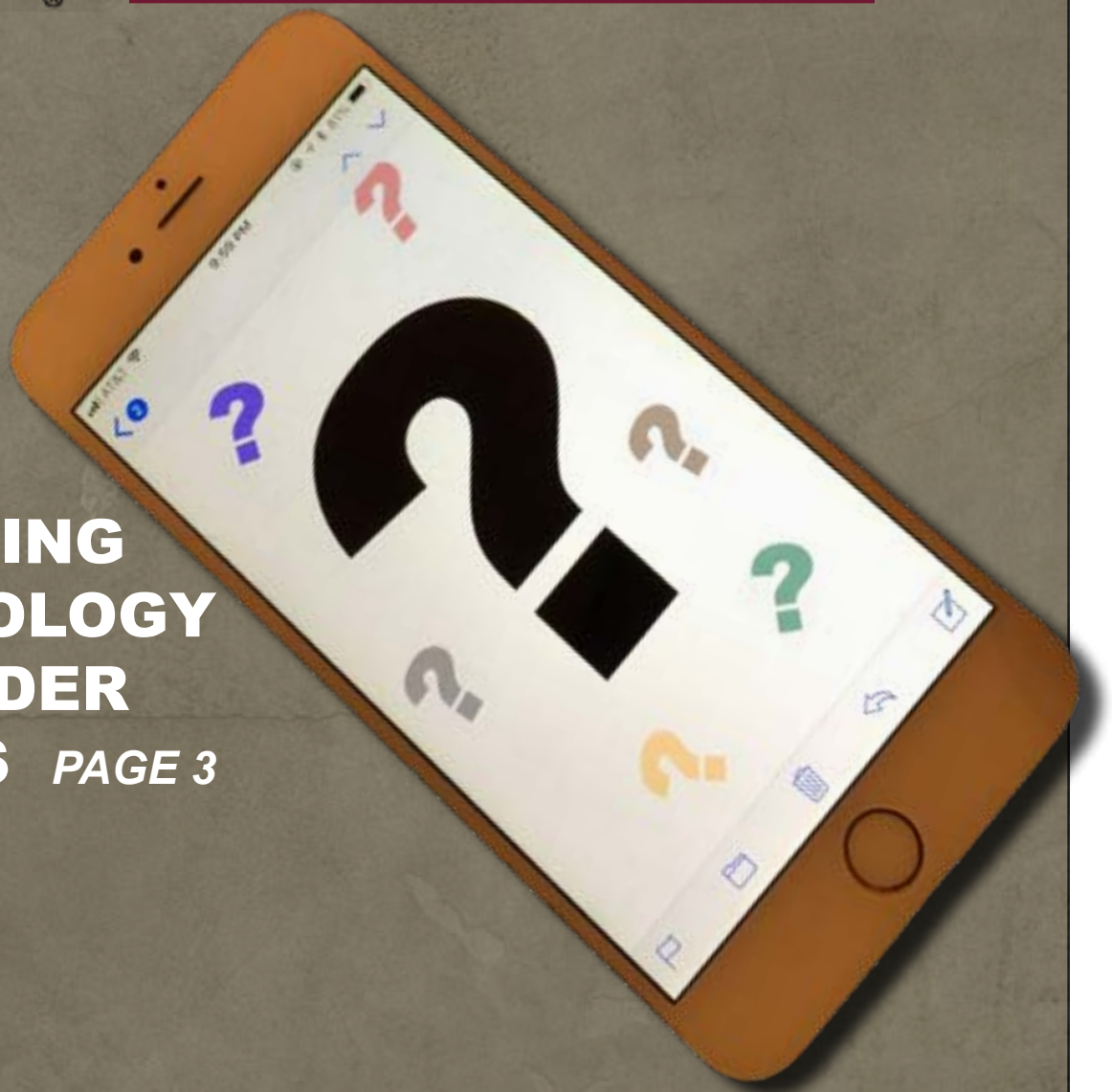
NEWSLETTER

INSTITUTE FOR SUCCESSFUL LONGEVITY

FLORIDA STATE UNIVERSITY



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Will driver-assistance technology help?

