

The Safety Illusion

A reflection for new and seasoned drivers



[Eric Horvitz](#)

Microsoft Research

&

[Decision Education Foundation](#)

In memory of Nica, Samantha, Ana Maria, and Robert.

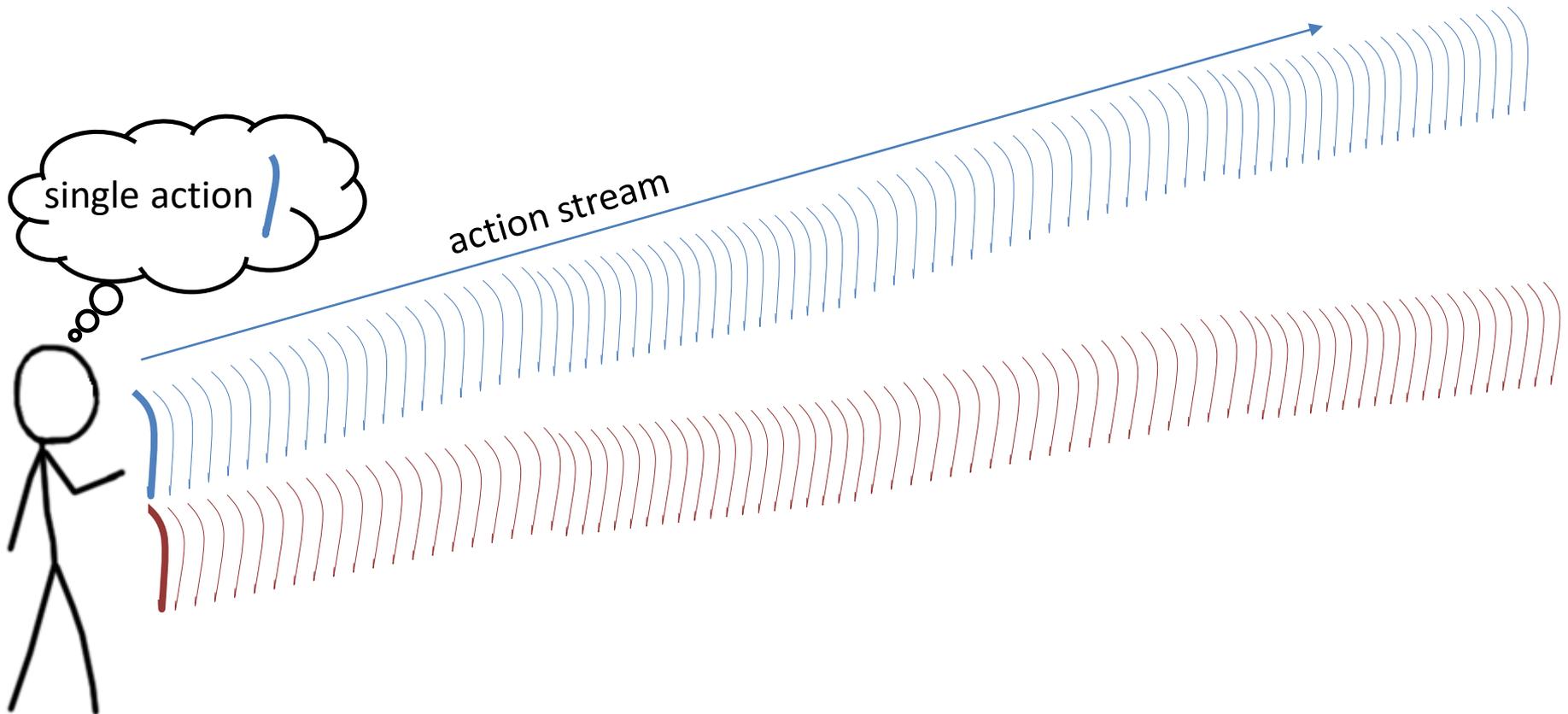


<http://www.robertandanamaria.com>

It's about the action stream...

We often think about a single action like “*send text message now*”

But many of the things we do, like texting, are best viewed as repeated patterns that leap across time as *action streams*.



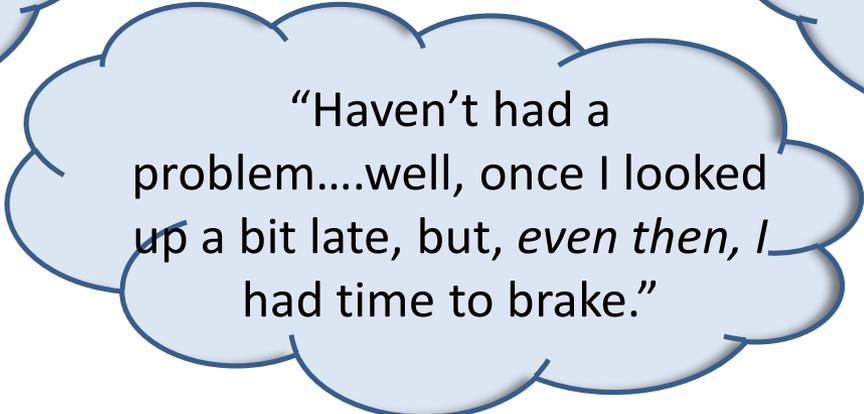
From Habits to Surprises

Common thought—and it's true:

“I can glance at a phone and it's not a problem.”



“Texting while driving seems pretty safe”



“Haven't had a problem....well, once I looked up a bit late, but, *even then*, I had time to brake.”



“Please! I can glance at phone and it's not a problem.”

From Habits to Surprises

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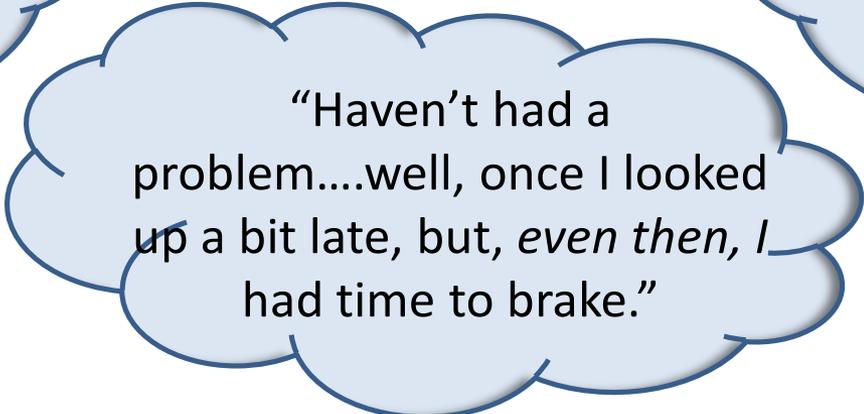
“I can glance at a phone and it's not a problem.”

Problem:

You can expect an eventual surprise!



“Texting while driving seems pretty safe”

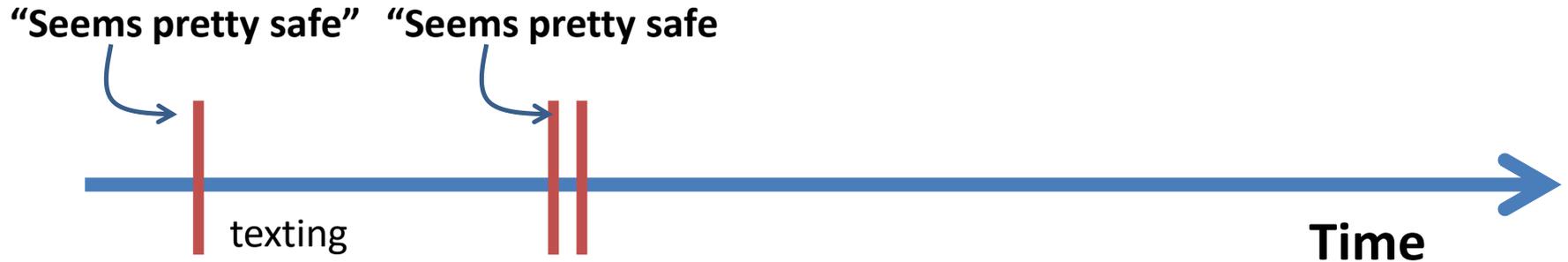


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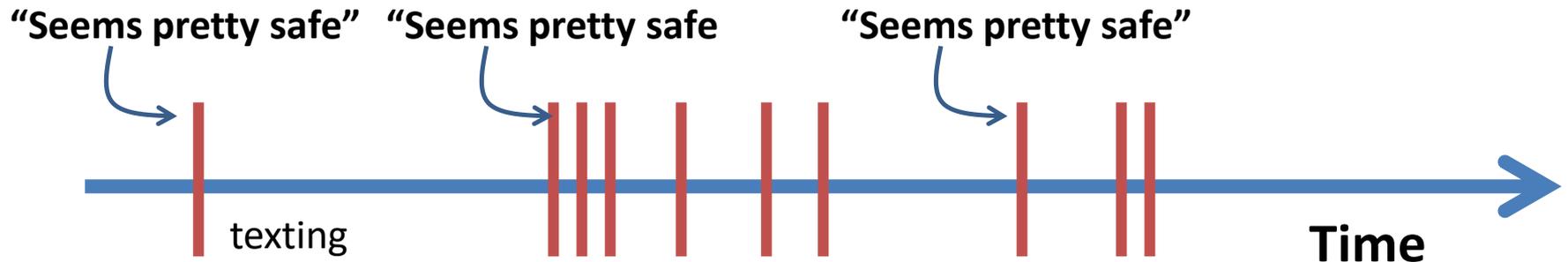


