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PROFESSOR: So today I want to talk with you about how it is that we can do research of a scientific kind for something as complex as human behavior as opposed to things that you measure out in space or test tubes or under microscopes. People are complex organisms, right? And to do research on them, to understand human nature, how the mind works, how the brain supports it, is a challenging story.

So the usual thing is an experiment. You have a group of participants. And we'll talk about that. But in the reading for today, and I know it's the first time we've done this so you may not have read it, but if you have, that'd be great, is a kind of another thread of the kind of way that people are studied, which is dramatic individual stories, case studies, single stories that are illustrative of something that we think are broader principles.

And a lot of our biggest discoveries-- and we'll come to that later in the course-- have been made on very unusual single individuals who turn out to have a lesson that's pretty broad, for example, for the organization of the human brain. So in the Oliver Sacks book, there's a story about Donald. And what did Donald do that got him in big trouble?

AUDIENCE: [INAUDIBLE].

PROFESSOR: Yeah, he murdered his girlfriend while he was on PCP. He's in a psychiatric hospital. They try hypnosis to help him remember it. He says he doesn't remember it. Many of you may know that an astounding number of criminals under interrogation tell you they don't remember anything about the episode involved.

So people are suspicious, at first, for many reasons. Because the easiest thing to say is I don't remember what happened. And then you can't catch yourself in a lie or

any complexity, right? Because you don't remember what happened. And sometimes you don't remember. And sometimes you do.

But in this case, they tried hypnosis. That doesn't help. He's in there for four years. And he knows conceptually that he murdered his girlfriend. And he says, I'm not fit for society. He knows it's a terrible thing he did. But it's kind of like an intellectual knowledge, right? It's not a feeling. It's not a memory.

And then he goes biking and something happens, which is he gets hit by a car. And so there's what appears to be a drug-induced amnesia of the original murderous episode. He gets hit by a car. He has a severe head injury. He's in a coma for two weeks.

He has left-sided weakness as he comes out of it, which means the biggest injury was in the right side of his brain, weakness and numbness. And he has frontal lobe contusions. He has injury and bleeding around the frontal lobes of the cortex that sits in the front of the brain.

But now a remarkable thing happens. It's as if two insults, two wrongs, made a right, the first wrong being the PCP, the second wrong being the accident. And now what happens? He remembers in vivid, in florid detail the horror that he actually committed this murder. It's as if two insults to the brain, one drug-induced, one a focal injury, repressed the memory and then unrepressed the memory.

And one of the first things they have to do is discover whether he really has his memory or he just thinks he has his memory. And how do they figure out to their satisfaction whether it's a really recovered memory or a fabrication of his mind?

AUDIENCE: [INAUDIBLE].

PROFESSOR: Right. It's really important. He remembers details of the murder that are not publicly available, that were not in the information that was given to him. That's a really huge issue in these kinds of memory. So this is a really recovered memory, not an inadvertently fabricated memory.

And they discover he has deep seizure activity in his limbic structures, the parts of his brain that are involved in emotion, are having seizures. In epilepsy, neurons are firing for no good reason. And that's part of his disorder. They give him medications to help with that.

But here's the question for you from a moment to think about. And it's now such a common question because our society is moving that way that it's on many TV shows. I see it like every couple of weeks there's a *Law & Order* episode that has something like this, which is the more you know about the biology that underlies really criminal terrible behavior, should that be a cause for understanding it or not?

So in this case, he took the drugs. He killed the person. You think he's pretty responsible. But how about somebody who kills somebody and it turns out, and there's such a case, a man with no history, a grown man with no history of criminal activity of any kind, shoved his wife out of a high window to her death in the course of a standard argument. Then they discover that he has a big tumor growing in the basal part of his frontal cortex. Now is the man responsible for what he did?

It's a really interesting question. And the more we understand about the neuroscience of our brains, what makes us do things, what lets us control impulses, what makes us murderous--

There's a guy, Kent Kiehl, the University of Mexico, he's driving around in a big van with an MRI scanner. And he goes from penitentiary to penitentiary. And he images the brains of serial murderers, of psychopathic murderers. And he's getting things that are pretty systematically different about their brains.

And the question is, what does that mean? Does that mean those people were prone to do it for reasons of their early environment or genes or some incident that happened? If that's the case, do you forgive them differently? Should we have a different moral code or legal code as we discover the brain basis for some of these things? Or is that irrelevant? What counts is the action.

So this is the kind of thing you can think about, maybe discuss in your sections

some. The more we understand about the human brain, the more we'll understand about behaviors that we find terrible. And what does that mean about legal and moral decisions about how to punish those or think about those?

So that's coming in your lifetime. Because there's steady progress on this. And how to think about that is really a big question.

So I'm going to talk with you today about research in psychology. And a funny thing about psychology, and I'll come back to this, is everybody is an amateur psychologist. They have to be. If you deal with people, you're an amateur psychologist.

Moreover, we live in a world with Oprah Winfrey and Dr. Phil, right? So in case you're only an amateur one, you hear all kinds of stuff, newspaper, internet, magazines. Everywhere you go, friends will tell you stuff about psychologists have found this or psychologists have found that. So you have your own intuitions to deal with people in everyday life.

And here's a kind of a sentence from *Time Magazine* that drives psychologists crazy if you take it seriously. So here's the literal sentence. "Almost half of children of divorces enter adulthood as worried, underachieving, self-deprecating, and sometimes angry young men and women."

So that sounds kind of like a psychological study of some kind, kind of, right? Somebody who wants to argue about the importance of divorce and breakdown of the family, this is the kind of thing. So let's think about this for a moment.

Almost half of children of divorce enter adulthood as worried. Are you guys worried about global warming? A little. Are you worried about peace in the Middle East and how that influences the Middle East and the US? A little. Are you worried about an economy that may not have jobs waiting for you? A little. Who's not worried a little bit of the time?

So it doesn't even tell you that half of children in the world, for example, are who come from families without divorce. Because that's the only relevant question. It's

not are people worried about stuff.

Underachieving, compared to what? How would you prove somebody's underachieving scientifically? Most of you probably have had days where you've underachieved and days where you've achieved pretty well. But how would you measure and prove that?

Self-deprecating, well, sometimes I think that's actually kind of nice if a person's modest. What's the difference between modest and self-deprecation?

And I like this one, sometimes angry young men and women. Are you sometimes angry about something or another? And if you are, does that tell us that society's breaking down and your parents did something bad that you're sometimes? Who as a human being is not sometimes angry?

So here's a kind of psychology-sounding sentence on a serious topic, which is what are the consequences of divorce in families? Should we be thinking about things that encourage marriages to stay stable and things like that? But there's really no information at all from a research or science perspective.

So I'm going to talk about a little bit just reminding you what science is, we're at a university, obviously, that thinks about science and does science all the time, remind you of what an experiment is, a very brief history of psychology experimentation, and then walk you through a few experiments that I find kind of interesting, and then some topics related to psychology.

