

Fearology Part 1 with Dr. Mary Poffenroth

Ologies Podcast

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Hi, friends. It's your weird old dog hiding behind the couch because I ate from the garbage. A.W. here, Alie Ward, hi!

Oh man, this episode, you guys. Whew! This episode is so good. Nothing to do with me, it's just very good. It's two episodes, is how good it is. So... this is just part one of a discussion with an ologist who might actually change the way you are living your life, because - fear. When was the last time you felt it? I know that there's a slim percentage of 'toughbros' out there being like, "Uh, when I was like, 5?" And we all know that isn't true. We're scared all the time! Someone almost spills a slurpee on your new shirt, no one on the group chat responded to your meme, your credit score went down because you messed up autopay, you're late to work, you have to buy a gift for your sister but she might not like it. We're scared all the time! We're scared all the time, and it turns out, for kind of weird reasons. But we can do something about it.

But first, what can you do for me? Well, you guys are so kind. I love *Ologies* listeners so much. Thank you so much for keeping this indie podcast up in the top 20 or so of science podcasts - I think in the world? - on iTunes. That's so crazy. Thank you to all the Patrons on [Patreon.com/Ologies](https://www.patreon.com/Ologies) for making it happen each week. There would be no podcast without you. You can join up for as little as a buck a month, which lets you ask the ologist your questions, and gets you videos, and behind-the-scenes photos. So thank you for supporting there.

Thank you to all the listeners who tweet, and who 'Gram'. If you tell a friend about the show, thank you for that. I really love making this podcast so much. I wanted to do it for like, ten years. Even when I'm afraid that no one will like it because it's too weird, and I talk about butts and bugs and stuff, I'm so happy I make it, and I'm even happier that you guys listen. Rating, reviewing, and subscribing on iTunes keeps it up in the charts so other people can be like, "What's this thing?" and listen, and there's more ologites in the world, so thank you for doing that.

Each week I read a review as a little thank you. This week NewGirl left a review that just says:

Hey, do you like breathing? Then you'll love this podcast.

Thanks, NewGirl! I also want to shout out to TaylorAnn2017 who wrote:

I absolutely love this podcast. Alie has such a great way of making everything interesting. And just to prove how much I love this podcast, I just spent two hours fighting computer updates so that I could write this review.

TaylorAnn2017, props!

Now, fearology. Really, Pops Ward? Really. I knew I wanted to do an episode on the subject of fear, and I came across the work of this ologist, and I saw that she studies fear specifically. I said to myself, "Ward, is fearology a word? Get honest with yourself. Wouldn't this be phobiology, because phobias mean fears? Yes?" NO.

Phobias are technically irrational or obsessive fears. The word fear comes from a root meaning "danger". So phobias are maybe a little OTT, maybe a little over the top and specific. But fear is a response to everyday danger.

I looked it up, and fearology is in fact a real word, as it's been used in books about fear, like *Philosophy in Fearism: An East-West Dialogue*. And a few other experts in stress, fear, and anxiety use the word fearology. So, I think it's a super-critical field of study, and thus I am throwing my weight behind making it an even realer, more commonly used word. Fearology! Let's do this! Let's talk about it.

I came across this ologist's work and I was immediately like, "I must speak to her!". Then I sent her a fangirl email and found out she lived a mile away from me. Thrilled! I was so thrilled. We had a time set to do the interview, and about ten minutes before, she emailed me just to say she was on her way, and uhhh... I was eating toast at a coffee shop, having fully forgotten that we were recording. I saw her email, shot up, abandoned my friend - and the toast - at the coffee shop, and I sped-walked home like one of those weird ladies that gets exercise at the mall, and I arrived just as she walked up. I was... very sweaty. My apartment was littered with tax paperwork. I was so mortified. I was SO stressed out. I was afraid of being judged, I was damp in many places, it was perfect! We recorded for about two hours. This episode - again - is broken into part 1 this week, which covers a lot of ground, and then part 2, which answers your specific questions and gives even more insight on how super-successful folks address their fears. So helpful! There were parts where I was so shook I could not make words, I just grunted in response. So come back next week for the follow-up episode because both episodes are real life-fixers.

Also, quick audio note: It was SO hot that day, and I had just run home, so all the windows were open and the air conditioning was on. So if you hear like a hum in the background, it's just the air conditioning. Super sorry. Ignore it.

She is an Instructor at San Jose State University, a TEDx speaker, and my new personal anxiety guru - whether she would like to be or not. So please breathe deep, and make room for epiphanies with fearologist, Mary Poffenroth.

Alie Ward: So now this is your mic. I'm still sweating. [*Mary laughs*] I'm sorry. Isn't this the funniest interview I've ever done?

Mary Poffenroth: I mean sweating is part of the stress response, so it's good that you came all ready to go. [*Alie and Mary laugh*]

Alie: You're like, "It's good you're a literal hot mess right now." Have I ever been a hotter mess?

Okay. I emailed you, and I knew that you studied fear, and for a second I was like, "Is it possible that you study pears and this is a typo, or you study feet [*Mary laughing*] or something and this is a typo?' Because there's no way you just study fear, that's too awesome. So how did you get into the study of fear? Where do you even start?

Mary: I was raised by someone that was afraid of everything. [*Alie laughs*] You know, like all good parents, my mom did a really awesome job of fucking me up because I think that's what parents do [*Alie laughs*], right? She was a loving mom and I had a great childhood, but like all parents, that's your job to pass on your dysfunctions to your children. And she never had a passport, she never left the country, and only went to high school. I didn't come from an educated family. I was the only one in my entire family to go to college. And so, it's one of those things that she passed on a lot of her fears to me, and as she got older, then it just kind of escalated. It was not until my late twenties that I realized I haven't left the country either!

Aside: Mary was the youngest of five siblings and the only one to graduate from high school. She ended up earning one Master's in Science, having studied Ecology and Evolution and Population Biology, and another MS in Science Communication, which are two really high-up limbs to go out on if you ask me, and thus very brave and cool.

Mary: I became a university lecturer in biology at age 27, and I was doing well in my career but felt like, "Okay, there's all these explorers that I see in ecological biology that I find are my heroes. And they're doing all this cool stuff and I'm still in the same town that I've lived for my whole life... what is going on?" So, I started to examine where that was coming from and that's really when I started to get super excited about the study of fear. My personal research background, my first job was at NASA Ames in the Bay Area, looking at the impact of hypergravity on the mammalian system; which sounds super fancy for putting rats in a REALLY big centrifuge and spinning them around for months. [*laughs*]

Alie: Oh my God! Have you ever been in a centrifuge?

Mary: No, they don't let us get in there. But the walls were so thick. We were in a bunker in case things went wrong with the centrifuge because it could spin out of control. And that's where I first started to get some of the physiology experience of the impact of stress. What we were looking at in the hypergravitational study was basically a preface of: Can we send humans into a long-term journey where their bodies are going to be under hypergravitational stress? We were looking at stress in, you know, can they pee? Can they eat? [*Alie laughs*] Will they still fornicate? Will they do all the things under long periods of stress?

And that was really when I started to examine the body's response to stress. And stress is that funny word when we think about fear, like no one uses the word "fear" in common language for the most part. And that's another interesting side note of what portion of the demographic in Western society uses the word fear. And we can come back to that. But stress and fear are basically the same.