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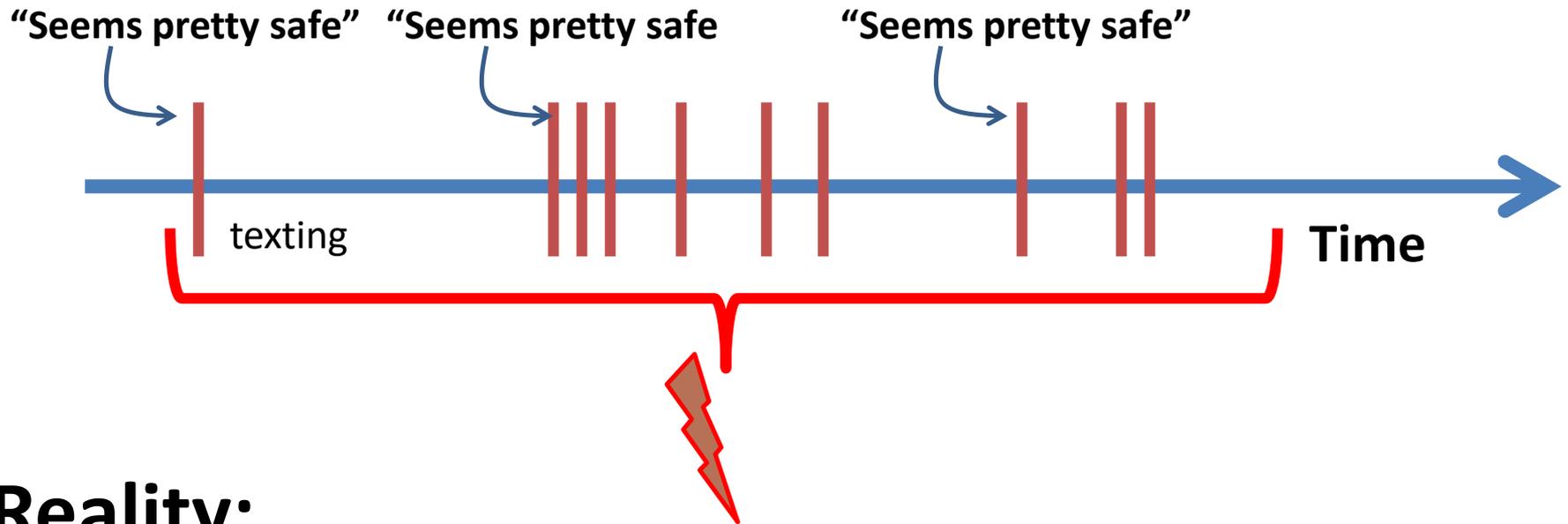


From Habits to Surprises



Illusion: I am as safe as the “small risk”
that comes each time I text while driving.

From Habits to Surprises



Reality:

Behavior over time → Terrible single outcome

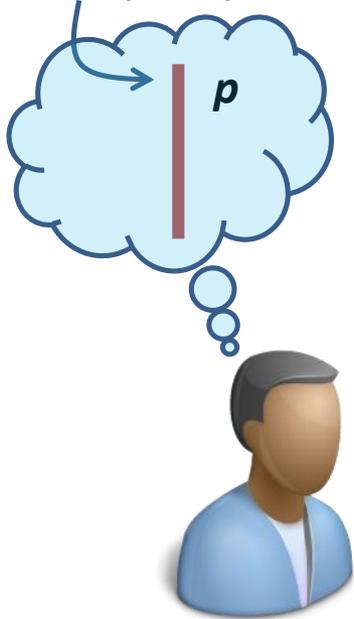
**Illusion: I am as safe as the "small risk"
that comes each time I text while driving.**

The Safety Illusion

We think about the risks and benefits of a single action, rather than the outcomes that will arise from the continuing pattern of action over time.

Perception

“Seems pretty safe”

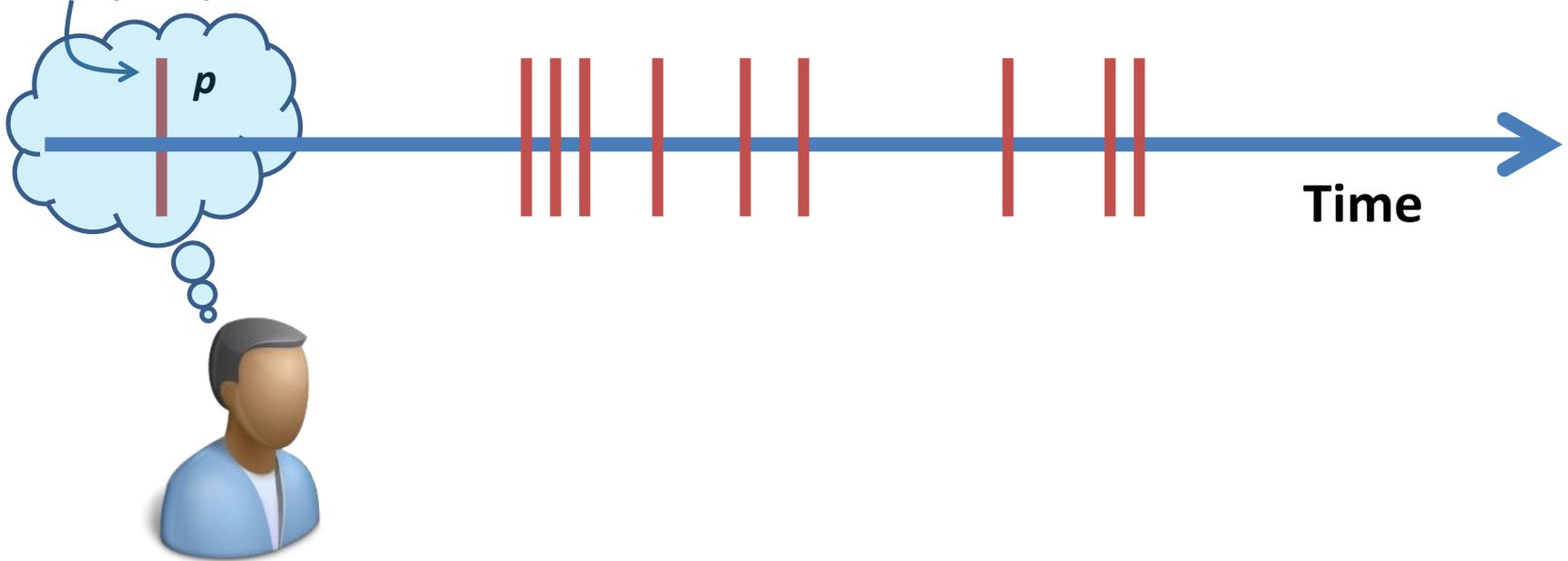


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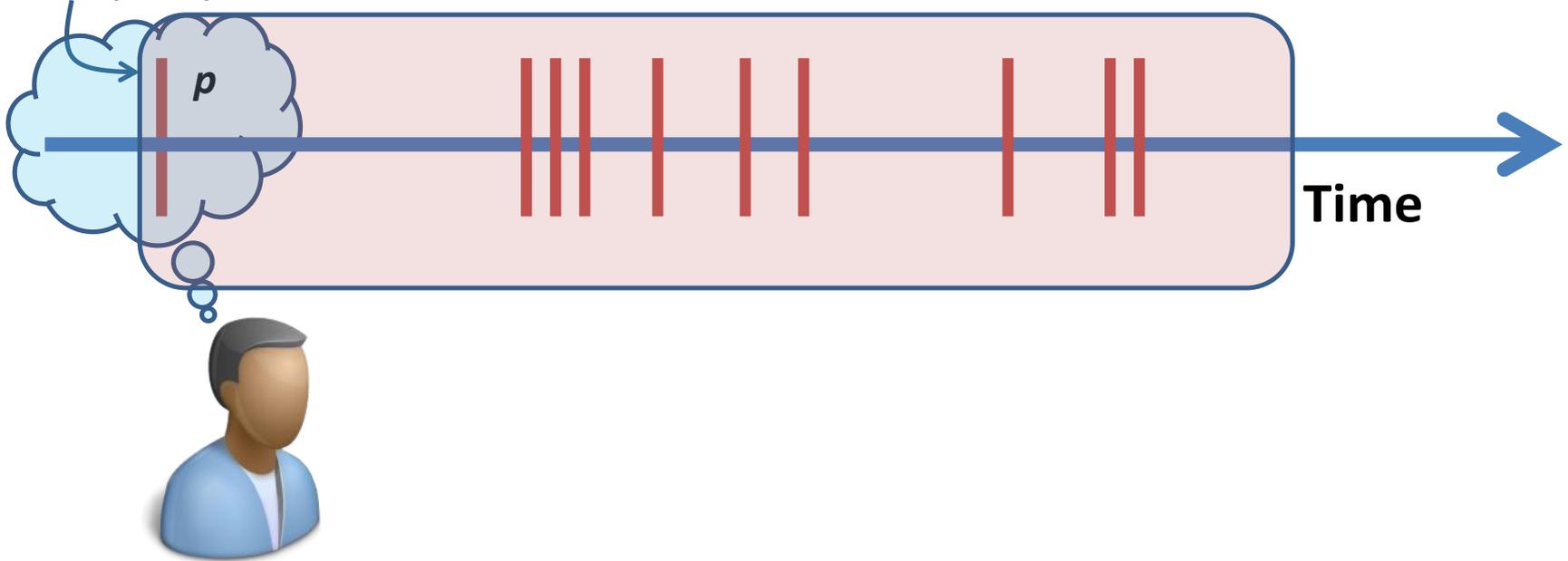
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Reality

“Seems pretty safe”



Surprises that you can expect...

