

PAUL ATCHLEY

DISTRACTION IS LITERALLY KILLING US

TEDx Talks

prepared by Weeklysafety.com

Paul Atchley gave an enlightening presentation for TEDx Talks at the TEDxYouthKC event in 2017. His research shows that drivers are four times more likely to get into a car crash while using their mobile phones – which is as bad or worse than drunk driving.



Transcript from: [Distraction is Literally Killing Us](#)

Paul Atchley has been conducting research and teaching about cognitive factors related to driving for over 25 years. He is considered one of the nation's foremost experts on issues of vision and attention, including their relationship to driving.

Atchley is part of state and national efforts to reduce distracted driving and works with Fortune 500 companies to improve fleet safety. He also works with groups like the National Safety Council, LifeSavers, FocusDriven, and We Save Lives to provide expertise on the science of distracted driving, which causes thousands of crashes each year.

Atchley's work has been highlighted by major media outlets such as the BBC, NPR, Time, and the New York Times.

[BEGIN TRANSCRIPT]

So, this is a story about YOUR brain. It's really going to be two stories today.

The first, is about what happens to your brain when you try to do two things at the same time, both of which seem simple, but in combination can produce deadly results.

The second story is about what happens when you trade the technological for the natural.

Distraction is killing us.

Now, we're going to start with the first story, but in preparation for the second, I want to give you a little task.



What you see here is a task of creativity. Your task is to think of these three words: same, tennis and head, and try to think of one word that goes with all three. That one word might be part of a word compound, it might be conceptually similar, but I guarantee you that there is one word that joins all three of these together. We'll come back to that one a little bit later. I'll give you some time to think about it.

[00:54] Over the past 27 years I've dedicated my life to trying to understand how we use our brain to navigate through the environment that we live in. I work with pedestrians, drivers and pilots to try to understand how our vision and attention systems help us move about this very complex world that we live in. And for the last 17 years I've been dedicated to a very specific issue and that issue has been the issue of distracted driving. Because as we move around our environment there is probably nothing more important than driving. **94% of crashes on our roadways today are due to human error** and understanding how our brain works in that very special environment is critical to our safety, health and well-being.

[01:41] Now, there's no question, I think everyone understands that distraction is killing us. When we think about all of the fatalities on the roadways in the United States, we start to begin to understand why our brain is so important. **We lose about 40,000 people every year on our roads in the United States** and they're certainly not the safest in the world amongst industrialized countries. There are some estimates, by groups like the National Safety Council, that **one-quarter of those people are dying because people are using their phones while driving.**

[02:12] You don't need to see this yourself, though you might have, to really understand how compelling these devices. This is a picture that one of my students sent me.

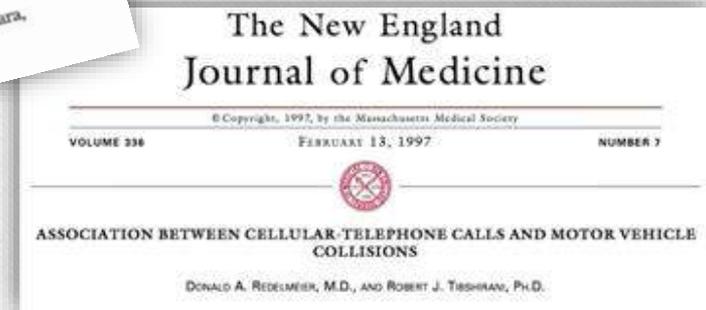


But you see someone here that's engaged in kind of a paradox, right? This is someone who's doing something very dangerous, they're riding a motorcycle. And they're doing something equally dangerous, they're doing it in hands-free and eyes-free mode. And at the same time this individual is wearing a helmet and they have a safety strap around the rucksack. So, in one case they're being safe, and on the other they're being wildly unsafe. I think understanding this, and how compelling these devices are, is really critical for all of us as we're trying to move around a world safely.

Drivers on cell phones are worse than drunk drivers.