Alie: Oh...

Mary: When we think about- I'm sorry, go ahead.

Alie: No, I just was grunting because I was like, "UGGGGH", like, "SO TRUUUUE". So true. Especially right now we're surrounded by my tax paperwork and I had a full-on stress meltdown being like, "I'm doing the forms wrong!" and I was scared.

Mary: Yeah. So, think about what we call the stress response. You are going to have tightness in your neck and your lower back. That's your body getting ready to fight with your arms and getting blood and energy to your legs so you can run away. Getting the shortness of breath and the tightness in your chest and getting sweaty; your pupils dilating, and your body is shutting down non-essential systems like digestion. This is why, depending on what kind of nerves - we use that word a lot too - that you're feeling you get butterflies in your stomach or maybe a little something more serious, like you need to excuse yourself. All of that stress and response is the fear response.

Aside: So, having slightly more gravitational force on you is a type of physical stress, and so Mary was studying what would happen to other mammals (i.e. huuuumans exploring space) under these conditions. And you know what? For some people, just being around a bunch of rats on what amounts to a very expensive carnival ride, would be a major source of stress on its own. But I like to think that the rats just loved it. That they just stumbled out wanting a corndog and more tokens to go on again. But aside from rats just having a summer, what kind of data were they gathering?

Mary: We were looking at: Can they do the physiological, basic functions under stress? But we were just looking at the renal system. Can they eat, can they drink? Can they process urine? Are things coming in and going out?

Alie: So did you find that - just because I have to get this question answered - in hypergravity were they able to pee and poo?

Mary: Yeah!

Alie: Okay. Just had to check.

Mary: Yeah. There was an uptick in like, "Holy shit, what's going on, oh my God we're in a big centrifuge! Aaaaah!" Then you could say that they were in the super fear response. Then when everything was just kind of on lockdown and - we weren't studying for this, but if you were - when they got acclimated to, "Okay, we're just gonna keep spinning. That's okay and this is just how it is," then they returned to their normal daily activities of eating and drinking and going to the bottle and getting some water. Humans under stress go to a different kind of bottle. [*Alie and Mary laugh*]

Alie: That's true. The most scared I've ever been in my life, it's funny... The reason why I keep peppering you about this, the most scared I've ever been was when I was in a centrifuge at a testing facility where they were testing and training air force pilots.

Mary: Oh, wow!

Alie: And yeah, I've been mugged at knife-point, and that was one of the scariest things and being in a centrifuge was one of the scariest. So I was like, "How'd they do?" I remember the moment where they put me in the thing. I've never been so scared of anything because at least with mugging it was like a surprise, I was like, "Wow!" But with this I was getting in, I just was shaking, I thought I needed a diaper. I was like, "I don't know what's gonna come out what end." *[Mary laughs]* And so I'm feeling for these rats. but that was one study you did, and then that opened up your mind to "Okay, let's really get into the nitty gritty of the stress response and fear." And you're right, we do call it stress when we mean fear.

Mary: Yeah, yeah. In Western society, we have this stress 'badge of courage'. When you ask someone how they are: "Oh my God, I'm so stressed!" "Like, Oh my God, me too! There's the kids and there's the work and there's the other things!" So we feel confident talking about stress because we can commiserate, but we don't feel confident talking about the 'f-word' because there's so much shame associated with fear in our society, and we are never taught how to deal with fear in a healthy way. I mean, I never was. That's not a subject in school. Yet, it's one of the four basic human emotions that go into make *[in soft, high voice]* all of the rainbow of colors of all the other emotions!

Aside: Wait, one second, there are 4 basic human emotions? There's 4?! I thought there were approximately one billion, and then several thousand more if you include feelings that only the French have words for. But nope, just 4, say researchers. There's happy (duh), sad (also duh), and then - not unlike many LA residents who are actors and yoga teachers - there are two emotions that are hybrids. One is afraid/surprised and the other is angry/disgusted. So right now, this information is either making you feel: happy, sad, 'afraised' or 'angrusted'.

Mary: And fear is not something we talk about in that way because the messaging we get is, "Be fearless!", which is hella dumb because that's like saying, "Just don't be thirsty!", or just... "Be hunger-less!"

Alie: You can't do that! I mean are we the product of... You know, I was talking to an evolutionary biologist, it was like 3.7 years of evolution...

Aside: I meant 3.7 billion, but... whatever.

Alie: And clearly the ones who could fight and run away were the ones who survived. So it would be crazy to be fearless because how would we have made it this far?

Mary: We'd be dead. *[Mary laughs]*

Alie: Yeah, we would've been dead if we were like, "Shit, go ahead and attack me. That's cool..." No! So, do you think that... When you first started studying stress and fear, what was the biggest question you had? What did you find that was lacking in either communication about fear or just data about fear?

Aside: I would just like to point out that as we discussed fears and emergencies, there happen to be fire trucks and sirens screaming past my apartment which was an

unintended audio bonus, just to make sure that our fear responses were working. So, yeah, yeah! It's working fine! It's working fine! Thanks Frank! Calm your tits!

Mary: I think that for me, I initially started studying fear in more of a hobby way because I was interested in it. And as an academic for my entire professional career, it's been one of those things that, I'm just a big nerd and I was absorbing all these things because it was fascinating to me. Through that initial search, I was really finding either clinical or pathological studies on fear that were about people that were more of the outliers; that were dealing with mental health issues in a professional setting, that were having very extreme phobias or really extreme anxiety that was negatively impacting their life. And I was like, well, I don't fit in that category because it's everyday fears of, you know, "How do I not freak out about this presentation?" or "How do I go say 'what up' to that cute guy?" I don't need to go and have a clinical... This is just normal stuff.

I didn't really see a lot of research in that area in terms of what was happening with people that were communicating, because part of my degrees are in science communication and biology. The people that were communicating about fear were either people that were bringing a lot of pseudoscience-level to it, or people that really did extreme stuff. So like, "Yeah, bro, I climbed Mount Everest and it was like super dope, and I'm here to like teach you how to like fight through the fear and also climb Mount Everest." [*Alie laughs*] I'm never- I hate the cold, I'm literally never going to climb Mount Everest. Or it's former Navy Seals and fighter pilots just being badassess. I'm like, "That's cool, but there's nothing that I can use there."

Alie: Right, not applicable!

Mary: Yeah, exactly! And one of the things that really got me interested in not only studying it, but trying to create a framework where people could take the research that has been done and apply it to their daily lives, is you have to make it simple. And that's kind of my jam with fears. I do original research, but I also am combing through the research and trying to create strategies for people that are easy to remember, easy to use, that help them understand their own bodies, and then apply that so they can not be SO afraid of all the things.

Aside: Quick question, so what are Americans' biggest fears? Well, that actually depends on what year you ask. In 2014, Chapman University put out a list of Americans' big ole fears. There were the usual suspects: public speaking was #1, then heights, and bugs, and snakes, and drowning, then blood, and needles... the usual. It's like a menu of scary stuff at a chain restaurant you've been to a dozen times... familiar. But according to the same source, the new biggest fears of Americans are: #1 corrupt government officials, the American Healthcare Act, pollution, and being involved in a nuclear war with North Korea. Never have I been so nostalgic for some simple old American drowning fears.