So let me start with this. How do you know what is true? How do you know what is true, that you take to be true? What is the answer? Everybody's looking like how do I know it. Please tell me.

Well, when people try to analyze this, and you can think about it for your own self, one of them is authority. Parents, teachers, textbooks, scientists, professors, and courses, we tell you this is the truth. And if you remember the truth correctly, you get an A. So authority is a huge source, right?

It would be costly to go around and kind of have your own idea about everything. 12 inches in a foot? I'm not taking that piece of information without skepticism, right? You couldn't lead your life without kind of believing a lot of stuff. But you don't want to believe everything, right, just because you hear it.

Repetition or tenacity, you hear something often enough, and people tend to believe stuff. A priori, what's reasonable? You think things through. Just by thought, what's possible, rational, and so on? Then maybe a fourth brand of knowledge, too, something is scientific analysis where we have hypotheses and we test them and some version of experiments or at least correlations among data.

Now, there's another view, which is kind of whatever we think makes something science is what the scientific community decides as a community is true. Roughly speaking that is the mainstay of faculty of places like MIT and Stanford and Harvard and so on and around the world at universities tell you, this is how science works. You go, OK, that's how science works.

I remember some years ago there was a lot of excitement about a satirical article written by a scientist where he said, oh, this is all just societal authority. The scientists tell you what's true just because they believe in it just like a sports writer says the Celtics are the best. You don't really think that the sportswriter know scientifically the Celtics are the best, right?

He wrote a paper saying that gravity is simply a consensus among scientists and a particular view they're foisting on society. But none of us would want to really go up there and jump out the window going, well, gravity is one person's opinion. And now here's my opinion, right?

But it's kind of interesting. Because for those of you who go to medical school, for example, you learn lots of procedures and so on that the medical committee believes is true. But there's not much scientific evidence behind it. But they have to use it every day.

So you're used to hearing about the scientific method. It applies to psychology in

many ways just like it applies to chemistry, physics, or biology. We have to test things that are falsifiable. We have to deal in probabilities of outcomes in terms of statistics in some sense. The kinds of data we can have are descriptive or correlative or experimental. I'll talk about those in a moment.

We are always trying to disprove the null hypothesis statistically as you know. We can't prove that something is true. But we can prove that it's not true. And then finally, like all fields of science, today's most exciting breakthroughs are tomorrow's things that have to be apologized for and rediscovered, right?

I mean what makes something breaking science is not that it's known with certainty. What's known with certainty is what's in your textbook kind of. What makes something breaking science is it moves the field forward. So what's the difference between the cutting edge and the bleeding edge is a very close call.

So here's a cartoon that says, he's constantly proving his experiments wrong. And the guy's kind of glum looking over. He's proving the null hypothesis to be correct. Now, that's sort of funny for scientists.

But it's sort of funny in the sense that, no, we don't really go around going, I hope with all of my heart for this research project I worked on for the last five years that it will prove the null hypothesis. There's no difference between things I'm studying.

In fact, scientists, like all humans, have agendas and hopes like everybody else. So they observe, hypothesize, experiment. So the data, it doesn't always go perfectly, right?

And the last thing I want to say is I'm going to emphasize today a scientific approach to the human mind and behavior. But of course, there's many other paths of knowledge for important things in our life: religion, philosophy, arts, and so on. There's many things that science cannot address. And I don't want to pretend that it does.

That's not a problem too much when you think about chemistry. It's kind of an interesting problem when you think about psychology. Because when we think

about happiness or values or things like that, those topics cut across psychology and things like religion, philosophy, and topics like that.

So what makes something an experiment is you have to have sort of two things conceptually especially, the dependent variable, what you measure, the outcome, and the independent variable, what you vary. Once you have those things in an experiment, you're kind of an experiment in a broad sense.

So in psychology, it took a long time. It wasn't until the 1800's that people had kind of an approach to doing experiments in psychology and figuring out, for example, how to use the simple measurement of time to measure how long a mental operation lasts in your mind. So that's pretty cool.

If you were to come to a fifth grader and say, how would you measure, not a brick or a stone, but how long a thought takes, you would say, well, that would be pretty hard. But it turns out it's not as hard in a simple way.

So Wilhelm Wundt, big figure in psychology, first textbook in psychology, first laboratory in psychology, did the following test of mental chronometry, simply measuring how long it takes you to do things. So he would show you a light. And you'd simply press the button. And that would take about $1/5$ of a second.

And then he would say, instead, you do this. If the light turns on and it's red, you push one button. And if it's green, you push another. So his idea was the motor system to push the button is about the same. The time to observe the light is about the same.

But the difference between these two is how long it takes to make a choice, how long it takes to make a choice. And that difference, when he subtracts them, took about $1/10$ of a the second by that measurement. So all of sudden you could start to measure, in an objective sense, how long a mental operation takes in your mind.

Then psychology went a lot of different directions. A famous one from Titchener, who worked with Wundt, developed a psychology department at Cornell, was introspection, look inside yourself and think very carefully. When you think about a

topic, how do I think about it?

That lost its way as a scientific method. The trouble is one person thinks one way. And one person thinks another way. And you can't really settle it, right? So introspection about your thoughts is a private process. It's not a public measure that you can exchange among scientists, like time or measurements.

But we still introspect a lot when we think about psychology, whether it feels right to us, what are the questions to ask. But still just being human, you can't help but introspect about psychology topics.

In the US, there was a sort of a huge response to introspection as being too loosey goosey. One famous name in this is John Watson. He said the mind is unobservable. So we can only study behavior, things that people do, actions they take. Their mouth moves. Their hand presses.

And then we identify what in the environment influences those behaviors. The principles of the mind should be similar between animals and humans. And that the only thing a responsible experimental scientist can do is relate environmental factors to actions.

And so there's a stimulus. And you can control the stimulus as a scientist. There's a response. You measure the response. And that's your psychology experiment.

And then the 1980's became the cognitive revolution. Partly this path lead to not, after a while, to not very interesting science. That was the biggest problem. And people said, no, we can make inferences about the mind as it translates what it hears or sees into what a person does so representations or knowledge in the mind or in the brain later on and how that translates what's out there and how you act upon it.

So I'll remind you of a couple more things. And then we'll get to specifics. So correlations you can only get in an experiment, right, where you have an independent variable. Sorry. Correlations you can look at all the time. Experiments

only allows us to infer causation.

So let's pick an example when I read that struck me as slightly relevant so age of parent and risk for disease in a child. So most of you are young enough that you're not too worried about this yet. And you have no reason to be.

But for those of us who are in my generation and some generations back, many people are postponing childbirth as they do their careers and complete different tasks. And parents are getting older. They don't only seem old. They are old.

It's the case statistically that, the older the mother is, the higher the risk of Down's Syndrome. So the statistics are, if a mother is age 20 to 24, it's very rare to have Down's Syndrome. And the number goes up dramatically if the mother is over age 42.

