

## **Episode 73**

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Patrick: Of course you say made up words are bad for SEO.

Ryan: I agree. I agree with myself. Shocking.

Patrick: You're wrong about the gnashing of teeth, by the way, that's just wrong.

Ryan: I disagree. I disagree that I'm wrong. I agree with myself yet again.

Music

Announcer: Hello and welcome to Science sort of.

Ryan: Hello and welcome to Science sort of, this is Episode 73, "I heart Science". I am your host Ryan and joining me today to discuss things that or science, things are sort of science, and things that wish they were science are the Paleo Pals. Patrick.

Patrick: I'm podcasting in new pants today. My wife recommended that I take them off so that I didn't spill my wine on them but they are brand new, I'm wearing them.

Ryan: Wow, went against the wife.

Patrick: I did.

Ryan: Bold.

Patrick: All for science.

Ryan: Bold choice. Also joining me is Charlie.

Charlie:: Yeah, I am joining...

Ryan: Are you wearing pants?

Charlie: I'm excited to be here. I am wearing some nice pants, some bluejeans and a white V-neck T-shirt.

Ryan: Whoa.

Patrick: Nice.

Ryan: Rocking the V-neck.

Patrick: Nice. Nice.

Ryan: I can't pull off the V-neck.

Patrick: It is tough.

Ryan: It's tough.

Ben: Try lifting it up over your head.

Patrick: I got a lot of...

Ryan: That voice is, of course, Ben Tippett.

Ben: Hi everybody, I'm ready to talk about make-outs. Awwww, yeah.

Ryan: Oh, man.

Patrick: (inaudible)

Ryan: Yeah, well, Ben is transitioning us nicely into a wonderful interview with author Dr. Sheril Kirshenbaum, author of *The Science of Kissing*.

Music

Ryan: Alright, so, joining us now is Sheril Kirshenbaum who is from the University of Texas to talk about her new book, *The Science of Kissing*, thanks for joining us Sheril.

Sheril: Thanks so much for having me on.

Ryan: So, I guess before we get into the nitty-gritty we should give a brief overview of what exactly is the scope of *The Science of Kissing*.

Sheril: Sure, well the book is divided into three parts. So, in the first part I try to look at the origins of kissing. The anthropology of, evolutionary biology, why do we kiss, why are we drawn to someone else's lips, what are other species doing, what kind of history do we have on humans kissing in terms of literature, and then how does it vary across culture? In the second part of the book I look more at the individual. So, what's going on in our bodies? How are our hormones and neurotransmitters involved in this behavior and then ultimately by the third section, I wanted to take readers into a laboratory setting and talk about what it's like to set up an experiment. I had a wonderful ally in the process, a scientist named David Havel at New York University who is more than willing to get involved. And also look at the future of kissing and how things are changing. Like, how online dating might be changing the way that we move in and out of relationships, because all the sudden we are depending on very different signals than we have evolved to depend upon. And so, I tried to take a really interdisciplinary look at a single behavior that's nearly universal and so I thought it really told a great story.

Patrick: I guess one thing I would like to ask is that, it seems like maybe it's not as universal as we think. I know you, you've pointed at some signs that mostly it's a western phenomenon?

Sheril: Ah, well, so, it's tricky. It depends on if you're talking about kissing mouth to mouth or kissing in terms of, kissing like behaviors which is what Darwin was describing when he would write about it. Because there seems to be some kind of instinctive drive draws individuals together. Whether it's meeting at the mouth or in other cultures, blowing on each others faces, nipping, rubbing, passing, usually around the face. In that respect that seems to be something that we see in various cultures in some manner. But no, kissing certainly has not always existed in its

present form and in fact not until recently, if you can imagine we haven't been using toothbrushes and mouthwash for very long so I'm sure mouth-to-mouth is a very different experience than it would be today.

Charlie: Before modern dentistry as well, huh.

Sheril: Yeah, absolutely. One of my favorite things actually when I was researching this book, because for the most part I was just digging into the primary literature and then talking to scientists as well, and, honestly, you know, if I didn't have so many people involved from all different disciplines to really help me put this narrative together I couldn't have done nearly as much as I was able to.