Let's estimate the chance of having a major accident over time based on distracted driving.

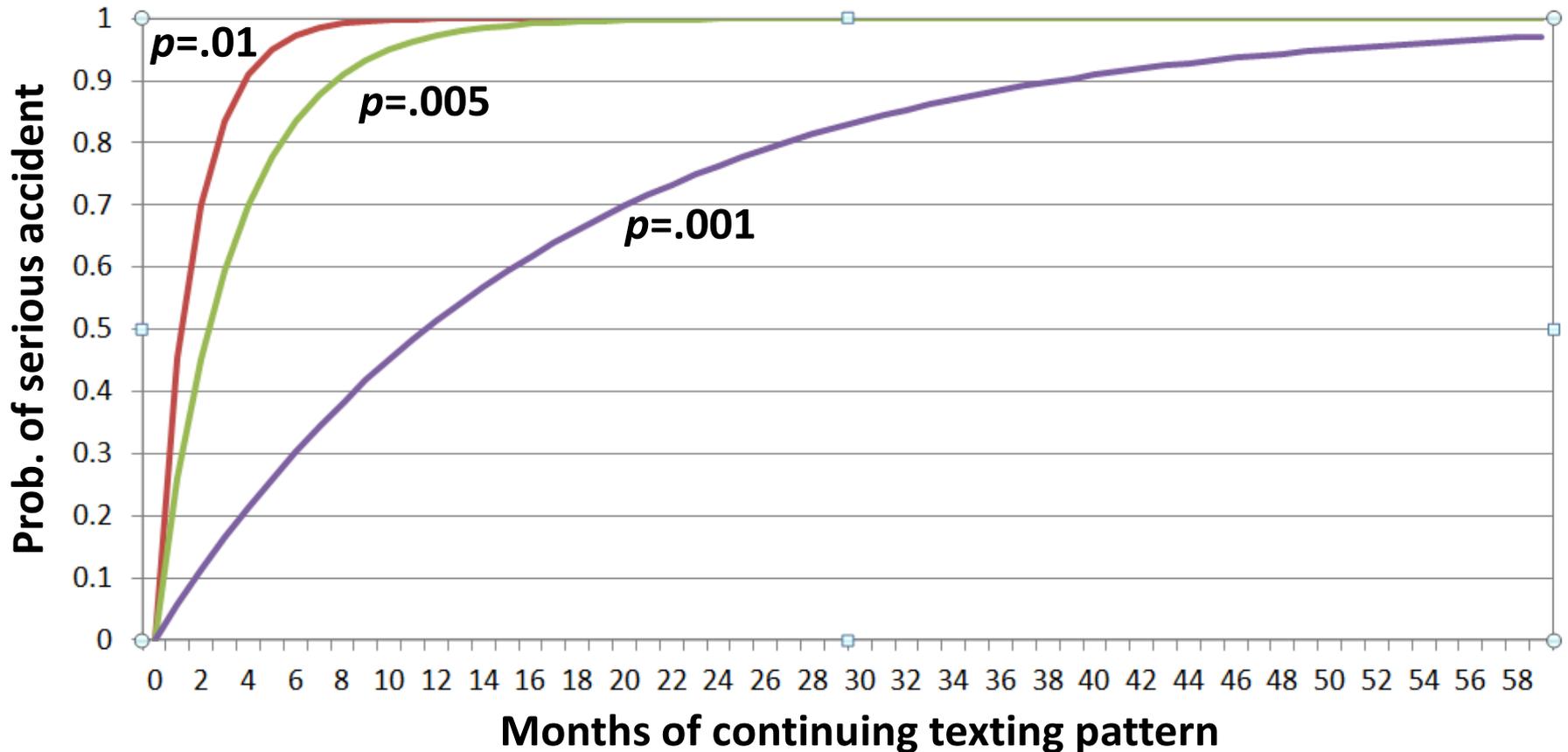
Consider that your pattern is just 2 text or email sessions while driving per day.

We need to assume some probability of having a major accident each time you read email or text while driving.

We'll start with a 1 in 1000 chance of an accident per session and consider the implications of this low level of risk and also higher probabilities.

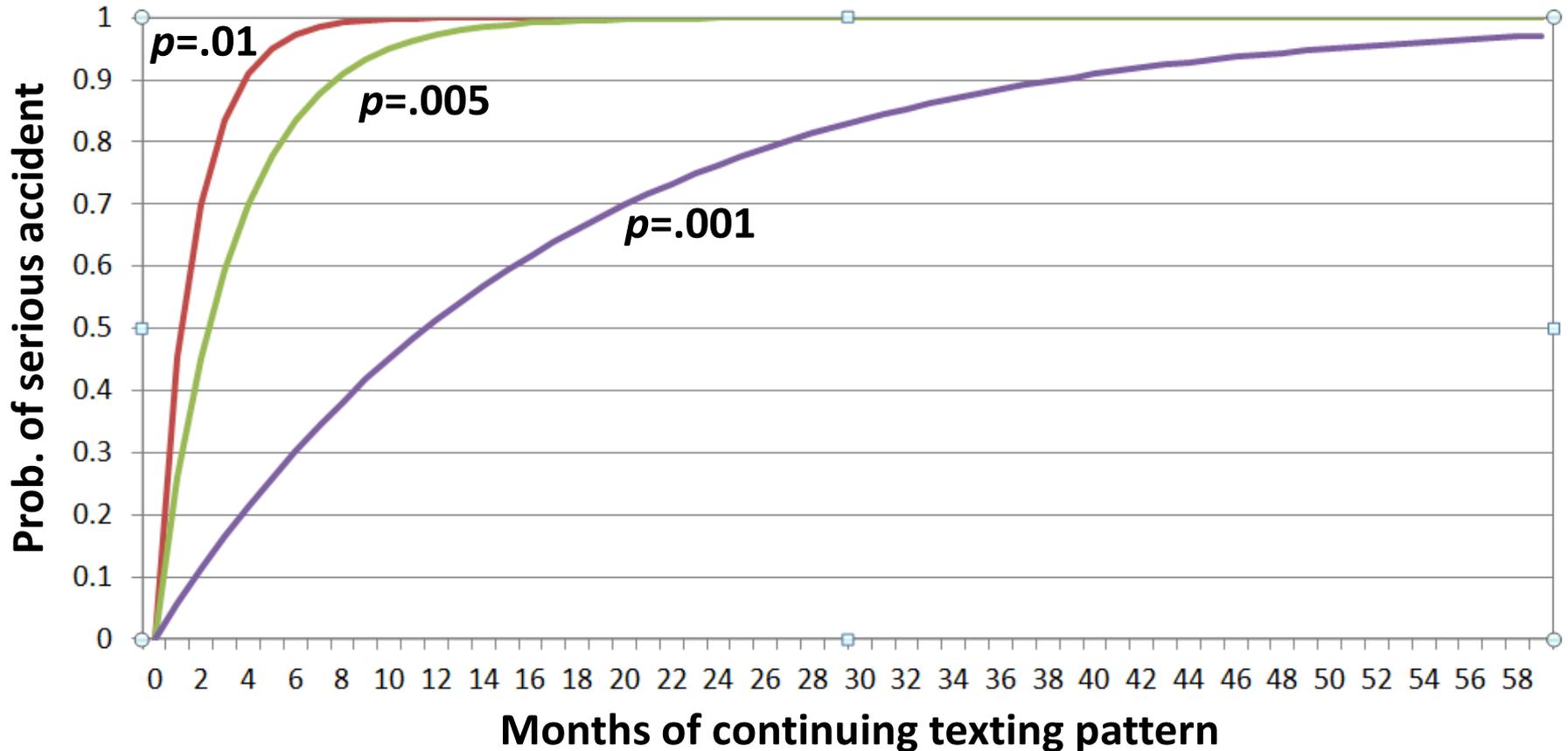
Surprises that you can expect...

Curves show the probability (vertical axis) of a serious accident over time (horizontal axis) for 1 in 1000, 5 in 1000, and 1 in 100 chances of an accident per session, when you text twice per day.