So this is simple observation and measurement. But it's something a lot of women giving birth in their 30s and 40s are thinking about and worrying about. And it's a thing on their mind.

Up until relatively recently men said, oh, it's too bad for those women. But no problem for us. So you have the movie star, right, who's 90 years old and marries a 20-year-old actress, right, that kind of model that you see all the time. Because it doesn't matter how old the guy is.

Well, it turns out it does matter. And here's some data for that. So here's the probability of developing schizophrenia, a disease that's typically diagnosed in a person's late adolescence or 20s depending on the age of the father.

And you can see if the father is less than 25, it's one out of 141. If the father is in his 50s, it becomes one out of 50, a dramatic growth in the likelihood of an offspring child having schizophrenia depending on the age of the father.

Now, there's a correlation between age and whether a child expresses schizophrenia. So let's guess about the possible causes of that. I can tell you, it's unknown. But let's even begin to guess about it. Let me ask you to guess about it.

Yeah?

AUDIENCE: Maybe the gametes become damaged by age.

PROFESSOR: Yeah, bad sperm, right, for some reason, in some way, and sperm that leads more likely to be risk for schizophrenia. That's your first intuition. And that may turn out to be right, something problematic about the sperm from the male.

Here's another one, though. And this shows you the challenges with correlational research on something even so important as this, which is how about an alternative, which is who marries later in life? Maybe the desirable men are plucked off the market on average in large statistics by age 30 or something.

And a bunch of us-- and I'm a late marrier-- limp to find some woman around the world who will accept us. And finally, out of pity, some woman says, OK, drag yourself into your 50s and I'll take you.

Because it's not random probably. We're averaging over many people. But it's not random probably who marries at 25 in a given society and who marries at 50. It's not random. It could be big differences among the-- and how can we tell that difference?

Maybe it's nothing to do with the sperm. Maybe it's something about the genes and environment that goes with being a parent in your 50s versus being a parent in your 20s. Completely different explanations, someday maybe we'll know. But we don't know now.

So this is the limits of correlations. And both could be true, neither. It could be a third story altogether. So that was about me, my becoming a parent late in life and marrying late in life.

Let's talk about you. So let's talk about the level of stress you have and how empathetic you are on average, your college generation relative to ones five or 10 or 20 years ago. So let's ask that question. Why would people want to know such a thing?

Well, you might want to understand what pressures are we putting young people under as they go through grade school and high school and college. What's the world like? Is it pretty much the same? Is it pretty much changing?

Now, how would we figure that? How would we begin to measure that? It's a very simple question. Are you more stressed than people 10 years ago at MIT on average across the country? And are you more or less empathetic towards other people? How might one answer that kind of a question? Yeah?

AUDIENCE: [INAUDIBLE] we know a little bit about hormones to the extent [INAUDIBLE].

PROFESSOR: That would be a very interesting path. It's a tough research path. But you're right. If we had some biological signature of stress, that would be a good one.

But let's ask this question. Let's say I measured everybody in here and got your average stress hormone or something like that. Now what's my answer about whether 10 years ago people were more or less stressed? Yeah?

AUDIENCE: We could look at suicide rates.

PROFESSOR: That would be an outcome of it. Yeah, that would be sadly an extreme outcome of stress of a kind. But there's a lot of things that are going--

So you have to worry about two things. One thing we know is-- let me ask another one. You could compare your level of stress to people who are 10 years older than you or 20 years older than you. What do you think about that? Yeah? Yeah?

AUDIENCE: It would actually be more accurate if you measured, if you want to know for college students specifically, you'd have to be the baseline of yourself from somewhere [INAUDIBLE].

PROFESSOR: Yeah, because maybe people who are 30 or 40 are more stressed for other reasons because they have more bills and mortgages to pay or less stressed for other reasons or whatever, right? Maybe it's not about the generation you're in. Maybe it's about being a person with more responsibilities at 40, right?

So for some things you get some luck. And you have it in your hands. So here's an emotional health questionnaire where students across the country for the last 25 years have been given the identical questionnaire. It's a questionnaire, it's not a biology measure, about their self-reported measure of stress.

And this was on the *New York Times* just a few weeks ago. It's you guys on average across the country, US college students, are at an all time high level of self-reported stress. Sorry about that. It's not the perfect measurement in every way. But it's the same questionnaire to college students year in and year out. By self-report, people say, I feel more stressed.

You can also see that there's a difference between men and women. Women, on average, report feeling more stressed. And it may be relevant that on average, for example, there's a higher rate of depression among women than men. There's a much higher rate of autism among men than women. So being one sex or the other is not a gift certificate of avoiding mental health challenges.

So you're more stressed than ever. Good luck. We'll try to do the best we can in this course to not worry that way worse. But it's something to think about.

I got a call the other day from somebody who said there's a lot of curiosity about whether the shift from book learning and book reading to internet worlds and Twitter and Facebook worlds are fundamentally changing how people think. And that sounds kind of possible. And there are people who give amazingly entertaining lectures about these things. Scientifically, it's unbelievably hard to imagine how we would ever answer that.

So when I get occasional phone calls like what do neuroscientists know about that, what could they know about it? Is that even an answerable question? If I take you now and say, well, you've probably done more Facebook than a 50-year-old and compare you to a 50-year-old on some other thing, is that going to answer the question of how you think about ideas given the world you live in versus the world the 50-year-old lived in? No.

So there's just a lot of huge deep things about changes in the world that we can't even begin to get at. Sometimes we get lucky. And people have been giving some particular measure for some time.

Empathy, by self-report-- and now I wouldn't fill it out now. But you can take a look just to get a feeling at your leisure. This is the questionnaire they used for self-reported empathy. It's self-report, 40% lower today than 20 years ago. So on average you guys, literally, on average by these measures, are more stressed and less empathetic towards others. Sorry.

This is not an individual. This is an average, right? So the levels that society operates, things are going on and moving for some reason. By the way, I can tell you that, when I'm stressed, I have less room to be empathetic. So maybe these things are related. If you're feeling stressed, your first thought is not how can I help others but how can I just get through the day? So these things might be related.

So let's turn a little bit to experimentation and some of the challenges of relating psychology to real world policies that are meant to make the world better or safer in some way. So there's a famous broken window theory from the political scientist James Wilson and the criminologist George Kelling.

And their idea was this that, especially in neighborhoods that are not immaculately kept or to say it the other way where there's a lot of damage around you, things like broken windows is the phrase they used, that this promotes in people who live in that community or work around that community to sense that the rules don't count. Anybody can do anything.

And then it fosters the growth of petty crimes. And once you do a petty crime, you're more vulnerable or willing to do a major crime, a slippery slope. And in fact, Rudy Giuliani and Commissioner Bill Bratton employed this. They asked the police to write lots of tickets and make lots of sort of minor arrests for things where people weren't upkeeping the environment to where they were littering or things like that.