5:08

But, one of my favorite parts of writing a book as well, when digging into all of these travel logs of explorers mostly from Europe in the 1800s when they would write about the people that they were seeing in parts of Africa, parts of Finland, places where they weren't in encountering kissing and what some of the responses to the behavior were. My favorite is this wonderful anecdote that comes from Africa where this young man fell in love with this African king's daughter and he finally summons up the courage to kiss her and he goes to meet her at the mouth and then she screams and runs from the room and it was only then that he realizes that she thought he was planning to eat her or some thing. Why else would anybody put his lips on her. And so they were all of these really, really fun or interesting accounts of what other people have been doing.

Charlie: That's great. What are some of the physiological or chemical responses in the brain associated with kissing?

Sheril: Sure, well, first of course there are many different kinds of kisses. So I guess in this respect I'll talk about the romantic kind and you know, a good match, so when you're with someone and there is real chemistry because you know there's chemistry involved on a literal level. So when you kiss someone your pupils can dilate which is one reason that many people think that we close our eyes during a kiss it was just sort of a natural response. Our pulse quickens, our heartbeat quickens, our pulse can become faster, did I say that? Sorry. But so much is going on in our bodies. Our breathing can deepen and become a irregular but that's really

only the beginning, that's the physical. During a good kiss there can be a spike in a hormone called oxytocin. Oxytocin is popularly called the love hormone. It's associated with important social bonds, With forming a strong attachment to someone. And so it's really important not just at the beginning I'll be relationship with someone new, but maintaining that bond overtime. On top of that there can be a spike in dopamine. Dopamine is a neurotransmitter that is responsible for feelings of craving and desire, I can't wait to be with someone sensation that so many people feel when they kiss another person who they really care about. There can be a rise in levels of serotonin and serotonin is involved in obsessive compulsive thoughts, you can't stop thinking about the person. And what's interesting is, as I was doing the research all of the sudden these responses or the feelings associated with different neurotransmitters and hormones, and I just named a few, there's so many involved, but they start to sound a lot like the so-called symptoms that we associate with falling in love. And it just paints a really interesting picture of science and our bodies and why it's part of our life on a day-to-day basis.

Ryan: Did you start at any point in the research to get too in your head when you would like lean over to kiss your husband or something and just think about all the chemicals that were firing and like did you get self-conscious or did he get self-conscious because he knew that you were analyzing every facet of what's happening?

Sheril: Well, I think in this case, fortunately, we'd been kissing a long time before I considered writing the book. But I do know he got teased quite a bit by some of his colleagues where he would go to an academic conference and they would say things like doesn't your wife need to do some research? You know, can you go away? But, no, actually for the most part, you know, a lot of people have asked me that, especially with the chapter on germs and bacteria, I called it Cooties in the book, but for the most part no, if anything I think it made me more aware of why kissing is so powerful and so significant in relationships and just more conscious of, you know, giving him a kiss goodbye in the morning. Because it's a way to reconnect and it's so important in our lives.

Ryan: That was, that was definitely one of the studies that you talk about in the book that shocked me the most, was the correlation in, was it, people live longer when they kiss their spouse leaving the house every day, and I mean...

Sheril: I was skeptical, no...

Ryan: I was going to say, that's another thing that I really liked about the book, was that you were skeptical of some of these seemingly dubious claims and dug deeper which is some thing I always enjoy seeing in a science book.

Sheril: I kind of have to be, I mean, a skeptical person fairly often, but no, I mean, I thought that was an interesting study because one, it was in the literature and two it does reflect some kind of correlation which is interesting and that is that it was a study from the 80s I think in Germany, and it said that man who kiss their wives goodbye are less likely do you have a car accident and more likely to more and had all these positive things associated with it. But beyond the sort of obvious, you know, how can you correlate those two things, well, if someone's kissing their wife goodbye in the morning then they are probably leaving the house in a bit of a positive outlook and maybe not likely to be as angry or maybe wreck the car, I mean, who knows what it was. But I just thought it was kind of interesting to find that among the different papers that I was pulling up.