FROM THE DIRECTOR

Neil Charness, Ph.D., is the William G. Chase Professor of Psychology at Florida State University and director of the Institute for Successful Longevity.

Advanced driver assistance systems (ADAS) are included in many new vehicles. They feature such functions as blind-spot detection (sadly, usually only available with a high-end package), forward-collision warning and braking, lane-keeping warning and steering guidance, adaptive cruise control and the now required (in all new 2018 vehicles) backup camera. Automated parallel parking is also a high-end feature on some vehicles.

New vehicles come packed with radars, cameras and artificial intelligence aimed at making us safer drivers. Driving is becoming more of a collaboration than a do-it-yourself activity. Ultimately, fully autonomous vehicle technology may free us from the task of driving altogether, but that is still many years away because of challenges in interpreting sensor data and choosing actions.

Still, it is quite impressive how well current ADAS systems can operate. I bought a new car this past year and appreciate being warned when a vehicle might be approaching from the side when I back up (before I could detect it) or when a car is in my blind spot and a warning flashes on my side mirror. Adaptive cruise control makes highway driving much more pleasant as I need not brake frequently to keep a safe distance from the car ahead of me. Forward collision warning can alert an inattentive driver that a crash is imminent.

But there are drawbacks. The systems do not function perfectly. On a recent return trip from Destin, Florida, the adaptive cruise control quit, warning me that a sensor had failed in the heavy rain. My blind-spot detection system occasionally registers "phantoms," invisible vehicles to my side, though the dealer insists they are going to tweak the algorithm with a software update. Anyone ever have a Microsoft Windows update generate more problems than it solves? How likely is it that automotive updates will always be perfect? So, ADAS is unlikely to be 100 percent reliable. Further, some features can be annoying. Adaptive cruise control may slow you too much, and frequent lane-keeping alerts may become so annoying that drivers turn them off, negating any benefit.

Finally, there is complexity. Aside from monitoring the road situation as usual, drivers need to interpret and respond to many possible new alerts. Will the systems prove too distracting when operating in combination? The latter is a research question that one of my doctoral students, Dustin Souders, tried to address in his dissertation study when he investigated both forward collision warning and lane-keeping technologies in a driving simulator, either with a single system active or both operating together. The bad news is that forward collision warning did not seem to affect older drivers' performance in terms of the headway distance to a lead vehicle. This finding was due in part to the very infrequent triggering of warning events in the scenario, because older drivers were already very cautious about maintaining a safe distance from the car ahead. The good news is that lane-keeping alerts did improve how well-centered older drivers became in their lane. The better news was that those in a condition with both systems active did not do any worse than those with just one system active. Added complexity to the driving task didn't faze these particular older drivers.

So, my hunch is that these systems will help to improve safety for older drivers, assuming that the drivers are properly trained in ADAS use. I received no instruction from the dealership when I took possession of the new car, but that was probably because we never got through the whole new-car routine. When the salesman tried to pair my smartphone with Bluetooth in the car, it sent the infotainment system into a continuous reboot, and my very first drive was to the repair center. Let me repeat: Complex operating software is never perfect. Another concern for assistance systems is that drivers may become overly reliant on the technology, technology that is imperfect. The real issue is whether driver plus ADAS is superior to driver alone. It is a bit too early to have a definitive answer, but I am optimistic. ■

Designing technology for older adults

Anne Collins McLaughlin, who gave the Fall 2018 address in the Institute for Successful Longevity's Speaker Series, is an expert in human capabilities at North Carolina State University. We sat down with her to talk about making technology friendly for older individuals**.**

Since the Apple iPhone, there has been a race to make phones sleeker, thinner, more subtle in design. All that seems contrary to the needs of older adults. It seems like older people are being designed out of the benefits of digital technology.
I think that certainly can be the case. A lot of time you see that when there is no market force on the object or the artifact to make it more usable for an older population. I do think that could be something that changes as the generation of Boomers exerts a strong market influence…. I think we see that already in the entertainment industry. If you look at the types of movies and the characters in the movies, just in the last few years there has been a lot more people focusing on life at older ages than we've really seen before. I think we are going to see that in technology, too.