And this is a huge debate. Because in a police department you can only do so

much. So if they have a person working on jaywalking and littering, that's a person not working on major crime rings so to try to make a choice where they think they can make community safer in the most effective way. And the crimes went way down in New York.

In most cities now, you don't hear crime discussed as a big topic nationally. In some local areas, like in Boston, some specific areas, you do. I don't think in the State of the Union there was a word about crime that I can remember a week ago. It's not a big national topic. In some local places, it is a big topic, but not nationally.

So you don't know some years ago when people said New York City was this horrible place to go because there was so much crime that you'd walk out from your airplane and get mugged before you made it to your taxi. It was like the whole country was saying big cities were just crime-ridden and dangerous.

They do this policy. Things get better. So everybody says, hmm, that sounds pretty good. But of course, it's not an experiment. It's a real life policy. And then people had these kind of incredibly clever reinterpretations of why crime went down.

So the wildest one was in *Freakonomics* was discussed in that, which said, well, abortion was legalized in 1973. That gave women who didn't have access to legal abortions the ability to have them, that the children, on average, in these communities that had at least access to safe and legal abortions would be poor, unstable, addiction-ridden communities statistically.

And so that if you imagined the reduced abortion rate in poor areas could, when you count out the number of possible criminals in those areas, account for the reduction in crime all by itself, a completely different interpretation that has nothing to do with the policy. It just said we can have a demographic shift, which will have a weird unexpected consequence of lowering the crime rate because it's the finding that young men, in particular, are most likely to engage in violent criminal activities. It's not an all rule but a statistical average.

Or there was a big crack epidemic that reduced. Or lots of states put in laws that put

people into jail for much higher, longer periods, much more severe penalties with new drug laws. So it's very hard to know if the policy that was initiated really worked or whether completely other things were happening that moved the crime rate. And here's some very sort of perverse or other explanations.

So that left the question, is broken windows even a good idea? Just because Harvard-- and we know Harvard is always right-- but just because a Harvard psychologist says pretty interestingly, that sounds right to me, is that even a right idea?

So let's take a step back. Can we test that experimentally? So here's the experiment. And the idea is, again, that, when people observe that others violate a social norm or legitimate rule, are they more likely to violate it? If you see people around you breaking rules, are you more likely to do it? And you could say, it seems like it is. But let's do the science.

So here's an independent measure. I'll show you the environment. The dependent measure is the number of people who perform a violation. Now, you can't go getting people murdering each other and stuff for an experiment. But you can do this.

You can have two conditions. So on the top condition, do you ever go back to your car or bike, usually it's cars, I think, and they put leaflets in your car? And now what are you going to do? You're running away. They'll leave the leaflet on your windshield wiper. So they put it out.

And they either had a wall like this, which was clean. There's a sign that says no graffiti. And they put on those white pieces of paper onto the bikes. Or they put a lot of graffiti on the wall. And people came out from their classes. They parked their bike. They ran into class. They came out. And they got all these white leaflets.

And what they did is watched. And they said, how many people put the leaflet away? And how many people crumpled it up and threw it right on the ground? So we don't know what they're going to do with the leaflet after they put it away. But we could hope they're going to throw it out.

But the one thing we know for sure, if you crumple it up and throw it on the ground, it's littering and not a good social norm. And sure enough, 1/3 of the people littered if the wall had no graffiti. But it more than doubled if the wall had graffiti.

So that's a small thing. That's not a broken down, complicated neighborhood. But just at that moment, as you roar out of class, you get that piece of paper on your bike. And you see like, wow, this is a pretty crummy place. People are breaking the rules all the time, twice as likely to throw a piece of paper on the ground.

So that shows that people very easily are influenced by very mild perceptions of whether people are following rules or not and will be their better selves or their worse selves depending on that sense of are all rules on or are all rules off. And there's a pretty good bet they're not thinking about it, right?

They're not sitting there thinking, OK, here's littering, not as bad as killing somebody. Here's the wall. Well, there's 30% graffiti. I mean nobody does that. They have an emotion quick response. But the environment makes a difference in that regard.

So an important thing about studies like this, so let me tell you about this one. Here's a study to look at a drug that was supposed to lower mortality from coronary artery disease. So those who took the drug, 80% or more, because people follow whether you take the drug, if you don't take the drug, of course, the drug won't work, had a 15% mortality rate within five years. Those who took the drug less than 80% had a 25% mortality.

So you'd say, well, 10% better chance of living for five years, that's worth it. The nice thing is they had a placebo. And there was no difference whatsoever between those who took the active drug and those who took the placebo.

The difference was those who followed the instructions to take the pill and those who didn't. So what does that mean? How do you interpret that? It's not the drug. Yeah?

AUDIENCE: It could be the stress of not following the directions, meaning it's not working.

PROFESSOR:

It could be that. It could be the stress. It could be that. But let me make a guess.

There's no scientific answer to this. People who tend not to follow instructions, are they mostly stressed by not following instructions?

The intuition is they're blowing it off. They're like, yeah, that's the instructions. But I got things to do and places to go. But you could be right.

So anyway, the idea is, what you pick up is, are people who tried to take care of themselves. They have a health condition. And the people who are following the pill instruction are probably also doing the best they can in terms of exercise and diet, all the things they could do to maximize their health, right?

And they're taking their placebo. Or they're taking the drug. They don't know. But they're doing everything they can. And the people who blowing off stuff, they're the ones who are doing all the things that aren't healthy, including not even taking your pills. I mean, if you don't even take your pills, right--

Exercise is work. Diet is work. Popping a pill that's been handed to you that you're told might help you is probably not that much work. It's what's called self-selection bias, that you stand out if you tend to take care of yourself or not.

So when we run experiments at universities that involve people, a huge issue for us is the idea is this, that we randomly recruit people. And we'll come back to this in a moment. Then we randomly assign them to one condition or another, for example, the placebo condition or the drug condition. We randomly assign them to the messy wall or the clean wall.

We discover something. And then we try to generalize it as far as we can to people as a whole. We've discovered something fundamental about how humans work, generalizable principles of human mind or behavior.

So what really happens in the world? And you're in between sort of the best possible world and the world we actually live in. So is it really random who participates in research studies in psychology departments where a lot of the

research gets done. Is it really random? No.

So who volunteers? Have any of you volunteered to be a subject in an experiment anywhere? Yeah. So it's not random. Some people, they either need to make a few bucks. Or they're very curious about psychology. Or they have a friend who's in psychology. It's not random.

And in fact, population-wide, people have said that psychology could be described as WEIRD research for the following reason, that the vast majority of the findings you'll read about everywhere, including in your textbook, but everywhere are from nations that are westernized, educated, industrialized, and relatively rich democracies.