10:08

I was most skeptical about the gender differences in men and women but they make a little more sense to me now after talking to some of the people that were involved with the research. But we can talk about that later because you were saying?

Ryan: Oh, I was just going to say, I was going to ask if you'd heard about a study that we've talked about on this show, man, probably a year ago at this point where they did a study, it's not directly related to kissing, but when men were talking to a woman that they classified as attractive, they were more likely to forget important details about their life like their address and their phone number...

Sheril: I did see that. I remember when that came out, I think that I blogged about it actually, because I have a blog at *Discover*. Yeah, yeah, it's funny the way people respond to up close and personal interactions with the opposite sex. I mean there are so many studies like that, that I kept finding.

Ryan: And they were often hilarious and never that surprising. They were always kind of the well duh studies that, well duh, people think that attractive people smell better or yes, you get flustered around pretty girls or you know things like that, so.

Sheril: Yeah, that, that was something that I kept finding, is the men's response to being around pretty girls changes the way they behave. And throughout the research that I was doing for the book it was interesting then I kept coming across different studies looking at, you know, a) the possibility of pheromones, but b) just some kind of cues that seem to tip men off about when women are ovulating because we're not quite sure why it is. For example men seem to be more protective of a partner when she is at her peak fertility and it could be something like, is there a pheromone involved, well pheromones are very controversial, scientists can't agree on whether humans have a means to detect them. But could it simply be that when a woman is ovulating she's acting may be a little bit differently, maybe she feels a little bit differently, who knows. But, there's a lot of, a lot of interesting work on that and particularly involving things like the birth-control pill because it seems to flip-flop that response or just get rid of it altogether.

Ryan: It would be fascinating to see if homosexual women in lesbian relationships have that same increased protective aggression response during ovulatory cycles.

Sheril: Mmmhmmm. So, one of the things, that, well, the thing that I think surprised me the most while I was writing this book is just how little research has gone into a behavior that so many of us do, because we spend so much time thinking about, you know, the behavior, the foraging behavior in birds, all of these other species and what they do and here's something that we see over and over and over across cultures that seems to be highly significant to humans, but it's kind of all but been ignored in the sciences were studied from a related angle involving another question. And so I thought that was really interesting. But beyond that, how, you know people are very careful about talking about sexuality in science generally but I think that shifting a little bit. But even so, there is a lot more published on men than women. And so when you start asking about female sexuality it's hard to find much. I mean, even things like, I have that wonderful image in the book of the homunculus, the sensory homunculus which is the brains-eye view of the body in a sculptured human form. So you'd see that the lips are enormous because there's so much neural space associated with lip sensation. But, it's a man's body, and I said



is there anyone else on earth, is what would this look like in a woman? Well, it's never been done. No one really bothered to make that figure. And so it's a sort of, it surprised me how little I could find on certain of these questions regarding women.

Charlie: That's amazing that that hasn't been done yet.

Sheril: I know, I think that especially looking at this book, a lot of people would be wondering, the first person to ask after I was wondering was my editor who also happens to be female. She said, okay, so where's the woman statue? I said oh we don't have one.

Patrick: Well, you've got some good evidence that people in general think that lips are really important...

Sheril: Mmhhhm.

Patrick: ...like what you just told us, but, I'm wondering about some of those hormones spikes that you see when people are kissing, is that especially prevalent in kissing or is that any sort of, kind of foreplay? Like, is, is holding hands in some cultures give you those same hormone rushes or is kissing especially responsible for those?

Sheril: Well, there is a wonderful study that people try to investigate, and I talked about it in the book, at Lafayette, Dr. Karen Wilson and Wendy Hill. And they were interested in that very thing so they were looking at changes in oxytocin depending on whether couples were, basically, having student couples make out and having other couples just talk and hold hands. Ah, the problem with their experiment was they invited all these student volunteers into the health facility and poked them with needles and had them spit in a cup before and after kissing.