But a fun thing to do is sit down, make a list of the things that scare you, and then say, "Hey, scary thing, I see you." And then maybe, "What can I actually do about some of this stuff?" Maybe not all of your fears are big huge environmental or governmental ones. I

did this once, and I realized that driving a Miata with a terrible blind spot on the highway was a consistent source of panic, and so I sold that thing, I got a station wagon, I never looked back. So that's one thing you can do.

Mary: Not that they're going to get - there's no cure for fear - not to get rid of the fear but change that relationship and change that story around their fears so they can start, "Living a better life... with fear!"

Alie: *[In nasal announcer voice]* "Now with added Fear!" *[Alie and Mary laugh]*

So, what is fear, and what is stress? They are the same thing, but what's happening? The basics I know of are the HPA axis, the hypothalamic, adrenal, there's something going on hormonally. But what is happening? Why is my body jacking me so hard all the time?

Mary: Yeah, right? And that's a complex, big, messy ball. And this is why, you know, the study of fear is so messy. I'm going to answer that question by pulling out just a little bit. There's no discipline in any academic institution around fear. Fear sometimes is looked at in the psychological genre. Sometimes it can be in sociology, sometimes it's in biology. There's also, in marketing and communications literature, this idea called 'fear appeals', which is a way to communicate a powerful persuasion tool that we have overused and now everyone's freaking out because we have trained people to be scared all the time!

Aside: Side note, I looked up this term 'fear appeals', and y'all it is a WHOLE THING. Whoa boy! Any time a commercial or a news network makes you feel like you're about to die, they're pretty much using 'fear appeals'. So yes, sex sells, but so does, "OH MAH GOD, YOU'RE IN A LOT OF PERIL! OOPS! I TOOK YOUR MONEY!" So, one could be a cheesemonger, one could be a fishmonger, but fearmongering is a little less smelly and it might make you more money.

Mary: You find these in so many disciplines that they don't fit in one discipline, which is not necessarily surprising because fear is such a base unit of our lives. It's not gonna fit neatly into anywhere. When you're talking about the physiology, the way that I like to explain it is, if you're looking at the brain, kind of like a simple condition of the brain, you're separating the three big parts. You have your hindbrain, it's going to be in the back, that's going to be the most basic of functions. Some people have likened it to the reptilian brain, that I'm sure that you've heard of because it's similar to other reptiles. If we're looking in the kingdom of life, kingdom Animalia, we have our vertebrates - we're not that closely related to reptiles - but we're going to all be vertebrates. And then in the center of our brain, right around the midbrain, you're going to have the ooey-goey limbic system center. This is where the emotional magic happens!

Alie: Aw, it's like a truffle!

Mary: Yeah, it is like a truffle! It's all goey in the center. You're like, "nom, nom, nom" and there you're going to find the amygdala. The amygdala's going to be the size of your thumbnail but shaped like an almond, and it's going to be on both sides. So if you were to cut your brain in half, you'd have one on each side. And they're really small, but that is the powerhouse of the fear response. That's going to be the control center. So when

our body's going to perceive a stressor - we talked about stress versus fear - you can really start to look at it as stress is going to be a physiological response that your body's having to a stressor. And that stressor is going to be the outside thing, the trigger. Stressors are generally never in our control, but our stress response is. So let's go back to the story that you said about getting mugged at knife-point. The stressor is going to be the mugger with the knife, threatening your life.

Alie: There were two of them. One for each side of my amygdala!

Mary: Oh, that's nice! *[laughs]*

Alie: Thanks kids!

Mary: They thought about you like, "You know, we're gonna tag team. You obviously are a very ferocious opponent, so we're going to need backup, boys!"

Alie: We're gonna need 2 of 'em! *[Alie and Mary laugh]*

Mary: In that moment, your central nervous system is what is allowing you to interact with your internal and your external environment. So your senses - your eyes, your ears - are picking up a threat. That's going to be the stressor. You have no control over that stressor, but your stress response is what's happening inside your body, and your amygdala is kind of hitting the panic button and being like, "Okay, we need to... It's go time." At that point it's going to create a cascading effect through your hypothalamus and thalamus and getting everything ready for your body to, in this particular point, to do the fight or flight.

Aside: Okay, so... little recap. This whole shebang is part of your limbic system, and once again, the little almond amygdala deep within your brain receives info that says, "Haaaaaaah! Nooooo! Oh no!" I'm paraphrasing. And it chemically pokes your thalamus, which sends other signals to the brain to release a floodgate of adrenaline and cortisol in preparation to either engage in fistcuffs, or get the fuck out, ASAP. Okay, this next thing she says changed my whole life. Get ready for it. Are you ready for it? Get ready for it.

Mary: And I think this is a good time to also separate... When we look at fear, we have two major types of fear, what I call factual fear versus fictional fear. Since we're on this example, factual fear is going to be actual threats to your life that are happening in a shared reality, right now, that your body's responding to.

So you getting mugged at knife point was 'hell yeah' factual fear. *[Alie laughs]* Shit is going down. It is time to put all systems into fight or flight. And that means at that time, your body is shutting down non-essential systems, "Cellular regeneration? Nah, taking that offline, don't need it. Digestion? We're just not gonna worry about that. Libido? Don't need to be worried about sexy-time right now! Just trying to get out of here alive!" That means that other resources can be put to your skin. This is why you can either break out in a cold sweat or get hot, because your blood is flowing to your muscles so that your muscles will have the energy to do what it needs to do to survive. And that's all the stress response.

There's also going to be the other side of that which is fictional fear. Just like a good fictional book might have a nugget of truth in it, most of it is just made up. With fictional fear, that is the everyday fears. And those are the fears that I really focus on. How we can change our story with our fictional fears so that they aren't firing up the amygdala so much? Then we're not going into this full stress response, because in modern times our body isn't really good. Our amygdala just sees stressor, right? It's up to us to control how that is perceived. Because if we are constantly in hyper-drive with our amygdala, just sending signals of "DANGER, DANGER, DANGER!", when it's not necessarily dangerous - it could just be annoying or maybe it's a good stressor, like an opportunity - if we don't start to discern that for ourselves and we constantly are just red-lining the stress response, that's why we're seeing this increase in all of these other issues in our body that usually would be taken care of.

So, like cellular regeneration - especially when we go to sleep at night - that's our time for our bodies to be like, "Okay, we're going to do some maintenance, we're going to get rid of some cells. We're going to make some new ones, do all the things." If we're constantly in the stress response, if it's constantly go-time, our body's like, "Nope, nope, not even dealing with that!"

Alie: Wow!

Mary: And cancer is a disease of the cell cycle.

Alie: This is mind-blowing! This is blowing all of my amygdala areas. [*Mary laughs*] So we are keeping ourselves partly in a state of heightened fear... when we don't need to.

Mary: Yeah, absolutely.

Alie: Why??

Mary: Because no one teaches us how not to! Isn't it frustrating? [*Alie and Mary laugh*]

Alie: YES!