The vast majority are between 17 and 25. They're undergraduates or graduate students who participate in research. It's been estimated that, if you're a US college student, you're 4,000 times more likely to show up in a scientifically reported experiment than if you're a person anywhere else on the planet, 4,000 times.

Because why? Because it's changing a little bit but for many, many years the huge amount of research happened in the US at universities, pretty much at better universities, pretty much at highly selected students. And then we never publish that.

We never say MIT students did the following thing. Because people will say, yeah, MIT students. Because then we have a different report from Stanford or from UMass or from Michigan or Texas.

We say, no, humans did an experiment. And humans are like this. And it's just something to think about as you see studies and stuff like that. And people are more and more sensitized to that. As more and more of the world gets somewhat industrializes, there's more and more research around the world. But still the vast majority of findings are you guys.

Now, that's just to start with who's in the subject pool or the participant pool. How normal are you when you do an experiment? Are you like yourself? Or are you

doing weird stuff? And people use this idea that you're really weird when you do an experiment in another sense. Because you don't know what's going on. You're following instructions.

So they do experiments to show how ridiculously people behave when they're doing an experiment like they would never do it. So they ask them to come in. And they say, will you fill out 200 sheets of paper filled with random digits, add them pairwise? And I'll come back in a few hours.

Now, if a friend asked you to do that, add random digits for a couple hours, you would go no, thank you. I've got about eight million better things to do than that, right? I could multiply random digits just to start with. But people will do it for hours. Because they're in this weird like that's the instruction. And that's what my mission is.

Or even more ridiculous, they pick up a card after each page. They've added all these numbers for no good reason. And the instruction tells them, when you've done the page, tear the page up into 32 pieces. And here's the next page and the next page.

It's obviously fruitless and pointless, ridiculously so. But because you're in an experiment and somebody told you do that, you just keep barreling forward. How much are we who we are when we do experiments versus people following weird instructions? And we'll come back to that in some serious context.

That's the subjects. How about experimenters? Experimenters are never objective. We try to be as scientists as objective as we can. We're never, we believe certain hypotheses. We have certain goals. We recognize results that would be super exciting. We recognize results that would be boring.

We're humans, too. We want to do stuff that matters. We want to do stuff that people reward us for. I mean it's just human.

So here's a lowest case example of how, once you're an experimenter, you produce

your own results. And believe me, it's much more when your result matters for things like your career advancement or your status in the field.

So students were told that rats were either maze-bright or maze-dull. They were told that these rats were bred to be smart learners or not so smart. The rats were all just random rats. It's a fake story to undergraduates.

Then they had them test on a maze. And they said for your laboratory exercise write down how quickly the rat runs the maze. And amazingly, the smart rats did way better than the dull rats.

Now, these are not students trying to become famous or have a career. They're handing in an assignment. And how did that happen?

Well, they went back. And it wasn't that anyone faked data or anything like that. But when they looked at films or discussed stuff with kids, students in the course, every little thing that the students did that moved the data in tiny, tiny ways always favored finding the maze-bright rats being brilliant maze runners.

So for example, they would put the rat-- if you've ever run a rat in a maze, has anyone run a rat in a maze? Yeah? Is it easy? Have you picked them up and put them in the maze? It's more automated now.

Is it physically easy? Are rats like, please, show me the starting line? I'm ready to go. No. What are they like? Help me out here for you guys who have done this. Are they kind of really--

AUDIENCE: [INAUDIBLE].

PROFESSOR: And they don't like to be handled that much really. And they're fighting. And these are undergraduates who've hardly ever touched a rat. They're like, please, don't attack me or something. So they're holding up. And the rat's fighting back. And because it's really uncomfortable, the rat's really unhappy. And the student's like really--

So what happens is-- and then they plunk the rat down. And they go, oh, my gosh,

it's facing the wrong direction. And it's a smart one. Wait, stop the clock. Let's get him--

But if it's a dull one facing the wrong direction, it's OK. It's a dull one. Let the maze-- so lots of little things.

Are you sure you wrote this down. Was it 12 seconds or 11? I guess it was 11. Oh, because it's a smart one. So completely innocently, completely innocently as far as we understand, they made the result to match up with what the expectation was.

And it's not just that. And if you know this example, cognitive psychologists have studied a phenomenon like this. So try this at your desk. Each card is a letter on one side and a number on the other side. Your job is to figure out what's the smallest number of cards you have to pick up to discover if this rule is right.

If a card has a vowel on one side, then it has an even number on the other side. So think about this for a moment. If a card has a vowel on one side, then it has to have an even number on the other side. What's the smallest number of cards you can pick up to test that hypothesis?

So here's what people have found. The correct answer is E and seven. And about 10% of people on average come up with that. Many, many more people pick E alone or E and six. Why?

Well, everybody gets that you have to look at E. Because if it's an even number, so you flipped E over. And if that one turns out to have, it's a vowel, if it has an odd number, the hypothesis is wrong, right? Everybody gets that you should check E. Pretty much everybody gets that J is irrelevant. Because it's a consonant.

Now comes the interesting six and seven. Because the sentence is talking about a vowel and an even number, sometimes people feel like I got to check the even number.

But it doesn't say anything about even numbers couldn't go with consonants. It doesn't tell you anything. That's not part of the hypothesis. But if you flipped over

number seven and you discovered a vowel, you'd violate the rule.

So what happens is they're tempted to go for things that feel like they confirm the question. And it feels like E confirms it. And it feels like six confirms it. It's what is called confirmatory bias that when you look at stuff, if you see what you think confirms it, then you tend to go for that, even when there's evidence in front of you that could contradict your expectation.

So now I'm going to give you a practical suggestion for how to win somebody over if you have a brewing romantic interest in that person. So finally we get practical, right? Everything was like, I look at you, I'm not running rats.

And I think it's very interesting. Because when we think about how people make decisions in their lives, we tend to think intuitively about big decisions. What's my career going to be? Where do I go to college? We think those are the big decisions.

But a huge amount of life is little decisions, moment to moment. If somebody asks you for something, did you say yes or no? Somebody walks up to you at a party. They want to talk with you.

Do you feel like talking or not feel like talking? Maybe you talk with them and it's a lifetime friend or romantic partner or whatever. So I think we make constantly little decisions that turn out to big effects in our lives.

So here's some evidence about things like that that influence that. And this is worked on at Yale. So we describe people as warm. Or we can define them as cold or aloof, right? And we could think those words are kind of arbitrary. And most of us, if you met somebody at a party, would you rather hang out with somebody who's warm or cold? Warm, OK, just checking.

Now sometimes there's an idea of embodied cognition. And here's what it is. We can't really know how warm or cold that person is or even that's an abstract idea. But we know we're comfortable when we're kind of warm. And we know we're not comfortable physically inside us when we're kind of cold.

So there's an idea that when we think about other people's feelings, other people's thoughts or abstract things in the world, we base them on physical experiences that we have inside, that there's a more direct link between what we know inside us. And we use that to interpret the world out there. Embodied cognition, your body is the vehicle for understanding things out there.