[02:57] Now, what's interesting about this, is this really isn't a new research problem for people like me. In fact, the first studies of this particular issue (using phones while driving) was published in 1969. Which means the advisor and a grad student were probably doing this work when I was born in 1967. What that means is that we've been doing research on this issue for over 50 years. And when I tell you today and make the claim that **using your phone while you're driving in any manner: hands-free, touching it, texting, just talking... is, at best, equivalent to driving drunk**, I'm not saying it based upon a few studies. I'm saying it based upon numerous studies and numerous methodologies that we've been using over 50 years.

Role of mobile phones in motor vehicle crashes resulting in hospital attendance: a case-crossover study
Suzanne P McEvoy, Mark R Stevenson, Anne T McCart, Mark Woodward, Claire Haworth, Peter Palamara, Rina Cercarelli



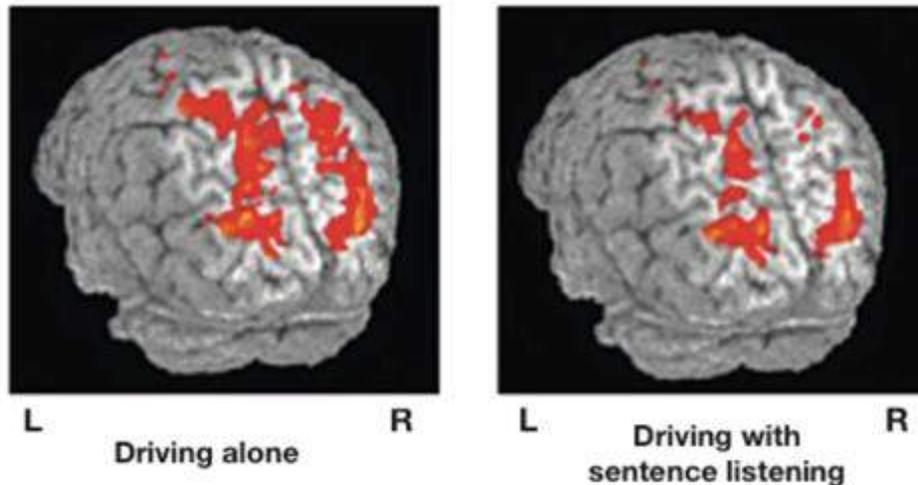
[03:45] Two of the best studies that really illustrate how much of a problem this is are what are called epidemiological studies. They're studies where people were actually in crashes. In one case the crashes led to a visit to the emergency room, in another case it did not. The crashes were in different countries. These studies were done by different researchers. But, the bottom line is, across both studies they found exactly the same thing: **You are four times (or more) more likely to be in a crash if you're using a phone in any manner.** It doesn't matter, in this study, if the phone was being used handheld or hands-free. People were more likely to be in a crash, in fact, that a drunk driver is likely to be in a crash. And again, keep in mind, these are two studies, done by two different groups of people, at different points in time, with actual crash victims.

[04:34] Now, speaking of drunk driving, if like my friend Dave Strayer, you had a driving simulator in your laboratory and you brought people in at the University of Utah and you got them drunk and have them drive in your driving simulator. And then bring them back, and have them drive sober, and while they're driving you give them some events they'd have to react to like a suddenly stopping car. You would find that people drive better when they're drunk. Think about that for a second. People drive better when they're drunk. The drunk drivers knew that they were impaired and knew that they were being watched and so what they made sure to do is try to be as vigilant as possible. When cars stopped in front of them they were slower but they tended to crush the brake pedal in response in order to stop. Those same drivers, when they came back, and they were talking hands-free on a phone to someone that wasn't in that vehicle with them, drove through four vehicles without even noticing it. When they were asked afterwards, "How did you drive?" They said, "Oh, much better than when I was drunk." What about that car they drove through? No recollection whatsoever of that event. Because it turns out, **you need your brain to drive.**

[05:50] We've used a device that's used to measure older adult attention, which is how I really got started in this (is looking at older adults) and that device tells us that **the attention of someone that's on a phone is so tapped out that they are at best four times slower to see and understand what's happening in that environment around them.** Four times as slow. In fact, when I do this task with a 19-year old (they look like a fighter pilot) but when I give them a hands-free cellular conversation, they look like a 7-year old adult with Alzheimer's disease. In Australia, they use this task to screen older drivers and that profile would lead to that person probably losing their license.