Mary: So many years of being scared when you didn't have to! Yeah, and that's my jam, because I am still that person, by the way. I continue to apply the things and do the 'walk the walk' of what I teach and what I study, but it doesn't mean fear is gone. It's just that I got super tired of living in a really tiny box and knew that there was [*in a breathy voice*] a life beyond the Provincial Town! [*Alie laughs*] But in order to get to that life, I needed to handle my fear business because no one was gonna handle it for me.

Aside: Sadly, Mary's mom passed away, and looking back on her life and how controlled by fear she was, Mary decided to face a lot of her own fears and take some dang risks. She was in a relationship that hadn't been working for years and she really longed to get out of the small town she was from. It is here that I will refrain from crooning "Just a small-town girl, living in her lonely world" but... "Don't Stop Believing" that I really want to.

Anyway, she went on a Journey. [*slow-speed DJ airhorn*]

Mary: Fast-forward a year of branching out of my original friend group, meeting people that had all these crazy stories of international travel and adventure, and me making the decision that I want this new life. And in order to do that, I'm going to have to make some pretty radical changes within that year because - not too off topic of science - but my long-term relationship of 12 years wasn't going well, so we decided to get married. Just like having a baby when you're struggling in your relationship is the best idea ever - IT'S NOT! It's not the best idea ever. [*Alie laughs*]

So clearly that didn't work. I was like, "Okay, I'm gonna completely change my life." and ended that relationship. I started this whole new... just was traveling. And whenever I had the opportunity with breaks from teaching at the university, I would travel by myself. And I was freaked out most of the time, cause you know, I wanted to travel but my friends had normal jobs, so they couldn't just take off for a month. So, I went to Costa Rica, got stuck in a cyclone in Croatia... went to the markets of Marrakesh. And most of the time being like, "What am I doing? What am I doing???" [*anxious panic grunt*] and totally freaking out but also discovering that I want to die with good stories.

Alie: Oh! I wanna get that tattooed on my stomach.

Mary: Right? Like, yeaah! I want to die with really good stories, but in order to do that I needed to leave my hometown. [*laughs*] So that's what I did, and it just became kind of a game of feeling the fear and doing it anyway. And it's no wonder that we constantly stay in this loop of being afraid to do anything, because even if we have an idea, the people in our life - out of love - are like, "Oh, you shouldn't do that, cause you're going to die."

Alie: Is fear contagious? In mammals, in social creatures, is fear contagious?

Mary: Yeah! When we're in fear, we actually give off kind of a pheromone as well as really delicate visual cues. And this is why... Have you seen someone talk for the first time, or they're really nervous, and it is uncomfortable to watch? [*laughs*]

Alie: There are some Ted talks where you can hear how dry their mouth is.

Mary: Yeah like, [*imitates dry mouth swallow, lip-smacking sound*].

Alie: Yeah. And you're like, "Oh, just relax! It's fine!" Although I knew if I were up there, I'd be crying blood. [*Mary laughs*] I don't know what would be happening, you know?

Mary: Yeah, and it's that visceral reaction for... As mammals, we want to run away from people that are in a big, fearful anxiety state because that generally means danger, like life-threatening, danger. So like, "Okay, well uh..."

Alie: "I'm outta here."

Mary: "Yeah, you seem like the danger zone. So I'm going to go..."

Alie: I think sometimes also we're conditioned to think, "If I remain in an anxiety cycle... if I remain seeming scared or fragile, then I will get care from other people." But it's funny that that's probably, in a subtle biological way, driving people away from you.

Mary: Yeah, and it's a delicate balance because one of the... So we've seen this in primate studies as well, that when we have fear, we will reach out - young kids and primates we see it the most in - will reach out for physical connection or some kind of connection. And that's the best way to kind of calm your fears, is to reach out and get connection, to ask for connection and receive that support. As adults in Western society we've had that trained out of us. We've been socialized to say, especially in America, "Stand on your own! Pick yourself up by your bootstraps!" We're so individualized that we are afraid of reaching out and being rejected of that support.

It's something that is so ingrained that we're having to fight our natural instincts, because like primates and children, what happens when a little kid is scared? They're going to run for their safety person, whether it's mom or dad or whatever. And they want that connection there. That's their safe spot. As adults we just internalize it, and then maybe numb it with drugs and alcohol, or sex or porn. And then we just pretend like it's not there. It's totally affecting our entire society.

Alie: Well, what percentage of our fears that we feel, would you say are factual and how much are fictional? And also, the way that we consume media, whether it's presidential Twitter rants [*Mary makes ringing bell noise, then laughs*] or, you know, documentaries about cults or whatever, I feel like we're kind of stimulating that a lot, right?

Mary: Yeah.

Alie: What's going on there?

Mary: So, as a scientist, I'm always hesitant to just make up any percentages, right? Because like 98% of statistics are made up. [*Alie and Mary laugh hard*]

Alie: That's so good.

Mary: But I would say it's going to be very specific to where you're living. If you are an American and living in Los Angeles and you have your basic needs taken care of, most likely most of your fears are fictional.

Alie: [*softly*] Oh my God...

Mary: If you are living in a really politically unstable area, if you're in Syria, if your basic needs are not being met, then a lot of your fears are going to be factual. So it kind of depends on what your situation is. But in modern society, in countries that are wealthy - like the United States - even though that wealth is not spread apart, we're still a very wealthy country, we're still getting by. So, in that case, most of our fears are going to be fictional. And fear is so funny that... Why do we like scary movies? Because they give us that rush of adrenaline. When we watch a scary movie - and this is kind of where it will be interesting with the VR world - because our mind doesn't know the difference, that that's not happening if it's a really engrossing movie. I just saw on the social feed, I think yesterday, there was on Netflix or something, that they made this like super-scary episode of something and people were shutting it off. No one was finishing it because it was so terrifying. [*Alie makes high-pitched squeal*] I mean, I clearly didn't click on it. [*laughs*]

Alie: Yeah, no, no, no, no...

Aside: I looked this up and Netflix released a list of 10 films that people tend to watch more than 70% of. Meaning they would have turned it off earlier if they didn't just like it, but they 'noped' it hardcore when the action started getting too spooky. So they made it most of the way and then they were like, "No." Among these 10 films: Eli Roth's *Cabin Fever*, plus movies like *Carnage Park*, one called *Teeth*, one called *Raw*, and of course, *Human Centipede 2*. This led me down a rabbit hole to learn about people who have suffered fainting spells and heart attacks in horror movie screenings. It happens! People just straight up faint and die! [*big sigh*] Oh, human beings. Man, we grew these big fat brains and we're like, "You know what we could do? We could create technology to make pictures move and then scare ourselves until we literally die. Let's do that!"

Mary: It's one of those things that if we can put ourselves in the story, we're activating all those things, but our higher brain functions, like our cerebral cortex is being like, "Okay, we're still safe. We're in a movie theater, we have our popcorn, we're on our couch." There's enough safety where we can play around in that fear zone and get the 'fear high' like, "Whoooooooooo!"

We also get to dress-rehearse tragedies and dress-rehearse fear scenarios. I mean, I know what I would do during a zombie attack. [*Alie laughs*] I totally think about it! I'm like, "Okay, I'm on the second floor. So that means..." or, "If someone broke in with the axe through my front door, I would probably go out the back door." I mean we're constantly dress-rehearsing these things that will most likely never happen. But, movies like that help us almost in a weird way to feel safe because our mind likes to dress-rehearse stuff and likes to play with scenarios. In a weird way that lets us feel like, "Okay, well, at least I would know what to do when zombies come."