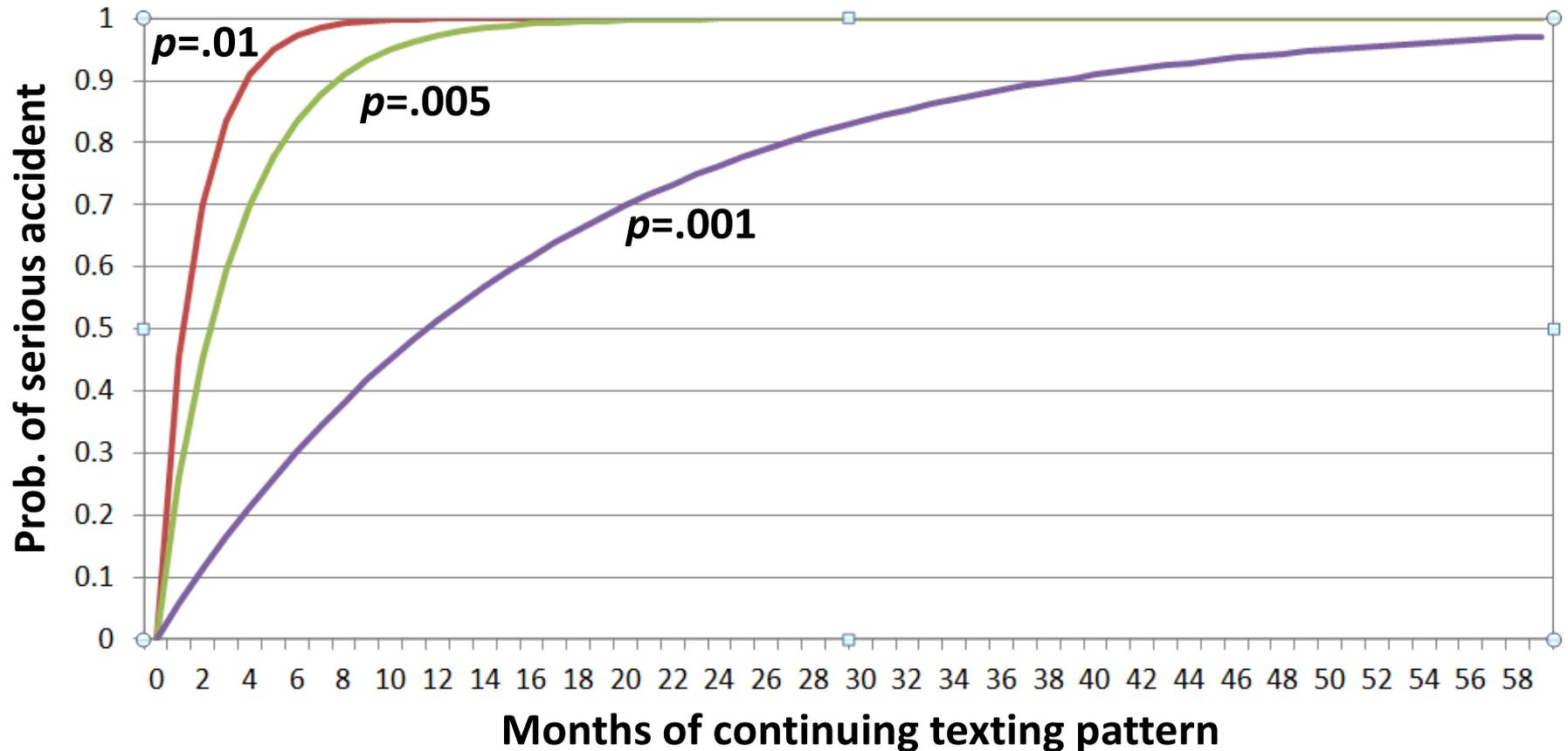
Surprises that you can expect...

So, a pretty safe single action is linked to a very dangerous pattern, in ways that people often do not understand.



Surprises that you can expect...

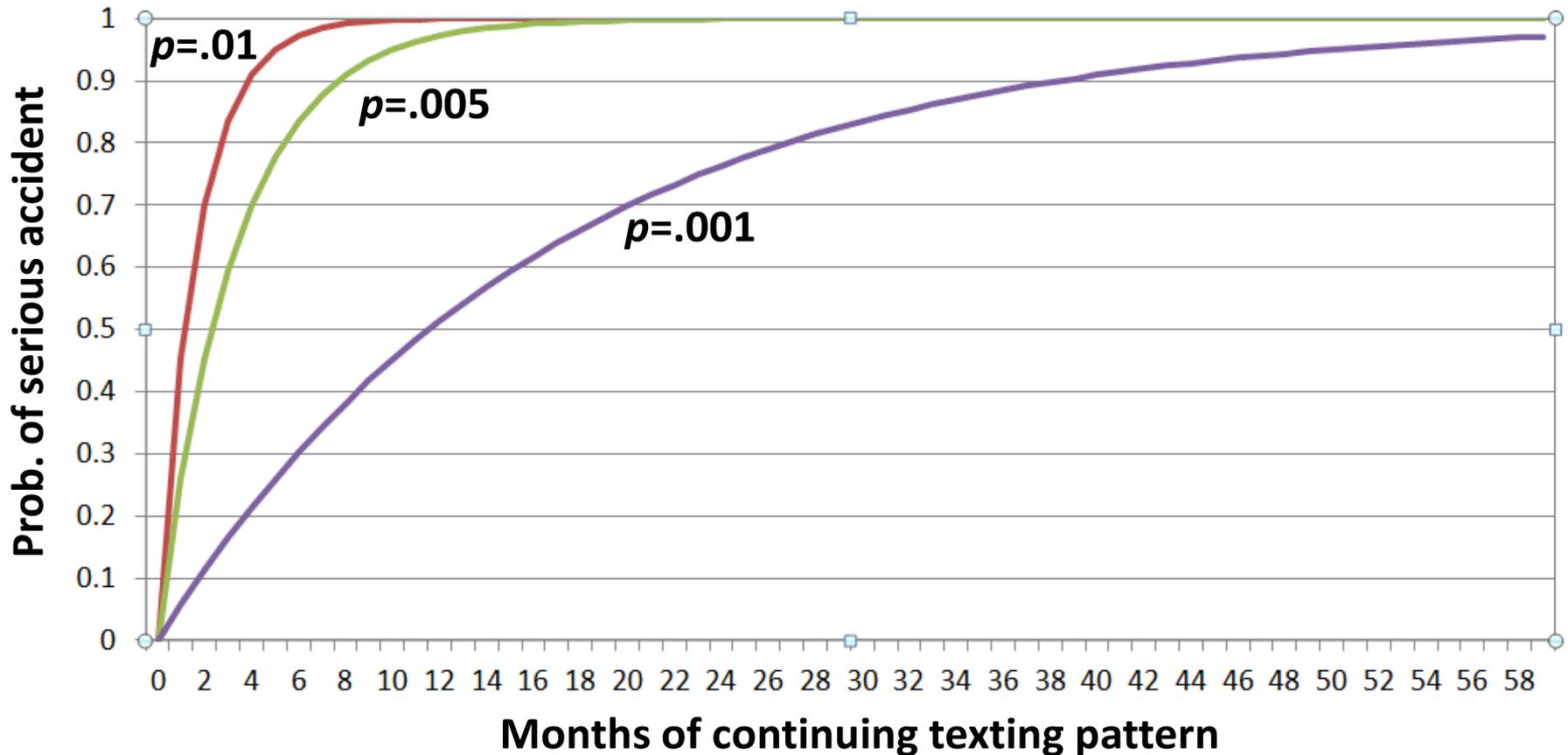
You can compute the likelihood in advance for any assumption of risk (see equations at back of slides).



Surprises that you can expect...

You don't have to simply wait for the bad outcome.

You can immediately "get off the curve."



Now that you're in the know...

Don't fall for the safety illusion

- User deeper understanding to your advantage!
- Make a long-term commitment *today* to reduce or halt risky patterns of action
- Explain the *safety Illusion* to others*

*Without knowledge about the safety illusion, your friends may be surprised with a terrible outcome. Your sharing of these ideas can truly be a gift of life for them and others.

Now that you're in the know...

Mastery of the safety illusion highlights the value of making commitments *now* that change patterns of actions over the long term.

Such a mindful change takes effort, but can have a tremendously valuable influence on your life.

Several tragic outcomes...
of folks just like you.



Meet Taylor Sauer

Bright, outgoing college teen

Graduated high school last year with a sparkling 3.9 grade point average, was class salutatorian, played first base on her softball team and was active in community charities.



Meet Taylor Sauer
Bright, outgoing college teen

After she was named a National Merit Scholar, she told a local TV station:

"I want to go even further and take on the world."



Meet Taylor Sauer

Bright, outgoing college teen

She was making a late-night, four-hour drive from the Utah State University campus in Logan to visit her folks in Caldwell, Idaho.