Anne Collins McLaughlin

There is also an opportunity for a blank design, where you can make it more accessible through its internal design…. The software could be made, and in a lot of cases is, more accessible for the changes that tend to come with age for vision, hearing, tactile sensations, vibrations. All these things are possible, and individual applications may or may not make these good choices.

I think part of our challenge is to make sure the guidelines are out there in a way that is really understandable to designers, in a way that shows them you don't have to make this look like it is "for older people." You can just make it better for everyone and in a lot of ways that will also be better for older eyes and older ears. If a 20-year-old is distracted, then they are probably attending to the phone in the same way as someone who might not have all the potential resources at hand. We have a lot of choices that we can make that are better. I think the opportunities are there. It's not like we have to have some sort of clunky device that matches aging.

What are you referencing — what are these guidelines?
You happen to have some faculty here, for example, Dr. Walter Boot and Dr. Neil Charness, who are big parts of the Human Factors and Aging Series, an entire book series aimed at practitioners where they are given real-world advice on what to do to make your designs more usable. I have one of those that I co-authored with my colleague, Richard Pak at Clemson [*Designing Displays for Older Adults*, CRC Press, 2010], and we focus on designing displays. That could be a phone display, could be a large screen that you are using in your office, it could be any kind of display that you need to get information from or interact with, and that's what our book is on. Again, it is aimed at practitioners, showing here are some case studies, here is exactly how you might use the guidelines, like, use increased contrast, and then here are some recommendations on how to do that with your product, to have increased contrast between letters and background, and here's how to test it to make sure that what you did is working. So it is very, very practical advice in that whole series.

Other than contrast, what other manipulations of display would make a difference?
Resolution, brightness, color options, the choices of what you are putting on the display, so not necessarily the hardware of the display itself. If I'm going to create a web site viewable on a mobile screen, then I should think about what colors I am using to make sure attention is attracted to the correct elements of the display. If I want people to be reading about something in my product or on my web site, then I don't need to have a flashing ad that's grabbing attention and

preventing people from being able to put their focus and concentration on important parts of the display.

Do you hear complaints about web pages from older adults?
I haven't surveyed them directly, but I can give you a couple of things I've noticed. I'm sure you've seen on many local news sites there is the fake news at the bottom to catch your eye. I believe someone called it "the chumbox," where it is just a bunch of horrible, not real "news stories." Those are carefully designed to be click bait, to be something that draws your eye and then draws you to click on it and then makes some money. I think it is a shame that that's how news sites have to survive, is to have these services pay them to be allowed to run this on their pages, because it is really easy to get this confused with the news, and its on purpose. We call that "dark-side usability," which is the idea that if you know a lot about human capabilities limitations, then you can design to support those, or you can design to fool them. If you apply design for evil, then you can do that.

What web sites do you like? Which ones are friendly?
I think that the AARP web site has done a good job. They've made it so that if you are looking for information there, they have carefully segmented it and made it so that it is very clear what the different categories of information are, how to navigate the site, kept it pretty simple. Any web site that makes it very clear and obvious how you can increase the font size and then the layout changes with the font size so that it preserves a pleasant look to the site, it doesn't just make everything bigger….

Some sites are pretty decent. I would say anything that uses a lot of white space, simple blocking in the layout, is going to be friendlier. But, that said, you could follow all of those rules to the letter and put up a terrible web site if your content or your menu items are misleading….

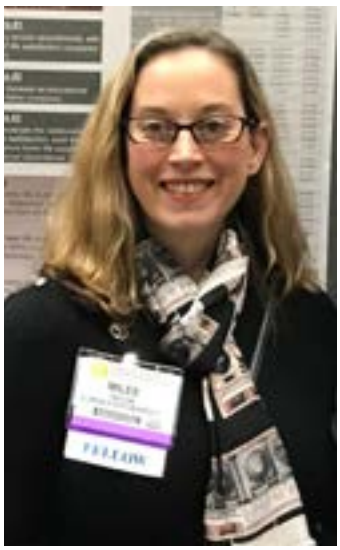
How do you bridge into the engineering offices to get designers adopting these guidelines?
I think in a lot of industries this is happening. One of the buzzwords these days is "multidisciplinary," you know, multidisciplinary teams, having people talk across domains and understand more about the value that different people bring to the team. So, if you go to large companies you are going to see that they probably have a human-factors team. Lenovo has one, Google has several, Facebook, these large companies have human-factors people who are there informing the designs to make them better. So, in that case, I think, we have made a lot of inroads. In terms of what do you do when you have a small startup, who is expendable? If you are going to be the first to cut, you are probably not going to cut the software developer who is actually making the product. So they are not going to have that same kind of support. Some of those use consulting services, but some may not know that they need to or be able to afford the kind of advice they need. So, I think that part of the solution is to be better ambassadors for what we can offer. If I say to a person I meet at a party, "I'm a human-factors psychologist," they do not say, "Oh, that it so interesting, I love human factors." They say, "What in the world is that?" Which means that we are not communicating who we are....