So here's the experiments. It's really clever. There's two temperature conditions. So what happens is you go into a building. And the examiner, an undergraduate usually or a graduate student, meets a subject in the lobby. And she's carrying or he's carrying a cup of coffee, sometimes it's hot coffee, sometimes it's cold coffee, a clipboard, two textbooks.

So you can imagine. It's a set-up, right? The person's walking. They're juggling with the coffee, the textbook, oh, the clipboard.

And he says, on the elevator he says, could you just hold my cup while I write down your name on my list of subjects in the experiment? It's very innocent, right, on the elevator.

And so you hold the cup of coffee, which half the people get a hot cup, half the people get a cold cup. Then you read a description of a person. It's just a paragraph. And you have to rate whether you find the person described as warm or cold.

And if you had the warm cup of coffee, you're more likely to describe that person as a warm kind of a person. Now, these subjects have no idea. They held a cup of coffee. They probably didn't even think whether it was warm or cold.

But something in their body that got warmed up to the least degree possible, that thought is still in their head. So when they read a description of something, you go, oh, this seems like a warm person. Or if it was a cold cup of coffee, they say, oh, this seems like a cold, aloof kind of person as far as I can tell, that little bit of difference.

So here's the lesson just so you got it. If you want to take somebody because you

have a possible friendship or romantic interest in that person, are you better off going out for a warm cup of coffee or giving them a cold glass of beer? For that first impression, scientific research shows it's something warm will work it out.

It's not that powerful. You're not going to be able to control the world. But what it says is when we are in ambiguous situations, ambiguous situations, we first meet somebody. We don't really know them. Little things can start us off on one path. Or it can start us off another path, surprisingly little things.

Now, then they have to worry about a confound. Can you imagine a confound here? Think of the rats. Who knows if the cup is cold or hot besides the person holding it? The examiner, right?

Now, maybe the examiner doesn't try to do this, but maybe the examiner, no matter what, says, oh, we're in the warm condition. And I'm smiling because this is going to be nice. I'm helping this person feel good. Here's the aloof condition I'm giving. We're all going to be miserable.

And the examiner knows it. Because they know if they have a hot or cold cup of coffee. So maybe the person's not vibing to the coffee. They're vibing to the expression or feeling or sentiment of the examiner who understands what's going on.

So they do one more experiment where they give-- have you seen these hot and icy therapeutic packs that you can make hot or cold? Now somebody else makes it hot or cold. The experimenter has no idea whether it was hot or cold. So it's what we call double blind. A person doesn't know it's relevant, the experimenter.

They rate the pad. And now, this moves it a little bit, they either get, after this thing's over, they're told it's a product evaluation of the pad. But they either got a hot pad or a cold pad. And they can either choose one of two rewards, a Snapple beverage or a \$1 gift certificate, whichever you like better. You had two little things you could do.

But here's the big decision. Do you get it for yourself? Or we can send it for you to a

friend. We can send them the Snapple or the certificate. If the people got a cold pad, 75% of the times they say, please, give it to me right now. I'll take it. If they had a warm pad, the majority of the time they actually send it to their friend.

That pad difference moved quite substantially the likelihood that you take it for yourself or you give it away, quite substantially. If you're a charity trying to get people to donate or you want to get help from somebody, 25% success rate is a lot worse than a 54%, right? It's a doubling, a doubling, of whether you keep it for yourself or you're generous to your friend, just that therapeutic pad.

I'm going to give you two more and then go to-- How about money? When you think about money, I don't mean traumatic things about money, just a little bit about money, how does that influence how you relate to other people? OK, here's the experiment.

The idea is that money, on average, when you just think a little bit about it-- and I'll show you how ridiculously little they think about it-- their hypothesis is that money makes you think about self-reliance, you earn your money, your bank account, compared to situations where you're not thinking about money.

So here's what they did. They have people come in in three conditions. And they had to unscramble sentences. You have no idea what's going on. You got a sentence like, cold it desk outside is, which you would make into a good sentence, or high a salary desk paying. So you just make those, you scramble those words around. But the money condition has a word like salary in it.

Or you get the neutral sentences that have no money reference. And you see Monopoly money in the corner of the room. So we're not talking like people just sent you your tuition bill or whatever. Or you just found out that something terrible happened financially or you won the lottery. It's Monopoly money. It's just like the idea of money.

And then they give you a task to do. And the experimenter, as he or she leaves the room, they say, it's a pretty hard task. You may want some help. So just come and

get me. I'm glad to help you, not a problem.

So what happens? Here's the probability of getting help. And it's incredibly more for the control group that did the sentences without money and way less not only for the people who unscrambled the sentence with the word salary but also way less if they saw Monopoly money in the corner.

The mere idea of money, not money given to you, not financial trauma or financial gain, the mere idea of money makes you less willing to get up and get help. So the positive it makes you more self-reliant. The negative is people were less willing to help somebody.

So now at the end as the examiner comes and says, I'm an undergraduate like you. I've got huge pressure to get this paper in. Can you help me code? Can you help me score up a few sheets? People were twice as much willing to help if they just did the neutral things than if they unscrambled the money sentences or saw the Monopoly money in the corner of the room.

Because just that thought about money goes like, man, self-reliance, we're all in it for ourselves. I've got my money. You've got your money. Good luck. Self-reliance can be a good thing. But it doesn't actually go with helping people very much also. Yeah?

AUDIENCE: [INAUDIBLE] because the Monopoly money and he's suspicious of why this money's over there, that's why you're not going to help.

PROFESSOR: It could be. Yeah, the Monopoly money, I agree with you. Maybe that's why they also had the one where you just get the scrambled sentences. I agree with you. You could think there's many, many ways to think about this.

The last example of this kind that I want show you is dating behavior and the way, again, an experiment can challenge various ideas. And this is specifically about dating between men and women. The story, to the extent it's been studied, would be a little bit different if you're dating within a sex.

So if we're dating between men and women, who is more selective in their dating choices do you think? Who's more willing to date widely or a lot or less? What's your thought if you have to generalize about men and women on average in your--

AUDIENCE: Men.

PROFESSOR: Thank you. And evolutionary psychologists, and I love evolutionary psychology. But it drives me crazy, too. Evolutionary psychologists will go, well, because by evolutionary theory men have to go and make as many offspring as they can to keep their genes going. Women have to be more selective. It takes nine months to bear a baby. It takes nine seconds to do the male part, right, estimated.

So this might or might not be true. It's kind of fun. We all laugh about it. All of us find it kind of amusing to sort of think about.

But how would we actually know if this is vaguely true on average? How would we actually know if men for dating behavior? How would we even, is that true? Is that a bad myth, bad rap, or whatever? Yeah?

AUDIENCE: Dating websites?