Meet Taylor Sauer

Bright, outgoing college teen

But she stopped short, writing in her final text msg:

**"I can't discuss this now.
Driving and facebooking is not
safe! Haha."**



Meet Taylor Sauer
Bright, outgoing college teen

Moments later, going more than 80 mph, she slammed into a tanker truck that was slowly creeping up a hill at 15 mph.

She was killed instantly.



Meet Taylor Sauer *Bright, outgoing college teen*

Investigators saw no signs that she applied the brakes before the fatal crash.

And in checking her cell phone records, they learned Sauer was posting about every 90 seconds during her drive.



Meet Taylor Sauer

Bright, outgoing college teen

"She just loved everybody and was an amazing friend," said her mother Shauna Sauer.

"She wanted to take on the world, and she would have."



Taylor is not atypical.
Meet Allison Smith

“Investigators: Teen Texting Before
Fatal Collision With School Bus”

(ABC 6 NEWS) - The Iowa State Patrol believes a teen from Stacyville was texting before her car collided with a school bus, killing her.

The accident happened in November 2011 on Highway 218 near St. Ansgar. Authorities say 17 year old Allison Smith was alone in the car and died on the scene. No one on the bus was hurt.

Investigators used cell phone records and video from the school bus to determine that Smith was texting prior to the collision. They also determined that data from the car's airbags show smith never braked and likely never saw the bus before impact.

Smith was a junior at St. Ansgar High School. Before she was killed, there were only a class of 58 students.



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“Deputies: Mother texting on cell phone before head-on collision that killed son”



Her 4-year-old son, Diego, was sitting in a booster seat and wearing a seatbelt, but he died at the scene.

The Safety Illusion is everywhere



Click on image for video.

Additional Materials

In Study, Texting Lifts Crash Risk by Large Margin

The first study of drivers texting inside their vehicles shows that the risk sharply exceeds previous estimates based on laboratory research — and far surpasses the dangers of other driving distractions.

The new study, which entailed outfitting the cabs of long-haul trucks with video cameras over 18 months, found that when the drivers texted, their collision risk was 23 times greater than when not texting.

http://www.nytimes.com/2009/07/28/technology/28texting.html?_r=2&hpw

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[Enlarge This Image](#)



Virginia Tech Transportation Institute

In these videotape stills, a truck driver texts while at the wheel, top left, with other angles seen.

Multimedia



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The [Virginia Tech](#) Transportation Institute, which compiled the research and plans to release its findings on Tuesday, also measured the time drivers took their eyes from the road to send or receive texts.

In the moments before a crash or near crash, drivers typically spent nearly five seconds looking at their devices — enough time at typical highway speeds to cover more than the length of a football field.

Even though trucks take longer to stop and are less maneuverable than cars, the findings generally applied to all drivers, who tend to exhibit the same behaviors as the more than 100 truckers studied, the researchers said. Truckers, they said, do not appear to text more or less than typical car drivers, but they said the study did not compare use patterns that way.

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Virginia Tech Transportation Institute

In these videotape stills, a truck driver texts while at the wheel, top left, with other angles seen.

By Larry Copeland, USA TODAY

Updated 10h 29m ago

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The high-profile campaign against distracted driving, especially among young motorists, has seeped deep into the national culture: April is Distracted Driving Month, and tonight's season premiere of the Fox teen hit TV show *Glee* features a distracted driving crash cliffhanger from last season.



By Pat Wellenbach, AP

Nearly half of drivers ages 16 and 17 say they've never texted while driving, a recent survey finds.

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Despite all that focus, a new survey from insurer State Farm indicates that many teens might still be ignoring the message.

The survey, conducted for State Farm by [Harris Interactive](#), finds that just 43% of drivers ages 16 and 17 say they have never texted while driving — the same percentage as in the insurer's first survey in 2010.

STORY: [Strategies aimed at reducing deaths among young motorists](#)

PHOTOS: [Teen driving](#)

Yet 76% of teens ages 14-17 agree that "if you regularly text and drive, someday you will be killed while driving," and 93% agree that "if you regularly text and drive, someday you will get into an accident."



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The State Farm survey comes as *Glee* is expected to resolve a cliffhanger from last season. Drama queen Quinn Fabray, played by [Dianna Agron](#), was rushing to her ex-boyfriend's wedding and texting while driving when her vehicle was blindsided by a truck. The screen went black, leaving viewers wondering about her fate.

Harris Interactive surveyed 652 teens 14-17 in February to examine their attitudes and behaviors around driving.

The message apparently isn't sinking in for some.

"Unfortunately, it has not in terms of the teens who say they're texting while driving," says Chris Mullen, State Farm's director of technology research.

The survey shows some progress: Fewer teen drivers say they "very often" text while driving, and more say they do it "rarely" than in the 2010 survey.

Cheyenne Schorlig, 17, a junior at Eureka High School in Eureka, Calif., who has had her license about 10 months, says she never texts while driving.

"I've been in a couple of accidents where the driver was texting while driving," she says.

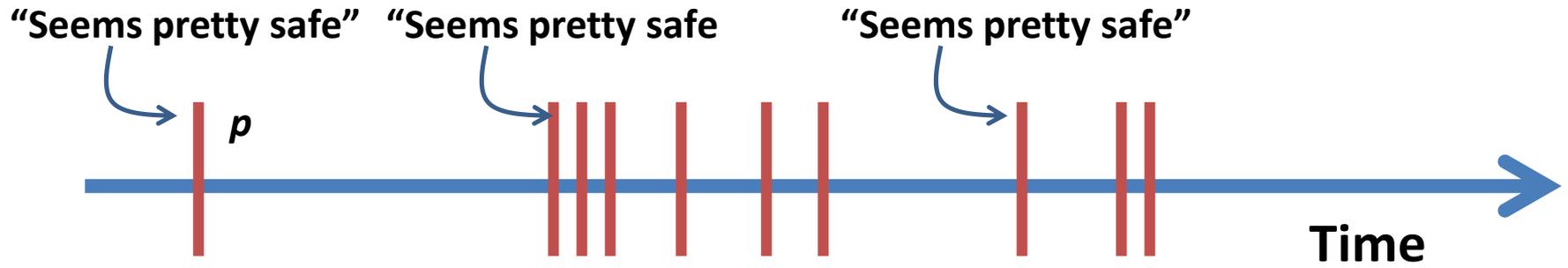
Jaylea Salk, 18, a senior at Eureka, says that among her peers who still text and drive, "a lot of it probably is the social media aspect with Facebook and Twitter. People want that connection, and they want to be able to talk with their friends. They don't think, 'If I just wait 10 minutes, I can do it safely.' They want that instant gratification with everything."

The survey emphasizes the vital role of parents in fighting teen texting and driving. Among the teens who text, 67% talk often with their parents about driving; that rises to 82% among teens who never text while driving.

"What it tells me is that parents do have an extreme influence and a role to play in teaching their teens how to drive," Mullen says.

Details on the analysis...

From Habits to Surprises



A tiny bit of math can take us a long way....

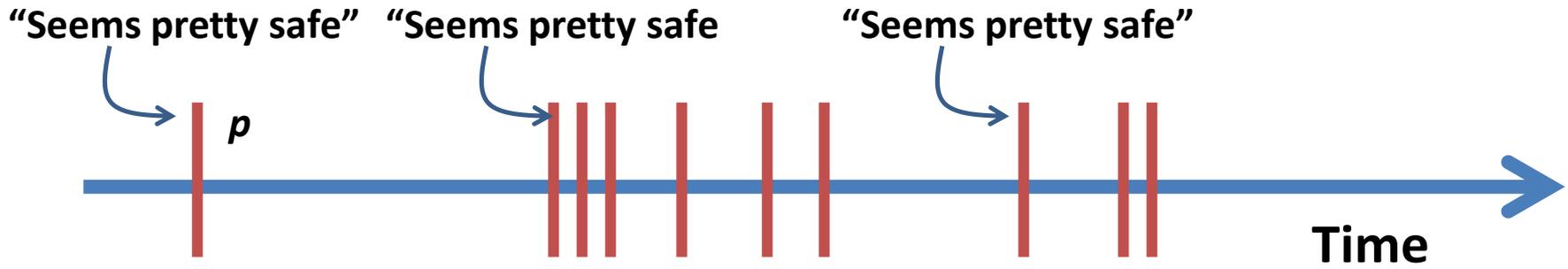
Consider the probability that you'll have a major accident because of inattention coming from texting while driving. The probability p may be small, but it is not 0.

Let's assume that p is 1 in a 100. So, $p = 0.01$

This means that there's a 1% chance of a crash with a single texting session while driving.