New cars — dashboards are unbelievable nowadays, with a lot of technology packed in there. People get intimidated. And we are seeing the same sleeker-is-better design imperative being brought to bear on cars, and the same problems.
Throughout history, we see that we tend do things because we can before figuring out if we should. I'm not surprised by what's happening in cars, but I think things will settle down to what is valued by the driver, hopefully. Right now its, "Wow, look at all the amazing technology we can do, lets throw it in there," but that doesn't mean we should.

The same thing with information. With the Internet, it used to be, "Well, I can present you with all of this information," but should I? What do you actually want to know? So we have better search engines and things that let you target what you actually want to get at, instead of just a giant amount of information. That's one thing that gives me hope. We go through these stages throughout history. I'm not surprised to be here, I just hope that we can get through that stage pretty quickly. ■

ISL researchers named Fellows of Gerontological Society of America

Three Faculty Affiliates of the Institute for Successful Longevity — Miles Taylor, Walter Boot and Dawn Carr — have been named Fellows of the Gerontological Society of America, the nation's largest interdisciplinary organization devoted to the field of aging.



From left: Miles Taylor, Walter Boot and Dawn Carr.

By naming each a Fellow, the society is acknowledging outstanding and continuing work in gerontology by the three Florida State University researchers. Fellow is the highest status within the gerontological society.

"Their Fellows award is a strong testament to the outstanding research and service contributions that they have made to their disciplines," said Neil Charness, director of the Institute for Successful Longevity. "ISL is proud to count them as Affiliates."

Taylor, of the Department of Sociology in the College of Social Sciences and Public Policy, focuses on racial and educational disparities in physical and mental-health trajectories in later life. Her recent work also involves the application of complementary statistical techniques to analyze trajectories across the life span. Other research interests include the impact of family and relationship factors on health at various life stages and a comparison of self reports and administrative reports of chronic disease.

Boot, of the Deparatment of Psychology, conducts research on how humans perform and learn to master complex tasks (especially tasks with safety-critical consequences), how age influences perceptual and cognitive abilities vital to the performance of these tasks, and how technological interventions can improve the well-being and cognitive functioning of older adults.

Carr, also of the Department of Sociology, works to understand the factors that bolster older adults' ability to remain healthy and active. Her recent work focuses on the complex pathways between health and active engagement during later life, including the impact of key transitions in health, productivity and caregiving.

In addition to being Faculty Affiliates of the Institute for Successful Longevity, Drs. Taylor, Boot and Carr are Faculty Associates with FSU's Pepper Institute on Aging and Public Policy. ■

ISL researcher investigates 'smart' highway signs to prevent crashes due to wrong-way driving

By Dave Heller
FSU Communications

Innovative traffic safety research from Florida State University, incorporating a fascinating mix of engineering and psychology, is being deployed on highways to save lives by targeting a deadly problem: wrong-way driving crashes.

Walter Boot is associate professor in the Department of Psychology and a Faculty Affiliate of the Institute for Successful Longevity.

The statistics are alarming. Nationwide, wrong-way crashes kill about 350 people a year and injure thousands more, according to the National Highway Traffic Safety Administration.

Walter Boot, associate professor in FSU's Department of Psychology and an expert on cognition and perception, has compiled two wrong-way driving reports for the Florida Department of Transportation. The research identifies "smarter" signs and pavement markers equipped with advanced technology that can improve safety.