Alie: Right. I wonder about that, like why do some people LOVE horrifying stuff? And others are like, "Hell no, pictures of bunnies only," you know?

Mary: Totally. And part of it's tolerance. Some people can have a peach schnapps and be loopy, other people can have straight whiskey and they'd be like, "Meh, that's good. It's a warm up." So it's really personal tolerance and that gets into personality and what your experiences are and what gets your motor revvin' for certain things. That's definitely a person-by-person thing but the underlying physiological responses are the same. Some people enjoy that feeling, like adrenaline junkies. They put themselves in physically precarious positions because they WANT to feel that high. They want to feel the knots in their stomach and all the things, because they find that pleasurable. Where other people are like, "Yeah, no. Yeah, that sounds horrendous. Why would I do that?"

Alie: I don't ever want to opt into diarrhea. [*Mary laughs hysterically*] That's always going to be a no in my book. Never a yes.

Aside: Side note just to say not everyone's adrenaline rushes are the same. Some folks may love jumping off of buildings in webbed onesies that allow them to drift back to earth, while others just procrastinate on their deadlines because they're afraid to fail

and need a rush of stress hormones to prod them. Guess which one I am? GUESS.
[whispering] Just guess.

Alie: Do you find that there's a distinction psychologically between stress, fear, and just anxiety? What is an anxiety disorder or what is anxiety? Where does it play into all of that? Where does neuroses come into it?

Mary: Like I said, I specifically have always focused on the nonclinical non-pathological stuff. I'm a biologist and a science communicator by degree and training, and that means that I pulled together interdisciplinary work on all of it, but I don't treat patients. I think that's important just because anytime you're talking about this, sometimes people are like, "Oh good, I don't need to see a professional because I can just listen to a podcast or watch a video!" If you're feeling those really extreme bouts of anxiety and depression - and that's how we deal with fear - but it's a spectrum. So, on those extreme things, that's when you *really* need to get that professional support so you can get back to having control over your life. That being said, they're all the damn same. And when I teach people about how to create strategies around fear, one of the mechanisms I talk about, is R-I-A or RIA...

Aside: Okay, so this genius strategy. R-I-A. RIA. Are you ready?

Mary: The first step is just recognizing what's going on. And then the second step would be identifying it, kind of like 'name it to claim it'. I was just in a Cozumel last week and talking about my research with my partner and he came up with this really funny idea - he works in creative and narrative kind of stuff as well - and he was saying that there is power in naming things throughout storytelling and mythology, pop culture, *Beetlejuice*, right? *Rumpelstiltskin*! If you know the name of the demon, then you can control it. And I just found that really fascinating because when you start to name it, sometimes that can just short-circuit the fear response in and of itself. Like you recognize, "Okay, I am starting to feel like the physiological effects of something just set me off," and just kind of recognizing that that's happening and identifying it. So, one of the things that I've made is what I call a fear wheel, which is basically a bunch of different synonyms for fear that we usually use like, "I feel insecure", "I feel overwhelmed", "I feel stressed", or "I feel inadequate."

Aside: This sounds like the best, worst game show ever, where there is just a Wheeeel of Feeeeear you have to spin. But it is comforting to know that whatever is making us sweat or wring our hands could be named and identified on a glittery, colorful game show prop. I'm so into that!

Mary: When looking at fictional fears, most fictional fears will fit into one of two categories: either the fear of being not enough, or the fear of not being in control. So if you can kind of go back to that and say, "Okay, which category does this fit in?" Sometimes that will just [fingersnap] click you right out of the fear response. [Alie gasps] Yeah, it's so fun because humans love to pigeonhole. We have an entire store called The Container Store [Alie laughs] because we love boxes so damn much!

Alie: [*fake crying*] I love the Container Store so much! It has so many zipper pouches, I love it!

Mary: See?? We love to put shit in boxes! It's so good! We're like like, "Ohhhh, yeah!" There's a relaxing like, "Oh, we get to put the box in the..." We love to categorize stuff. So when you get into the habit of categorizing what you're feeling, sometimes that will just click out of it and you'll be like, "Ahh, it's so good, I put it in a box... a happy, safe box."

Alie: I filed it correctly.

Mary: Yeah, and it's like, "Ahhh.." And sometimes that's enough to knock you out of it.

Aside: So the RIA so far is RI, recognize and identify, but what's the A?

Mary: And then the A is going to be to address. What kind of strategies do you need to manage outcomes for this? But a lot of times you can get just in the recognizing and the identifying stage and then it'll click you out. For example, I have a great story that just - back to Cozumel because it was two days ago [*laughs*] - so we're coming off the plane, had a whole travel day. This is the end of the week and my partner Craig and I are sitting on different seats because, you know, American Airlines... meh. [*Alie laughs*] Not my favorite airline. I got off first and I'm waiting on the jet bridge for him. He comes up and he's like, "Wow, you look a bit rough!"

Aside: Just a little visual FYI, I looked *appalled* when she told me this.

Mary: I made that face! I made that face and got real mad!

Alie: You're like, [*nasal Valley Girl accent*] "Excuuuse me??" [*laughs*]

Mary: I was so mad! And he's not someone that would ever usually say something like that, and I'm like, "Yeah! Well, I do look like crap! We've been traveling for like, a million hours!" So at that point I'm just like, internal rage. [*Alie and Mary laugh*] And when you're feeling a stress response or a fear response - your cerebral cortex - where the higher thinking happens - just shuts down. It's like, "Okay, aaand I'm offline." It just shuts down, and now I'm in what I call a 'fear storm'. It's like a maelstrom because that just hit my 'I'm Not Enough' button. At this point I'm going through all of the scenarios of like, "He thinks I'm fat. He thinks that I'm ugly. Oh my God, I'm old! I should probably dye my hair. I should probably go on a diet. I probably need to never eat again." [*Alie squeals a high-pitched NOOOOO!!*] And it spirals so quick! This was all happening even before we left the jet bridge. [*laughs*]

Alie: Oh, you poor thing!!

Mary: And he did not mean it in a mean way. Because when he came out, I was tousling my hair and I kind of looked like a lion, [*Alie and Mary laugh*] but I took it SO personally. And it was my perception of what he had said. I didn't ask questions like, "Oh, what do you mean about that?" I just went straight down the rabbit hole of internalizing everything and that was my fear talking, the fear of not being enough. So I walked it off a little bit because I'm just like, "I'm not going to talk to you right now because I'mma say something real mean." [*Alie and Mary laugh*] And then in my head, I'm like, "Okay, you gotta walk the walk. If you're going to ask other people to do it, you gotta do it yourself."

And just analyzing, "Okay, why am I going down this crazy rabbit hole?" Especially as women, our value is associated with how we look in Western society. We've been conditioned. So that's going to be one of our buttons. Hands down, that's going to be one of our buttons. So just kind of identifying what I was feeling, naming it and putting it into a box I'm like, "Oh...okay." Because it also makes us feel not so alone, that it's just our human body being a human body. That it's not what we would consider ourselves. It's our brain doing its brain thing and that totally helped me snap out of it and then be able to have a conversation. Because before that I was just so caught up in the emotion of it, I just couldn't even ask questions about, "So what exactly did you mean by that?"