PROFESSOR: Yeah, thank you very much. So there's an entire research enterprise out there now that uses online dating sites, which, of course, it's only in the last 20 years or something that they've existed, I think. So it wasn't before. And the other one that's been a treasure trove of data is speed dating environments where you can observe things and measure things.

And those studies have shown, for example, that online dating on average men are 1.5 times more likely to send email offerings dates to a woman than the other way around compared to women. And in speed dating, too, men are more likely to indicate they would be happy to date a person they met than women. So there's objective evidence that this is true on average in this society at this time.

And so everybody, oh, yeah, this shows the evolutionary psychology. Evolutionary psychology drives you crazy. Because, on the one hand, it's certainly the case that

our minds and brains evolved through evolution. So there's something about the history we went through as a species that matters for who we are now. That's got to be the case.

On the other hand, it was a different world before internet dating and speed dating, right? It's hard to know how those things line up exactly. So here's the fun thing.

It turns out that on average in speed dating a typical speed dating event will have four minutes, right? So you typically have women sitting at desks. Almost always they set it up that way. And the men are sitting in chairs in front of the desk.

And they meet. And they talk for four minutes. The bell rings. The men jump up. And they shift over one station.

And then what happens is, for each time you meet a person, you fill out a card that says yes or no I'd be willing to have a date with the person. And if you have two yeses from the man and the woman, the speed dating organizer exchanges the information so they can make direct contact. Does that sound OK?

And men make more yes responses. And it turns out, it doesn't have to be this way, but almost, from my reading, that almost every speed dating thing has the men rotating around and the women sitting there waiting for the men to rotate around.

So let's just ask this question. What happens if the women rotate, which almost never happens? But they did this experimentally. They said for half of the speed dating sessions the men will be sitting at the table. And the women will stand up and move a chair over every four minutes. The bell rings. So the women are moving and rotating.

And here's the results. Basically, what's showing on the left are when the men rotate, the standard condition. First, it's romantic desire. Men feel more romantic desire, on average, for the partner they sit with. They feel that more chemistry is happening with the person they sit with. And on the bottom left corner, they also are more likely to give a yes response, I would like a date with this person.

But reverse the roles, have the women rotating, and look at these bars. There's no difference at all. You completely wipe out the male female difference and self-reported romantic desire per person, self-reported chemistry they think is happening, and the yes no responses that I would have a date. You completely eliminate it when the women are rotating. It's flat even.

So that's the result. What does this suggest? What happened to the evolutionary psychology? It disappeared just by having the women rotate around the room. It suggests, and we don't know this with certainty. But people are following this up who are interested in this.

It suggests that there's something about getting up and approaching that person, your body going here I come, I'm not sitting in my chair hanging out, it's like here I come, that makes a person energized, feel more romantic, feel more chemistry is happening, and more likely to ask on a date. And it doesn't matter whether you're a man or a woman at all.

It's the getting up and that physical approach. You're more invested. You're more out there. Who knows what it is, completely eliminates what everybody had said is an ancient, inevitable, evolutionary difference between men and women.

And this isn't to say there might not be some of those streaks in us. Who knows. But speed dating is not showing that. All you got to do is have the women rotate. And you completely eliminate what's thought to be some hard-wired biological difference on this dimension.

Now, talking about that, when we do experiments like this that look at sort of fun things like dating around a thing or age difference between a five-year-old and a 20-year-old or a 20-year-old and a 80-year-old, cultures, there's lots of experiments that compare say Western cultures verses Eastern Asian cultures, we'll talk about that later in the course in terms of behaviors, genes, whether you have one gene or another, all those things, are those independent variables? No.

We can't assign you randomly to be a man or a woman, young or old, to come from

the United States or Japan or China, or to have this gene or that gene. It's not that we couldn't do stuff in some monstrous world but not ethically. And it's never going to happen, right?

So whenever you have science that talks about differences between men and women or young and old or cultures or genes, it's not really a completely independent manipulation. We can't assign you randomly.

And so it means everything in the world about what it means to be a man or a woman, a 20-year-old or an 80-year old, come from this continent or that continent, have this gene or that gene, those are not things we can freely manipulate. And we have to be extra cautious in interpreting those kinds of studies. Because we can't randomly assign you to conditions. We just can't.

And I didn't talk about the fact that, up until this moment, we've made every conclusion a complete generality about human nature. And people are different one from the other, individual differences. We'll talk about that later in the course, too.

So for the last couple minutes I want to talk about this, folk psychology. Everybody has ideas about psychology. So if you have this piece of paper, if you would zoom through it, ideas about people in psychology and just where there is some scientific evidence, if you just zoom down and mark yes or no--

On average, do opposites attract? On average, does familiarity breed contempt?

On average, more people present in an emergency, are you more likely to get some help? On average, are there such things as visual learners and verbal learners, and if they got the right kind of instruction that would help them in school?

Is hypnosis baloney? Does subliminal advertising work? When things are presented so you don't see them below consciousness, does it help you buy something? Does playing Mozart to an infant boost their intelligence, Mozart effect? Is old age, on average, associated with dissatisfaction?

If you're unsure of your answer when taking a test, I'm going to tell you the science about this. It's best to stick with your first hunch. Practically every website tells you

that. Have you heard that many times? I'm going to tell you what the actual evidence is about that and how they get that in a moment.

Ulcers are caused primarily by stress. A positive attitude can stave off cancer. Raising children similarly leads to similarities in their adult personalities. Low self-esteem is a major cause of psychological problems. People's responses on the ink blot test tells us a lot about their personalities. Interviews help identify those most likely to succeed in medical school. OK? I'll give you a minute.

A bunch of these we'll come back to in the course. But the answer for all these is this. And there's evidence to it all. So I'm going to tell you about four of them for 10 minutes.

One of the ones you might want to know most about is the changing your initial hunch answer. How do you know that? So the people have gone back over test scores and looked where people crossed out an answer or erased an answer. That's the best source of evidence they have in large samples.

And people are twice as likely to give a better, the correct answer, than to move to a wrong answer. That's the empirical evidence. So it's a fantastically interesting disconnect that you see so many places. In teachers' advice, you go with your first hunch when you're unsure. The empirical evidence is you're much more likely to be correct when you go with your best final answer.

I mean, of course, you're not sure. So you're going to miss a fair bit. But you're twice as likely to come out with the correct answer when you go with your best possible answer. So that people who crossed out their answers or erased their answers, they were twice as likely to move to a good answer than leave behind a good answer. Yeah?

AUDIENCE: Do you know that maybe it's they picked an answer and then they switched their answer and then picking their best and going back later--

PROFESSOR: Yeah, that's an excellent question. We don't know. They've kind of gone like five times back and forth. The assumption has been, on average, that people will go

once back and forth. But you're right.

But ask yourself the other question, too. What's the evidence ever that going with your hunches? And nobody's been able to show that. So where there's evidence, it's all in favor of best answer. And nobody's shown evidence that hunch is the best way to go empirically.