Boot's recommendations will help shape future countermeasures for wrong-way driving. The Florida Department of Transportation is currently testing those and other recommendations on the most effective safety measures.

"This is a no-brainer," said Boot, a Faculty Affiliate of the Institute for Successful Longevity. "We need to develop, test and install more visible countermeasures against wrong-way driving. We tested new technology-based, radar-triggered road alerts to determine which worked best. The evidence we collected suggested these detection-triggered countermeasures will be more effective than traditional wrong-way countermeasures."

Boot started collecting that evidence as part of a contract with the state Department of Transportation following an unusual series of deadly wrong-way crashes in the Tampa Bay region in 2014. One in particular, a horrific crash on Interstate 275, added urgency to the search for more effective countermeasures. Early one February morning that year, a drunken driver drove the wrong way in the northbound lanes for more than 10 miles before crashing head-on into a car with four college students. The fiery crash killed all five young men.

"Wrong-way crashes are rare, representing only about 3 percent of highway crashes, but they are 27 times more fatal," Boot said. "It's tragic, but it keeps happening."

Boot was determined to reverse this chronic trend of wrong-way driving, which dates to the 1960s and the original construction of access-controlled divided highways. He embarked on a multiyear research project drawing on his expertise in visual processing and visual cognition to test detection-triggered wrong-way signs and pavement markers. The goal was to identify "intelligent" technology that would better detect and prevent wrong-way driving and could be incorporated into new warning systems.

Boot's research team found that installing more countermeasures ahead of exit ramps helped, but additional warnings were needed to grab motorists' attention once they started driving in the wrong direction. The next line of defense would be to install alerts that could cause wrong-way drivers to recognize their mistake, stop driving and turn around.

Boot's team evaluated high-tech countermeasures for wrong-way driving on Florida's highways.

The team, working in collaboration with the Center for Urban Transportation Research at the University of South Florida and Florida International University, evaluated seven high-tech countermeasures. They included radar-triggered blank signs that immediately lit up when they sensed wrong-way motion, as well as bright beacons that flashed asynchronously.

The research included field tests on Florida highways. As a team of state troopers and traffic engineers shut down exit ramps in the middle of the night, Boot deliberately drove the wrong way on roads and ramps equipped with prototypes of the seven countermeasures.

Boot said the sensation of driving onto an exit ramp and traveling the wrong way was surreal. "It was frightening because I knew I was doing something very dangerous, but we had a lot of police officers there to make sure it was safe," Boot said. "Having a firsthand perspective was valuable because I could see how countermeasures might work or not work."

Then Boot's team enlisted 189 drivers to get behind the wheel of driving simulators to test participants' reactions to real-life highway situations. By placing visual and auditory distractions in the simulators to mimic alcohol intoxication, the researchers also tested the effectiveness of countermeasures on impaired drivers, who account for nearly half of wrong-way crashes, according to the Florida Department of Transportation.

Signs and pavement markers with other countermeasures proved to be the most effective countermeasures for impaired drivers.

"The flashing onset of something new is the most effective thing you can do to draw someone's eyes and attention, and all of the most effective countermeasures used that technique," Boot said. "People's brains are hardwired to pay attention to things that abruptly appear, and virtually everything we tested with a red flashing light worked well."

Raj Ponnaluri, project manager at the Florida Department of Transportation, said FSU's research will help guide future work with traffic signs and pavement markers to mitigate wrong-way crashes.

"It's helping us better understand the need for new safety technologies, and now we are testing them," Ponnaluri said. "I think Florida is becoming a leader nationwide in developing countermeasures for wrong-way driving, and the FSU research is one reason why." ■

Transportation Day 2018

The Institute for Successful Longevity was a partner in Transportation Day 2018, sponsored by the Center for Accessibility and Safety for an Aging Population. ASAP is a joint research and outreach effort of Florida State University, Florida A&M University and the University of North Florida.

Clockwise, from top left:

Dana Reiding, administrator of the Office of Policy Planning in the Florida Department of Transportation, gives the keynote address of the Nov. 30 event at the FAMU-FSU College of Engineering;

A participant goes through safety challenges on a driving similator;

CarFit technicians work with a driver to help adjust her seat, mirror and other components of her car's cockpit to improve safety and comfort.