For each text session, the probability that “things are fine!” is $1 - .01 = .99$. ***That is 99% of the time, things will be okay!***

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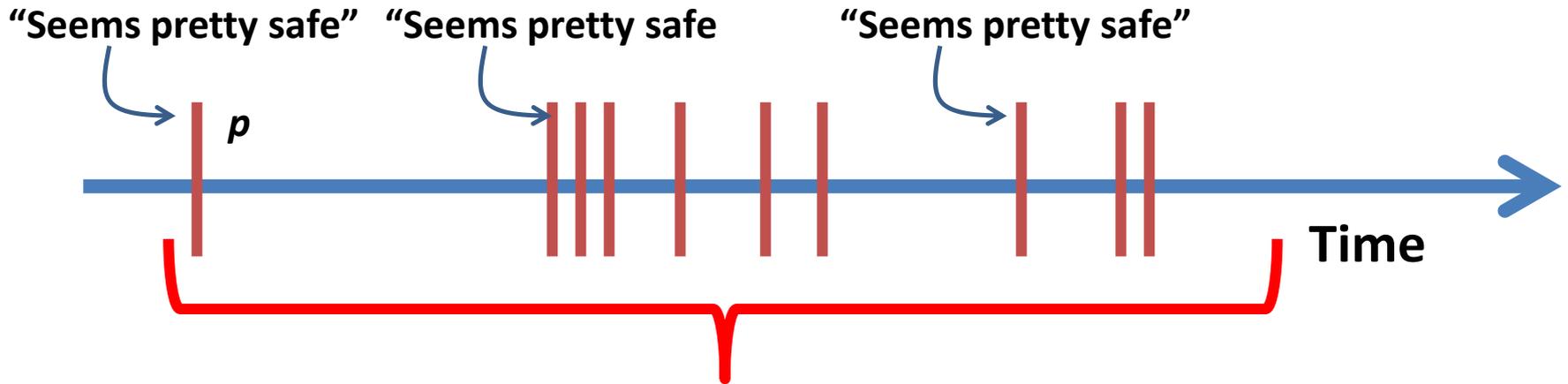
Wait. Given that you're comfortable texting...

You will be sending an expected stream of txt messages over time...

So, if you have 50 texting sessions over a month, what is the probability that things are still okay?

Can you figure this out?

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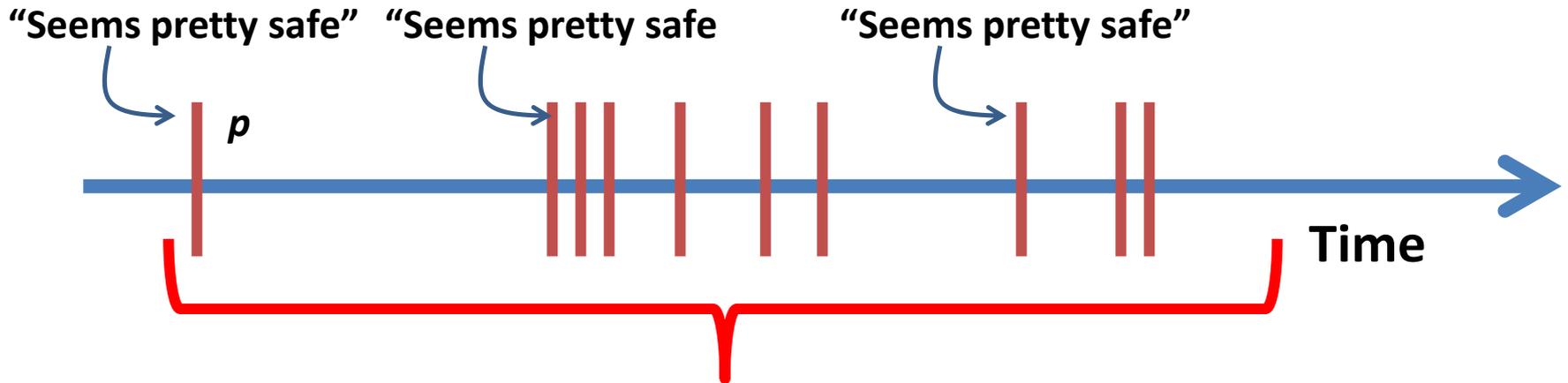


Probability of bad outcome for whole stream

Let's consider probability of a bad outcome for a stream of actions over time.

We first compute the probability that things are still okay after several text sessions—the probability you make it fine through n sessions of texting and driving.

From Habits to Surprises



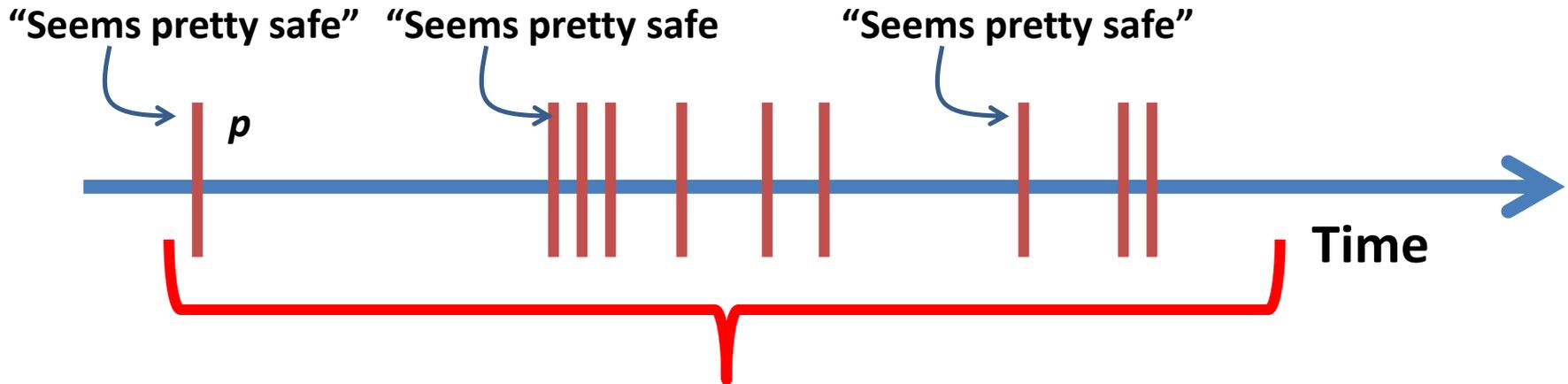
Probability of bad outcome for whole stream

The probability you make it fine through n sessions of texting and driving is an ***and*** of all the separate, independent events or times that things are okay following each texting session.

This is computed as a multiplication of each probability of getting through okay:

Okay after n txt sessions \rightarrow $= .99 \times .99 \times \dots \text{etc. or } (.99)^n$

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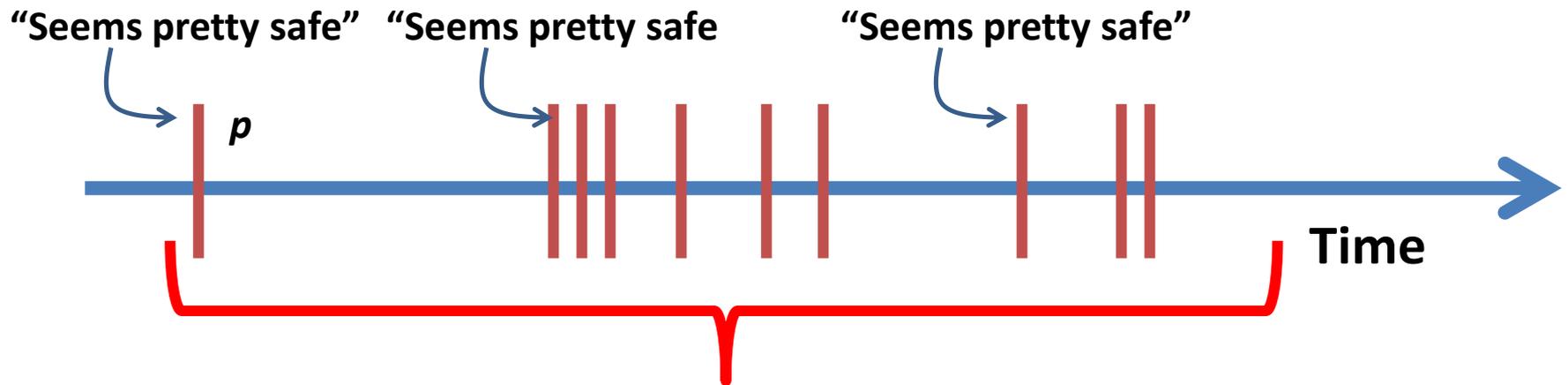
Probability of bad outcome for whole stream

So, to compute the probability of not having an accident over $n = 50$ texting sessions (one month) of driving, we need to do 50 multiplications of .99, a 99% chance of getting through each texting session without a crash:

$$= .99 \times .99 \dots \text{ or } (.99)^{50} = .60$$

→ 60% chance that everything is OK!