[06:28] The reason this is so hard is because **your brain just doesn't have enough resources to do multiple things at the same time.** I know multi-tasking is in. We've got some incredible bright young adults here today. They're going to be talking about some amazing things and in the back of their head right now they're thinking, "Yeah, but I've been doing this since I was four, so my brain is totally different, right?" No. The problem is, all of our brains are the same and with training, they're not getting any better, in fact, they're getting worse.

Conversation impairs visual processing — fMRI.



Just et al., 2008

[06:57] When you look at the brain of an individual that's trying to talk and look at the world around them at the same time, you see something very compelling. This is an image of the brain. It's the back of your brain, the occipital cortex (primary visual processing area) and that darker red area is essentially where blood is flowing, where neurons are active. It means your brain is doing stuff. We can use this technique to understand which part of our brain is active, and which isn't. On the Left panel you see the brain of someone that's been asked to look at a traffic scene (and just look at a traffic scene) and try to process it. The primary visual processing area is lighting up, it looks like they're doing something.

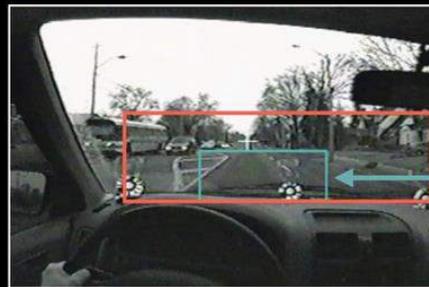
[07:34] Then, when that same person is asked to look at that traffic scene but then also listen to some simple sentences, and because they're going to be asked some simple true and false questions after that. (They're not asked to give those answers until later, just listen.) When that person listens, now that brain region turns off by 40%. The region of the brain that is responsible for seeing the world starts to deactivate and regions that are responsible in the temporal areas for listening start to activate. In other words, your brain doesn't have enough resources to go around to do both things at the same time. **The real-world implication of this is incredibly scary.**

[08:13] I want you to imagine that you have a child playing on a sidewalk. What you would want for a driver driving down your residential neighborhood is that they would scan on the right side of the road for your kid playing on the sidewalk or maybe a car getting ready to back out into the intersection. You want them to scan on the left to make sure that there are no sudden events like cars running in front of them at unexpected times. You would want them scanning the environment as far ahead, not just the car in front of them, but as many cars away as they could see. What you are seeing here are the eye movement patterns of someone doing just that (that larger box) because those little dots there are eye trackers so we can see where people are looking. That larger box is where an attentive driver is scanning for hazards, where your kid's playing, where cars might be stopping, where someone might come across the intersection unexpectedly.

Conversation restricts visual processing.

[09:11] Here's what happens with that tapped out brain when someone's asked to have a conversation with someone that's not in the vehicle with them. When you are talking to someone that's not in the car with you, now because the brain is trying to allocate resources strategically, they're not scanning a region of space that is about the width of the steering wheel and about the distance of the front bumper of the car. That means when your kid runs off of the sidewalk into the street, they won't even be looking at the right place until that person is right under the front bumper of their car.

Conversation restricts visual processing — eye movements.