That doesn't mean that sometimes it doesn't happen. But on average, that's the way the ends go. But your point's excellent.

How about Rorschach tests? Every psychology program, clinical psychologist in the country, is required to learn how to administer and evaluate a Rorschach. You know this? So this obviously shows, obviously it shows, some sort of horrible sex act between animals.

You know these kinds of tests. You're supposed to read it. And then the examiner listens to you. And they figure out something, right? There's been about 10,000 publications about this. There's no evidence that there's anything predictive or correct about this test, none, zero, none.

People argue it. People give it. People have to learn how to give this test. So this is a disconnect that happens a lot between clinical stuff and experimental work. I mean researchers can't grasp why people still give this.

Medical school interviews, those of you who will apply to medical school will get interviews. You'll get interviews for jobs. You'll get interviews for all kinds of things in your life. What's the evidence that interviews are any good for anything? How could you know whether interviews are good for anything?

A company interviews you. A university interviews you. How would you even decide whether? So I can tell you this. Social psychologists have shown repeatedly that interviews are cesspools for discrimination. Because people tend to like people who are like them.

Oh, you went to MIT? Yeah, course nine. Then you go, oh, man, this is going to be

good, right? I went to CalTech. We didn't like MIT people. We thought they were a little bit snobby or something. And you go that's not going to be so good.

Social psychologists have shown that, if you just vary information in practice interviews, people tend to like people who are like them, by background, by appearance, and so on. On average, they try not to. They try to be fair. So we know that.

So here's what they did. Yale compared students who were accepted or rejected on the basis of an interview. So they all had scores that got them to the interview. And then they looked at them where they went in pairs or larger than pairs to other medical schools.

So let's say you got accepted by Yale. And you were accepted or rejected on the interview. But you ended up as two students at Penn or two students at Michigan. You're sitting next to each other.

One of you was accepted by interview at Yale. One of you was not. Who does better at that other place? They're dead even. The interview added nothing for predicting grade point average or completion of medical school.

Here's one more example, University of Texas enlarged in the midst of their, at Houston, in the midst of their interviews, it enlarged from 150 to 200 students. They had interviewed 800. The 150 who came were among their top ones. They interviewed them. They liked them. They came.

And then all of a sudden because the state legislation said, by law, mandating that you take 50 more, they took 50 more who didn't do so well in the interview. Those 50 more performed identically to the ones who got in with the successful interview. They couldn't find a difference between them.

Now, there's at least one thing you might think the interview might have done. But we don't know. What do you think it might have done? So the outcome was your grades in medical school and your likelihood of completing medical school. What else could an interview have been relevant for?

Maybe, maybe, maybe something about bedside manner or how you relate to people, maybe, maybe, maybe, but there's no evidence that that's true. Now you're starting to grasp at straws.

So there's no evidence that interview processes make any difference anywhere. But everybody does interviews all the ways. Because we always think we're kind of good judges of human nature or something. So interviews, it's very hard to tell that they ever do anything.

So here's my last thing. Self-esteem, you cannot watch Oprah or Dr. Phil without some discussion of self-esteem at some moment. And it sounds good to everybody.

I mean nobody would wish for you as a parent or friend for you to have low self-esteem. And in fact, higher self-esteem is correlated with higher initiative and persistence, happiness and emotional resilience, and also, unfortunately, with people who are narcissistic and bullies.

And how they measure it, just so you know, because this is a problem, too, how do you measure it? There's several scales. But the most widely used scale is this Rosenberg scale. So you have that, too, if you want to try it out on yourself.

Self-report, and when they reviewed 15,000 studies some years ago, they could find no evidence that higher self-esteem leads to better things. It all seemed the other way around that doing better at things led to higher self-esteem. They could never find that pushing your self-esteem up doesn't.

Having said that, I can tell you as a parent of two young kids or if you have friends and you care about them and you know this, we like to praise people to build up their self-esteem. We tell you you're awesome. Someday you'll go to MIT. I know you will. You're a wonderful person. And you're smart. And you're beautiful.

Parents want their children and teachers, too, to grow up and thrive and build up that self-esteem. And the easiest way to do that is praise, right, just telling your kid how awesome he or she is or your younger sibling how awesome her or she is. Get

their self-esteem up.

So the last thing I'm going to tell you and then we'll be done in about three minutes is work from Carol Dweck that shows you how dangerous it is and counterproductive it is to have praise where you don't think through its relation to people.

And in one sense we'll talk about, are you going to succeed in life by your effort or your talent? What's a bigger question than that? Wherever you get to in your life, it's going to be based on your effort or your talent or both. I'll just have a sentence about that now.

So here's the experiments she did with fifth graders. She had them perform a pretty hard task. And afterwards, randomly, they were either praised for their intelligence. So a person said to them, you, fifth grader, you are so smart. I can't believe how great you did on that, fifth grader. Or they were praised for their hard work. This shows a lot of hard work, different kids. And some kids got no praise at all in this experiment.

Then they get a task that's even a little bit harder. How does the different kind of praise influence things? And here was the finding. If you were praised for your intelligence, you did worse on the second test. If you were praised for your hard work, you did better. If nobody said anything, your performance didn't change.

And the idea is this. You understand, praised for your intelligence, you did worse on a hard task. Praised for your effort, you did better. And here's the idea that, if we praise people for their intelligence to build up their self-esteem, they start to care more about how their performance reflects on them than the performance itself.

Because you're trying to prove that you're an intelligent person. The students who get that kind of praise for their intelligence, they persist less in a difficult task. They say they don't enjoy challenges. Why? They just want to ace everything to keep proving they're smart.

The kids who got praised for effort, they're kind of like, OK, I'm going to make some

mistakes. But I'm just going to keep going. Because with effort I can do things sometimes. And it turns out that it makes a remarkable thing.

And so Dweck, and we'll come back to this, talks about you can imbue your intelligence as a trait, I have only so much, or as a growth, the harder I work, the smarter I get. But I have to do the hard work to get there. And we live in a society that often goes by fixed traits.

American Idol, the harder the work, the better you sing or who has the talent is discovered? Who has the talent is discovered, right? Because the idea is you have a certain amount of musical talent. And now the judges show. And you break into the world. And you're a famous singer, right?

So ask yourself this. When you are good at what you do, is it because something in your genes and environment made you good at it or is it because you try really hard? So Malcolm Gladwell has this statement that's floating around, gets a lot of attention, that anybody can become great at anything if they work on it for 10,000 hours.

So how much of your success in the past, currently, and in the future is going to be based on your effort? And how much is it going to be based on your talents? And how would we know that? And we're a very talent-oriented society. And it seems like, the more we encourage effort, maybe the more people might flourish.

So we talked about how psychology and science, experiments, brief history of psychology experimentation, some issues in experimentation, and some psychological topics, and some practical information for being generous and kind and winning friends rapidly. OK, thanks very much.