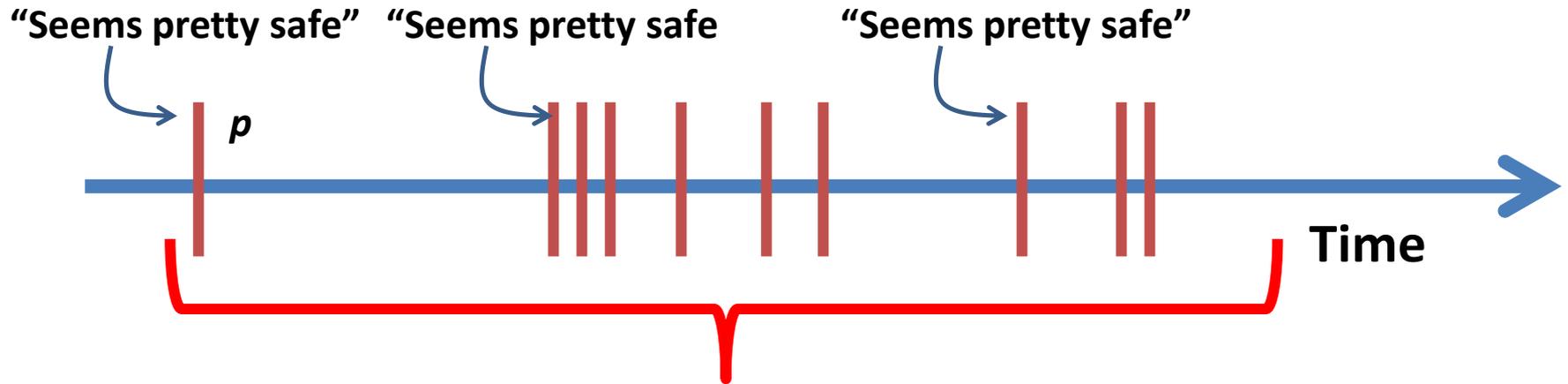
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Finally, to compute the probability of a major accident over the month, we compute the **complement**. **60%** of the time there's no crash, but, there is a crash with the complement probability of $1 - .60 = .40$. So, you will *not make it through all 50 text sessions safely*, with a *P* of:

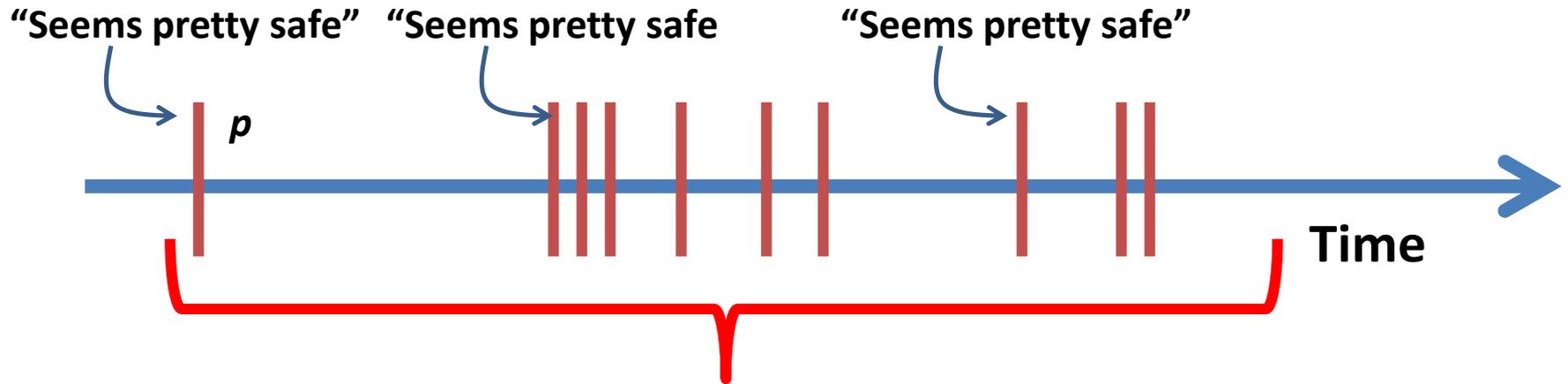
$$= 1 - .60 = .40 \rightarrow \text{40\% chance of a crash}$$

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So, there's a 40% chance of a major accident within 50 texting sessions, even though the risk is only 1 in 100 each time.

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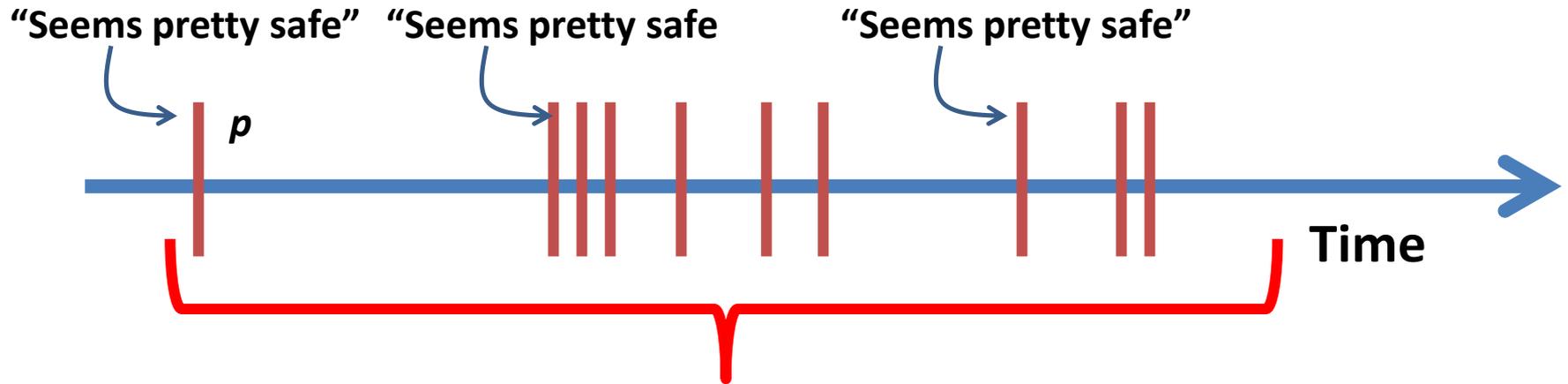


We can compute *the probability of an eventual bad outcome* for any probability p and any number of text sessions n as follows:

$$\text{Prob. of bad outcome} = 1 - (1 - p)^n$$

You can use this equation to compute the risk of having a major accident using your own numbers.

Plug in your own numbers!



Try out your own numbers

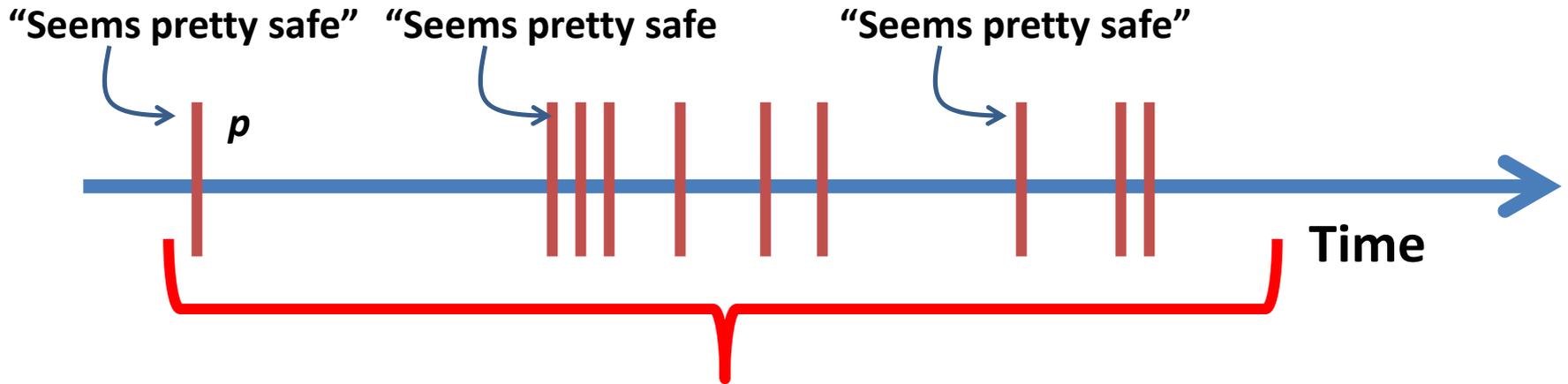
p : ___ (prob. of a bad accident for a text session while driving)

n : ___ (number of sessions of texting while driving)

Probability of bad outcome = $1 - (1 - p)^n$

= _____

Here's an example...