Eye movements

Attending on cell

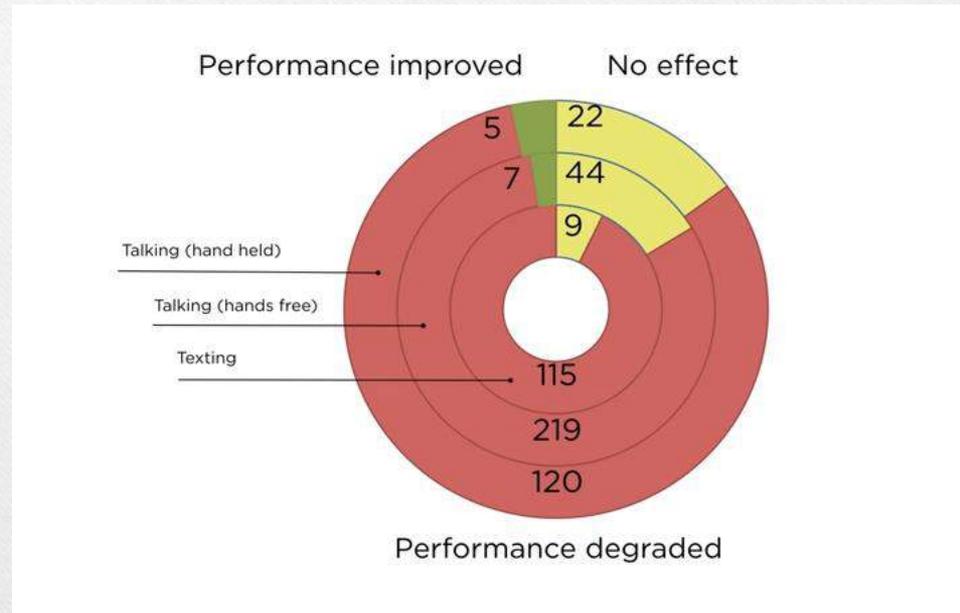
Transport Canada

[10:00] This helps explain why we are seeing this huge rise in fatalities and why we have crashes where people are completely not understanding why they missed it because it seems like they are seeing everything but they are actually not. This last year we actually did a study of all of the research that's out there on distraction generally, looking at the effect of distraction on driving. We looked at 342 studies that cover about 1608 measures of distraction and about 20,000 people.

The case against.

Since 1969, there have been 342 studies examining 1,608 measures with 19,370 subjects on the effects of distraction on driving performance.

[10:37] I'm going to show up a slightly complicated graph but here's what I want you to get about it. What we did was we asked a simple question: did the study show that there was 1) a negative effect on performance driving performance for that distraction, 2) no effect (because science sometimes doesn't find things), or 3) the distraction actually improves performance.



Texting reduces driving performance.

[10:54] When you're texting, almost every single time we measure it, we find that texting reduces driving performance. When we look at hands-held versus hands-free, **81% of the time we find that using a phone reduces your ability to drive safely.** And it doesn't matter if it's hands-held or hands-free.

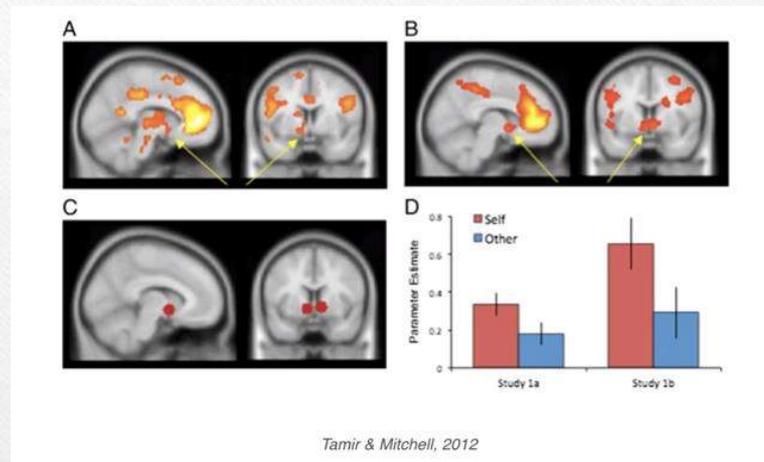
[11:31] The bottom line is, we've been studying this for a decade and we've done hundreds of studies. I'm not just saying this because I think it's true. I'm saying this because the vast preponderance of evidence says that we are all putting each other at grave risk when we're using our phones to drive down the road.