Then once I calmed down at baggage claim, I was like, "Okay, now we can have a conversation." But ten years ago, before I started really studying fear, I was really shit at emotions. [Alie laughs] I was a scientist. That's why I got into science because you didn't have to have emotions. In fact, they give you extra credit if you didn't have emotions. [Alie laughs] It was so great! I'm like, "Oh, science, I'm here for you! You're going to my friend because I don't have to have emotions!" Which is kind of weird for a girl, but whatever, it was so great! And I had to teach myself how to communicate, especially difficult emotions. So for me to, even within a couple of minutes, go from ragey-pants and hurt, and going overdramatic about it to, "Okay, now that I'm able to get a little bit of my higher functions online, what exactly did you mean by that?" He was like, "Oh, I'm really sorry! I just meant like, after a long day and you know, when Wonder Woman is at the end of the battle? She looked a little rough too!" [Alie laughs] Because I'm a big comic nerd, so he's going to pull out all the stops on this one right?

Alie: Way to go, Craig. [laughs]

Mary: So he's like, "You know, like Wonder Woman, she looked a little rough after the end of the battles. That's just what I said!" I was like, "You're ridiculous, okay." And it was fine, but I could easily see myself 10 years ago being mad about that for a year and just internalizing it and being like, "Whaaaaaaa!"

Alie: How much do you think of our anger, in general, is just fear that comes out the wrong pipe?

Mary: So much. Especially with men - not to overgeneralize; gender is very complicated as well. But generally, men will go to the anger button first and women go to the shutdown button first. Part of that is socialization. Part of that can be associated with physiology. But anger is a way to not show what they think, not showing fear. So if they're scared of not being enough, if they're scared of losing control, whether that control is financial or their health, it comes out as anger because it makes the person feel powerful. Because anger is also one of the base emotions, but we don't feel powerful in fear. We feel powerful in anger. And we talked about media. When we look at archetypes in media, the ones that come in, they're angry, and they've got the *Rambo* knife, and they've got guns. Those are the powerful ones. They're here to whoop ass. Not the like, [high pitched] "I'm afraid in the corner! I'm the big scaredy-pants. I'm not saving anybody." No

one wants to be the scaredy-pants in the movie. They want to be the hero, and the way that we've told stories, the hero is generally angry.

Alie: Yeah, they have a bone to pick, or they have revenge to seek or something like that. They've got a score to settle. And I find it's funny, when I'm scared, I either shut down and I just... almost in conflict, can't even speak. Words just won't come out.

Mary: That's me.

Alie: That happened when I got mugged too. I went to scream and no noise would come out of my mouth and I was like, it was like one of those -

Mary: Nightmares?

Alie: Yeah! Where you can't run, only I ran, but I was like - [*choking sound*] – just nothing. But yeah, sometimes I'll be super afraid. I'll have an anxiety attack about something. I was doing my taxes the other day and I realized I forgot to pay this one thing and there was a fine on it. It was this tiny business tax that I just didn't see the paperwork, and I got so angry at just... humanity. [*Mary laughs*] I mean, do you think that that there is a stage where we'll stop doing that, we'll stop relying on those, either shutdown or anger? Not to make it like, [*newscaster tone*] "The World Today", but I mean I feel like people online get so angry with each other, politically people are so angry. Do you think there's a way to make people recognize like, "You are afraid right now, and that is why you are bullying someone" or "That's why you're shutting down sections of the government"? You know what I mean?

Mary: I think that we definitely can get there as a society if we try. And I think this is, for me, part of my "Why" of why I think this work is important to start these conversations. Because fear in and of itself is never gonna go away. As long as we're humans, until we can put our consciousness in a robot, then we can come to that bridge when it exists. But if we have our human bodies and our amygdalas are intact, we're going to have fear. So changing that conversation and teaching people - this is a total... We teach people to sit on a toilet; that is not a natural thing. [*Alie laughs*]

From a very young age we're like, "Just don't stand and pee." Because most animals are just like, "meh." We teach very young children a very unnatural thing because it's more socially acceptable. So we can do it! I believe in humanity! At some point someone's like, "Hey, you know, I have this really good idea. It's called a toilet. It's gonna be real fancy!" [*Alie laughs*] And then people thought they were crazy. And you know, it caught on and now it's great!

Alie: So happy about it! So glad! 10 out of 10, 12 out of 10!

Mary: Yeah. And I mean with human behavior, people have to see what's in it for them. They have to see, "Well what do I get out of it?" And that's going to take some people longer than others because it's going to take humans - and adult humans - recognizing that this needs to be cultivated. Because fear can't be cured, but it can be cultivated in a way that we can have a healthy relationship with it. And changing the conversation when people are raising kids to say, "It's okay to be afraid. You can be scared." And allowing for that

to be socially acceptable. Then teaching people what to do when they're in the rabbit hole is going to be important. I think that we definitely can get there but it's not gonna [*nervous laugh*] happen overnight, as nothing does.

Alie: If you had kids, what would be a good toilet training for them in terms of fear? Would it be trying to recognize if they're afraid of being out of control or not being good enough? Or would it be naming their fears? How would you try to train a kid to have better... Or how do you wish you had been trained, or I had been trained, to deal with fears?

Mary: I think depending on how old they are right now, you would want to start having the conversation of asking them to examine their own feelings in the moment. I think it's one of the hardest things to - you know, since we're not trained about our emotions - sometimes we don't even know what we're feeling. We're just like, "I'm just...AAHHH! I'm not happy." [*Alie laughs*] What is it? "I'm just, I'm not happy. I'm on the not happy spectrum of not happy."

Alie: "I'm growly."

Mary: Yeah, like, "RAWR!", and getting into the practice of, "Okay, you know, I'm feeling insecure." or "I'm feeling terrified." or trying to attach names to things. So even just in the moment they can say, "I'm feeling this way", and teaching them to reach out in that moment. If they're smaller, even if they're larger, saying, "I, as your parent that loves you, I am a source for you to reach out. So when you're scared, you reach out to me. Whether that's a text, whether that's a call, whether that is physically coming over and just holding my hand. I can be your buoy when you're afraid and we can talk about it."

I think one of the worst things is to just really super-internalize the things you're afraid of because then you just keep building that story, and it gets bigger and bigger. The stories that we tell ourselves continue to grow if we just keep in that cycle. So kind of creating a pattern of behavior that acknowledges the fear, that is aware of it, is accepting of it, and then focuses on ways to cultivate a better relationship with it.

Alie: Do you recommend that adults kind of have those same conversations with themselves? Like when you're feeling anxious or angry or whatever, sitting down with yourself and saying like, "What are you feeling?"

Mary: Yeah, all the time. One of the reasons I'm so excited about what I study is because I was - I am not kidding - I was really bad at emotions. I was good at showing happy, bubbly, 'Perfect Mary', [*high-pitched voice*] "Everything's perfect!" But darker emotions, [*high-pitched voice*] "No, see I don't have those. They don't exist." Everything was coming out sideways. So having that conversation with yourself is going to be important. Knowing what your fear reactions are is going to be essential. Like you said, you shut down, right? That's really common. People will run away, they'll get angry, they'll self-medicate with food or substances, they will become depressed or inactive. These are all unhealthy ways to respond to fear. But knowing how you respond is really important for building those relationships so you have the people to reach out to.