Assumed values

p : .001 (prob. of an accident for each text session)

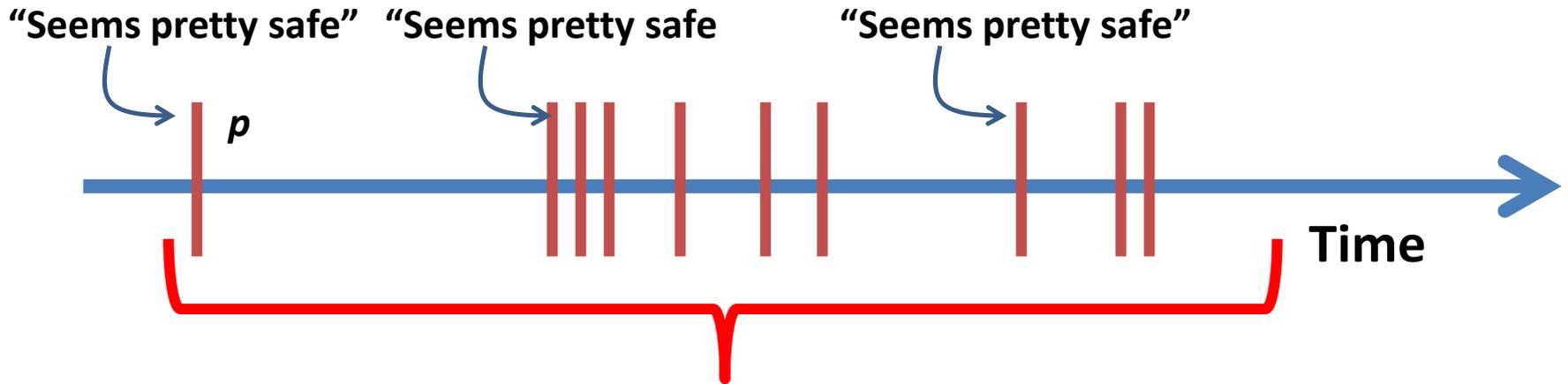
n : 500* (number of sessions of texting while driving)

Prob. of bad outcome = $1 - (1 - p)^n$

= $1 - (1 - .001)^{500} = \mathbf{34\% \text{ of a major accident!}}$

*Note that 500 = 10 text sessions per week for year.

Another example...



Assumed values

p : .01 (prob. of an accident for each text session)

n : 100* (number of sessions of texting while driving)

Prob. of bad outcome = $1 - (1 - p)^n$

= $1 - (1 - .01)^{100} = 64\%$ of a major accident!

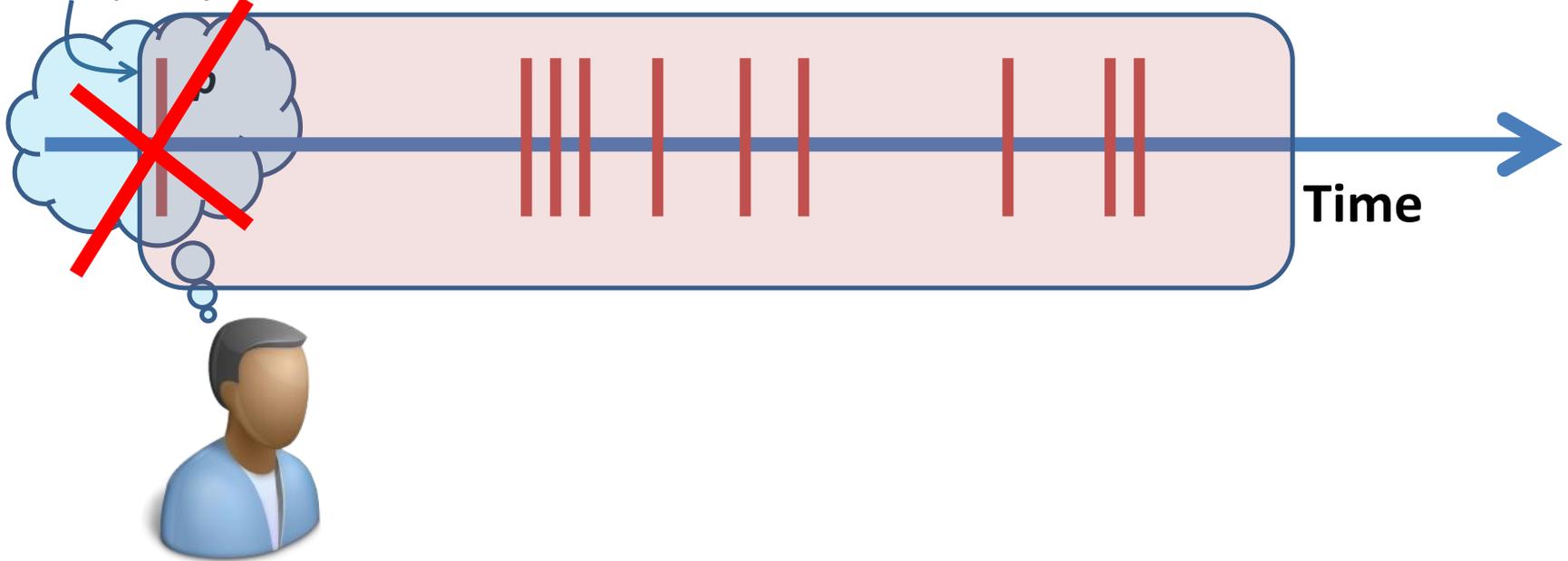
Mastering the Safety Illusion

Critical need: A decision and commitment *now* to immediately stop or modify the long-term pattern.

Perception

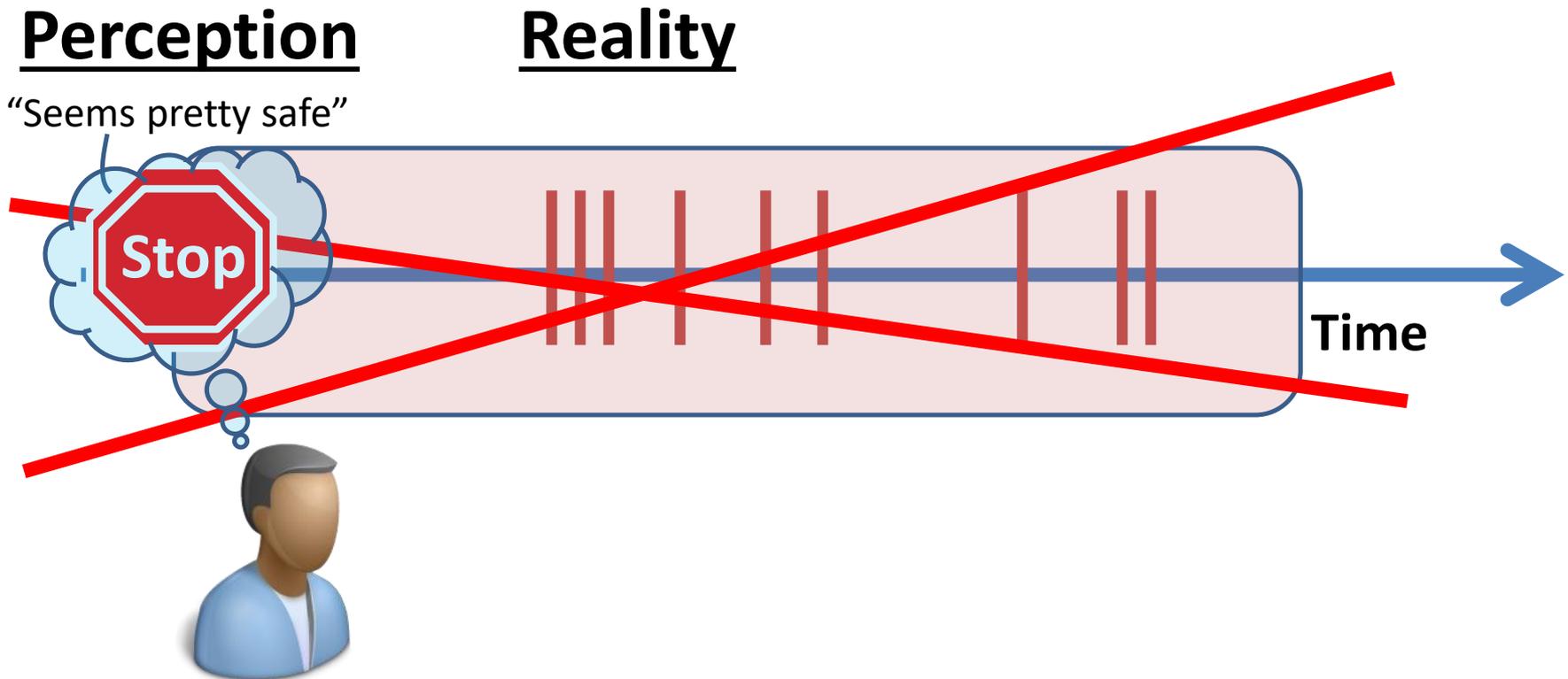
Reality

"Seems pretty safe"



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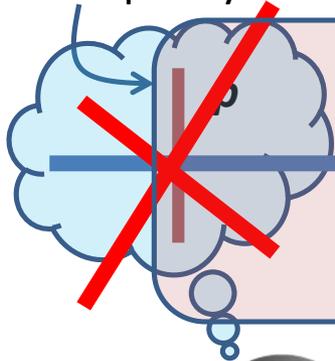
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Time



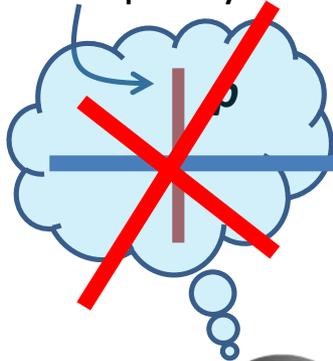
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Perception

Reality

"Seems pretty safe"



Time



[Access Powerpoint version](#)

[Access longer course \(pdf\)](#)

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Additional resources on decision skills can be found at the
Decision Education Foundation site.

<http://decisioneducation.org>