[11:49] The National Safety Council estimates that of the 40,000 people that died this last year... By the way, that's an increase and we've been increasing for the last two years and we're probably going to increase again this year and that's despite the fact that our cars are safer with automatic braking and stability control and airbags. Our roads are safer because the engineers are designing them better. Our emergency services get to a crash faster and once you get to the hospital you're more likely to live. Despite all those safety improvements, more people are dying because of ubiquity of phones in cars. **A quarter of the 10,000 people that died probably died because someone was using a phone.**

The bottom-line.

The National Safety Council estimates that one-quarter of crashes in the U.S. are attributable to cell phones.

[12:28] Why do we do it? This is what really fascinated me. The bottom line is our brain is wired for smart phones. Here are some fMRI images from areas of the brain called the dopaminergic system. This is the reward system.



[13:48] This is the image of the brain on Facebook. What it's showing is the dopaminergic system kicks in big-time whenever we do something social. We love to talk about ourselves, so this is why Facebook is so popular. You get to like things and tell people what your opinions are and where've you've been. Our brain is wired for this kind of stuff. There are smart people in Silicon Valley that are designing these things to attract and grab your attention whether you want it to or not because that's the business model.

[14:31] When we ask people to put these things down for 24 to 48 hours, these are the kinds of reactions you get. I think it tells you something about the deep connection of our brain to this stuff.

The lure of media.

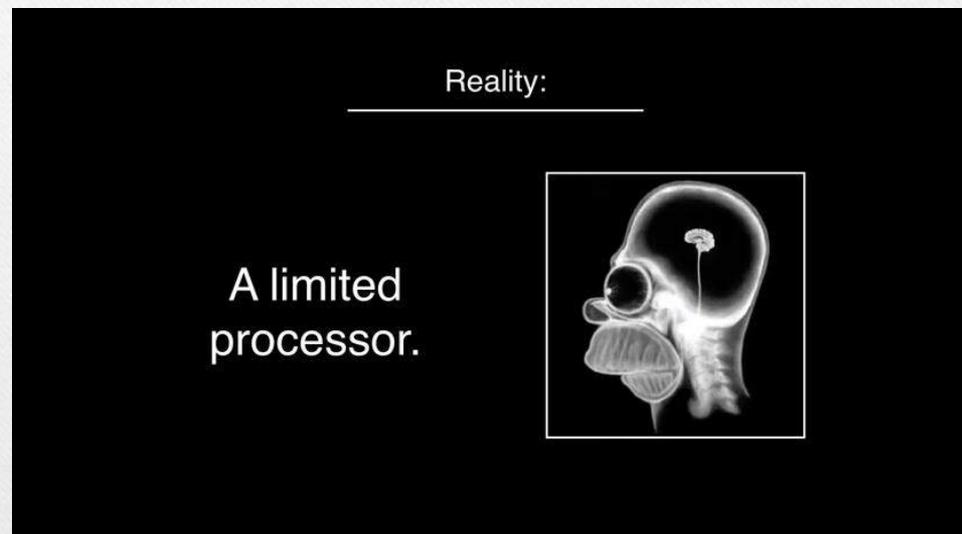
"I have come to realize that five minutes without checking a text message is like the end of the world."

"I went a solid five hours without media, and I was a wreck."

"The withdrawals were too much for me to handle."

[14:47] People look addicted and in fact, we've done some work on addiction and I will tell you, there are some people that are legitimately addicted to their smartphones. I had one young woman say, "I lost my phone for awhile and I felt like I was missing an arm. I was handicapped."

[15:00] But, what if I told you that the reason we do this because your brain is in fact pulling a trick on you. **We fool ourselves** in lots of different ways. We think of our brain as a really complex supercomputer but it's not. We've got billions of neurons and trillions of connections, multiple areas dedicated to processing speech and music and love. We can build tools to go into space. But, I'll tell you, if you study it long enough, it's a lot more like this.