So, having a romantic partner or friends and once they're in that kind of circle of trust, saying, "This is how I react when I'm in fear. I shut down. It's not that I don't want to talk to you, my mouth isn't working. I'm one of those people. I just [*grunt sound*]. I stonewall and I know that's not the person I want to be, but it's also going to just be part of the equation." And when you add in: you're tired, or you have 800 other things on your plate, you're not always going to be that perfect person like, "Hi, I'm feeling fear and I'm going to eloquently articulate those feelings for you in a very nice and gentle tone! So there's going to be no friction between us."

Alie: [*laughs*] You're like, "I have a Powerpoint."

Mary: "I made a slide deck. It's on Prezi."

Aside: Uhhh, I just had to look up what Prezi was, and I'm sure it's for lecturers and marketing professionals, but it seems like a real snazzy way to tell a lover how and why they bruised your feelings. I'mma use it.

Mary: That's just not how it's going to come out. Right? But knowing how you and your partner react when you're in fear is going to be important so you can also start to see it. So if they're shutting down or if they're getting angry disproportionately to the thing, you can actually be like, "Okay, this is not me." And ask, "Are you feeling afraid right now? And are you able to talk about it? Or maybe do we need to take five?" For me sometimes, I just need to walk away because I'm just going to say something stupid.

Alie: And what's happening in that because I will sometimes be... I know there's this adage of, "Never go to bed angry" and sometimes if I'm annoyed or angry or insecure or fearful and it's coming out sideways - thanks, Catholicism! - [*Alie and Mary laugh*] I'll fall asleep and I'll wake up and I'm like, "Ah, I'm fine." And that's so antithetical to the, "Never go to bed angry." But I feel like this is a chemical tornado in my brain and it's going to go away. Is there ever... Is it just like different strokes for different folks? Or is there something good about just letting your brain chemicals drain and get broken down over time? Like an hour or five minutes?

Mary: Yeah, we're essentially always two-year-olds. Forever. And sometimes we just need a goddamn nap. We just need to take a little nap or have a snack. 'Hanger' [hunger+anger] is a thing, and sometimes the root of the problem is that your brain just needs a break, or you're hungry. That sounds oversimplified, but it's also true. So sometimes if you just feel like everything's going wrong - and I heard this quote a couple of weeks ago, it was great - it was, "If you run into one asshole during the day, that person was an asshole. If you keep running into assholes all day, it's you."

Alie: [*laughs*] Yeah, you're the asshole.

Mary: [*laughs*] So if you're just - all day - everyone is just on your last nerve? It's you. Just go take a nap, right? It's probably you haven't had enough sleep.

Aside: SO... there is something to be said for going to bed angry and waking up chill. I saw this one psychology website that said the typical fight or flight response lasts about 20 minutes, and so 20 minutes of calm is a good start to drain your brain of the

panic juice. Which - I'm starting to realize - may be why some meditation practices recommend 20-minute stretches at a time. Now, if you can't find a soft surface to peace out and dream, or breathe your fear/rage away, apparently exercise can also help you burn through some of that cortisol and epinephrine. So if you're having a day, or you're having a moment, just announce, "I am going to run around the parking lot a bunch to metabolize my very common chemical feelings of inadequacy. Be right back. Thank you." And also, maybe take a look at what's making you have those adrenaline spikes.

Alie: But do you think that there should maybe be a deeper look at the way that we do scare ourselves? Should we maybe stop looking at Twitter accounts that terrify us all the time? Should we put a cap on how many rabbit holes we go down? Or do you think that if we're going down it we should be going down it.

Mary: I think you have to really be discerning on where you're going to spend your stress response. We know that having a stress response all day long is really bad for you. It will kill you. Your body's not able to take care of itself. It's not going to be mentally fun. It's not good all around. It's not good for your relationships because you're constantly like [*imitates angry cat meow*], so you're not going to have the best life if you're constantly in that state of stress and fear. Just like you can't eat all the things every minute of the day, you have to be discerning. It's got to be discerning on: what kind of things do you want to expose yourself to, what kind of things do you want to spend your stress money on?

For me, I don't engage with people in comment sections - and you do media as well - especially when you do visual media. As a woman, even if it's in science, people make crazy-ass comments and you're like, "Seriously?? You came to a science show... I'm not even going to get into it." I am just going to let it go because that's not worth my stress energy. It's a finite amount of currency that I have and I'm not going to spend it on that stuff that doesn't matter. If it's something I enjoy - like I don't like horror, slasher films, but I like spooky films or psychological thrillers - and that's kind of fun. If I don't have to go to bed alone and be like, "Woo! Spooky movie!" then that's fun for me. So I'm going to spend some of my stress energy there. But that's going to be a choice.

Really, it's about choices and knowing which things are going to kind of be your stress responses. You're not going to fully manage those, but just making better choices of, "What is my return on investment in this?" We were talking about social media. Am I going to change that person's opinion by fighting with them in the comment section? [*Alie laughs*] Probably not, right? Cognitive bias is a thing, and people in the comments section are not there usually to have a deep, meaningful conversation. They're there to get their anger fix. So for me, I'm like, "Ah, I'm not going to be your dealer. Sorry. You're going to have to get your anger fix somewhere else."

Aside: So, staying calm and super collected might be the cruelest response. And then, to quote the wisdom of ancient East Coast philosophy: [*slowed playback of Alie saying, "Fuggedaboutit!"*]

Mary: And when you have rumination, when you have fear and anger that don't have an outlet, then you just keep cycling it in your body. You're just like, "I'm going to hold on to this

and just get more angry and more frustrated or fearful about things.” That’s not serving anything. It’s not doing any good.

Alie: I know we don’t know a whole lot about depression and anxiety. I mean the amount people suffer from it compared to what we know. I think we still are figuring out how SSRI’s [selective serotonin reuptake inhibitors] really work in the brain. How much of anxiety do you think is genetic-physiological and how much is it learned responses? Do you know what I mean? I know that cognitive behavioral therapy is super helpful and that is re-learning, but I’m just curious - and I can look more into this - just thinking of my family history of anxiety, I’m wondering how much of it is just patterns and behavior?

Mary: It’s definitely gonna be a mix. With a lot of mental health issues, part of it is going to be a genetic predisposition. Take addiction: part of it is genetic predisposition, part of it is going to be the environment in which you were raised, and part of it is going to be your active choices and the support system or education that you’ve been given around how to make different choices. Humans are so complex, and this is kind of why there’s no easy answer to any of these things. But we’re always going to have that genetic predisposition be a part of it because we do have lineages. They just came out – I think a few months ago, and you probably saw this - with scientific evidence to support that trauma gets passed on through generations, and not just in-utero. There’s a genetic - with the telomeres - impact of trauma that gets passed through DNA. You’re like, “WHAT?!” So if you have a trauma, you’re screwed! And it’s not even your fault! [*laughs*]

Alie: You didn’t do anything!

Mary: I just... Let me live my life! [*laughs*]

Alie: That is as quite an inheritance. You’re like, “I got shitty telomeres and some epigenetics that are boning me... Thanks, Grandpa!” [*Mary laughs*]

Aside: So, if you listened to the Evolutionary Biology episode, you might remember some things about acquired genetics and epigenetics and gene expression, and this kinda falls in line with that. There was a study out in *The American Journal of Psychiatry* in 2014, and it involved data about war survivors who suffered PTSD having children with higher methylation of a gene involved in stress response. [*skeptical “hmmm”*] But it was a small study. It only looked at a liiiiiittle slice of genes with not that many people, so some scientists say that more data needs to be gathered. We got a lot to learn.

Mary: And a lot - especially really big trauma - things like the Holocaust, things that were completely out of those individuals’ control continues to get passed down in generations. With the brain, there’s still so much we don’t know and we’re kind of still scratching the surface of understanding... like learned fears. We still don’t quite know how that works, of why someone learns to be afraid of water because something happened when they were a kid, and then you have other people that LOVE water. So there’s still a lot of research to be done on that end. But it’s definitely passed on both... I think genetically as well as behaviorally. Because how did you do learn how to be a

human? From your parents and your family. Especially when you're young and really impressionable. Like, "How do I human? [*Alie laughs*] Oh, that's how I human! Okay." And that's so deeply imprinted that even when you start to learn new behaviors, it's not going to be as powerful as what was imprinted when you were young. So, depending on what kind of shake of the dice you got, that's going to have a huge impact on how you're going to express yourself as an adult.

Alie: But it's interesting to me that learning about how much of our fears - especially in the Western world or in a big city, or whatever - are fictional, gives me more faith in pursuing more cognitive behavioral tactics. At some point I think you kind of just surrender to your anxiety and you're like, "Well, I'm an anxious person." I got diagnosed with generalized anxiety disorder a few years ago, and I was like, "Oh, that's why I'm constantly worried about living under a bridge. That's why I'm always afraid of being a failure or something." And so I think at some point I was kind of like, "I got a diagnosis, I'm surrendering to it. It's who I am." And it's interesting to hear you talk about it in that way because I'm like, "Oh, there are steps that I just don't take because I just think this is my lot in life." It'd be like if you're a diabetic and you're like, "Well, why bother taking insulin? I'm diabetic." [*Alie and Mary laugh*]

I have more power to actually change things than I probably have given myself credit for. You know what I mean? And I think it's interesting because I feel like the more people open up about fear and anxiety and stress, the more you find out a lot of other people have it. And there's something really tragic about that because that means a lot of us struggle with it and none of us know what to do to self-soothe in the moment. We're just not equipped. We weren't given that. That's so fascinating. I'm going to remember that. R-I-A. Super helpful.

Mary: Yeah, and it's one of those things, that having professional therapy can be super, super helpful, but that's only maybe once a week, maybe twice a week, and we feel fear every damn day. So we need things that are going to be easy to remember when our higher functions are just shutting down that we can put in their pocket and be like, "OK, I'm gonna pull this out and I'm going to pull myself out of this fear storm." And that empowers us. That makes us not feel like we're just at the whims of our brain.

Alie: Exactly.

Mary: That our brain's just going to be like, "I do what I want!" [*Mary and Alie laugh*]

Alie: And the other thing is especially if you're having... If fear can be divided, if fictional fears can be divided into "I'm not good enough" or "I'm out of control", I think that feeling embarrassed that you're afraid, or ashamed that your fear made you angry... that only triggers more of that "I'm not good enough" and "I'm out of control" because I'm not in control of my emotions and I'm a huge turd [*Mary laughs*] for feeling angry and afraid. And now I'm even worse because I'm ashamed that I'm angry and afraid! You know what I mean? It really spirals down so quickly.

Mary: It's like *The Song That Never Ends*.

[clip from *Lamb Chop's Sing Along*: "This is the song that doesn't eeeeeend..." Shari Lewis, "How do I turn you off?!"]

Soooo... hoo! If you're an alive human, you probably related to a lot of this. And you're like, "Wait! There's so much more I need to know!" But don't fear... Part 2 is here! Well, it will be next week. I broke this episode into two. I made Mary, talk to me on my couch for so long, I'm obsessed with her work now. So stay tuned next week to hear about Mary's own personal moments of greatest fear, and what she did, and what it taught her; as well as a ton of REALLY good questions sent in from your own inquisitive brains which Mary will answer. Meanwhile, you can find Mary online at: www.MaryPoffenroth.com, she's on Facebook at [MaryPoffenroth](https://www.facebook.com/MaryPoffenroth), she's also on Twitter [@MaryPoffenroth](https://twitter.com/MaryPoffenroth). Instagram though... her handle is [@FearFoward](https://www.instagram.com/FearFoward), so... gently stalk her.

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And if you stick around through the credits... you know you get a secret. I just gonna tell you that... [laughs] This is so dumb. So, this whole two-part episode is about fear and stress. This weekend I was on a tiny vacation with some of my best girlfriends I've known since I was twelve, and I had to get the audio uploaded, and the Wi-Fi at the Airbnb we were staying at was the slowest ever. This will not mean anything to most people, but it was .24 megabytes per second upload speed; which if you deal at all with any uploading of anything, you know that that is just tear-inducingly slow. Anyway, I finally went to a library - shout out to public libraries - y'all have fast, free Wi-Fi and I love you. But my poor girlfriends I've known since high school had to watch me freaking out trying to upload this episode all about fear and the stress response. So... It's uploaded. And I had to ask myself, "Why am I freaking out right now?" And I was like, "I'm afraid I'm not good enough because I didn't upload this earlier, and what if this episode isn't good enough and no one listens anymore?" So... there you go. There's my secret for the week, you guys.

Real life fears. What if I'm not good enough? What if this isn't good enough? All because of slow upload speeds. So, anyway... think about what you're afraid about. We'll have more next week. What a great two-parter. It's kind of like free therapy. Even though I think I'm supposed to say a disclaimer about: This is not intended to diagnose or treat anything, and you should get professional help for everything because podcasts aren't allowed to fix anything. But it's very helpful nonetheless.

Okay! Breathe deep. [High-speed playback] Berbye!

~Transcriber Sign Off~

Haaaaay. It's your overly enthusiastic Spanish teacher who really needs to take it down several nachos and maybe take an aggressive siesta... That'd be me: Sean Alphonse. Hoo boy, this episode. I love this episode. And I loved transcribing it and trying to explain [Alie Noises] in handy brackets. A thank you to Emily White who coordinated the transcription effort, and of course, a big thank you - all of the thank yous - to Alie Ward, the Rainbow Sponge Lady of science. Long may she reign!

Some links which you may find useful:

[*What do Americans fear most ... in 2014?*](#)

[*...and in 2018*](#)

[*Meet your amygdala...it keeps you alive*](#)

[*Movies that make people faint*](#)

[*Adrenaline duration*](#)

[*One more on adrenaline duration for funsies*](#)

[*How does the brain process danger?*](#)

[*Advertisers love fear tho*](#)

[*There are only FOUR emotions?!*](#)

[*Mary's tip: RIA \(recognize, identify, address\)*](#)

[*Is trauma inherited? THANKS GRANDPA.*](#)

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