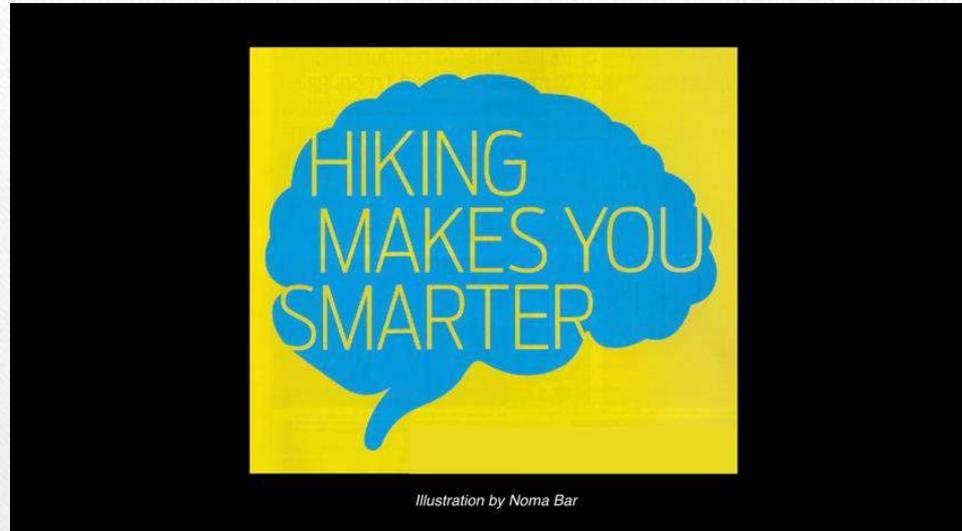
[15:28] It does a few things really well, but everything it doesn't do very well it sort of disguises from you. I need to convince you of this fact because I believe your life is at risk if you don't believe me. When you drive down the road, you think you see everything. We call perception the grand illusion because you think you have this 180-degree, full-color, motion-based, high-definition, 3-dimensional panorama available to you at all times. You don't see everything at the same time. I'm going to convince you of this.

[16:15] I'm going to show you some work we did with actual drivers, driving in Chicago. So, we took pictures of driving scenes and we asked folks to look at these driving scenes. What we did was, we manipulated the driving scene.

[Check out the video at 16:15 for a demonstration of viewing a driving scene as he describes.]

[17:50] Your brain can track about 4 objects at any one time. We've spent billions of dollars trying to improve situational awareness of pilots (and others) to get them to see and pay attention to more than four things. It's a hard-wired limit.

[18:21] There's a cure and there's good news. The good news is all we really need to do is put down our devices for a little bit and go outside.



[18:31] I want to talk very briefly about some research that I've done at the University of Utah looking at what happens when people put down their devices and go outside for some period of time. What we did was we took people out into nature on long hikes and gave them these kinds of tasks.



You've had some time to think about it, what's the word? **MATCH**

Tennis Match, match and same are related, the head of a match.

Now, these aren't easy, so we gave these to people knowing they wouldn't solve very many of them. When we had people go out and hike, what we saw is that the ability to solve these creative problems went up by 50 percent. It's been replicated in other studies. We've recently replicated it with teams working together in office environments versus outdoor environments and we still see that same improvement.

[19:39] What's also interesting, is when you go outside you become more emotionally intelligent. You become more sensitive to the emotions of others because the brain regions that are being distracted and that are being stimulated by nature actually help make you emotionally smarter. We had those workers work in teams outside, they laughed twice as much, they collaborated more, they came to solutions faster and the team was happier with those solutions that the people that were in the office environments.

[20:20] I think part of the reason for this is because our phones are making us a little dumb and a little insensitive. Maybe going back outside is something we all need.

[21:04] **Attention is a gift that you give to yourself and it's a gift that you give to people around you.** And I appreciate the attention that you have given me here today. Thank you very much.

[END OF TRANSCRIPT]

To learn more about Paul Atchley's academic history and what he is focused on today, visit his bio here: [Paul Atchley on LinkedIn](#).

To watch the video of this speech, published by TEDx Talks on YouTube, click here: [Distraction is literally killing us | Paul Atchley | TEDxYouth@KC](#).

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