15:00

So they didn't get the results that they really expected, but at the same time stress is so influential on the kissing experience and considering these couples knew they were going to be poked with a needle for example, it probably had a strong affect. I know, I mean, oxytocin is very involved in human bonding, human connection, but one of the reasons I think the lips play such a powerful role in stimulating the

hormone is probably a part of our neural pathway from our earliest experiences. Ah, feeding experiences as infants and toddlers, often involves nursing in many cultures and throughout human history, the pre-chewing of food which also involves lip stimulation, tongue stimulation and both mother and infant in these instances are having a rise in levels of oxytocin. So our earliest experiences using our mouths, I mean we use our mouths to interpret the world in so many ways I think that we take for granted, but at that point are lip pressure is associated with this, you know, large rise in oxytocin which in some respects might be rekindled later on in a romantic relationship just from a sort of similar sensation involving other feelings of security, of love, of comfort, of a connection.

Ben: So, I was going to ask, if you kiss somebody that you hate, do all these, you know, chemicals triggers, still get triggered?

Ryan: Ben just got married by the way.

Sheril: Not necessarily...

Charlie: I was going to say...

Sheril: Oh, congratulations.

Charlie: ... How does that situation arise?

Ben: So, there are, I know, kiss each other on greeting, right? So, you see...

Charlie: Oh yeah.

Ben: ...somebody, your best friend's aunt and you kiss her on the cheeks, right? What would happen if you hated your best friend's aunt and you kissed her on the cheeks, would you still kind of end up thinking fondly of her as a result of kissing her? Is it...

Sheril: No, no, no, no, no, no, no. Well, the social kiss itself is very different and that probably, was, kind of an evolution, in some ways, a cultural evolution of the sniff greeting which is so important in human cultures. We have all these scent glands on our faces and traditionally many, many people's dependent on their sense of smell

and greeted one another through this sort of sniff on either cheek which, you know, when we didn't have lightbulbs to recognize friends and family members, was a pretty good way, you know, reestablishing bonds of, firming up relationships. And so at some point that brush of the nose across the cheek probably became associated with the brush of the lips and then we have the cheek kiss which is much more popular in parts of Europe and parts of Latin and South America, but we see it all over the world today. And that's very different, definitely not the same kind of extended mouth-to-mouth session as a passionate kissing session. But even in, you know, a romantic kiss, it's just not right if someone feels stress that the timing is bad, the moment is off, the environment is all wrong, they are feeling a lot of pressure from a partner where they just don't want to kiss them, then no you were not going to have the same chemical response in your body and you're going to have a rise in cortisol the stress hormone, and cortisol and kissing don't mix. In terms of first kisses it's so important for a first kiss to go right. I mean, it won't necessarily make or break a relationship but more than half of men and women have reported or do report in evolutionary psychology studies that they have ended a budding relationship because of a bad kiss. And so, it has a very, very powerful effect on what we decide to do next.

Ryan: Yeah, that was one of the things that I was really interested early on in the book when you were talking about the history of kissing because I've often heard, I've often heard people linguistically inclined people talk about how the Greeks had multiple words for love and all of those words make a lot of sense and had different reasons and I never heard a similar breakdown of kissing and you actually have the three different types of kissing that the Romans talked about and how those are really more or less present today but we have broken it down into one word. So that was kind of what Ben was getting at because you know you had the...

Sheril: Right.

Ryan: ...you had the kiss, the kissing the person who was above you socially, like the kiss of deference and then you have the kiss of the greeting and then you had the romantic kiss.

Sheril: Right, right, right. And they, yeah... I was going to say, you definitely don't have the same kind of enjoyable reaction especially for social kisses that you would with someone that you're going to love and want to be with.

Ben: So, the kiss of death doesn't count then, eh?

Ryan: That would probably be the, the kiss out of respect Ben. The osculum.

Ben: The kiss of death is when you're kissing an underlying that you're about to kill, you see, Ryan.

Ryan: That's a kiss of respect, you respect him enough to kiss him before you kill him, but that's...

Ben: No... (sigh), Ryan, come on.

Ryan: Well, one thing, one thing I definitely want to get into, well, two, I, I guess the two things I want to talk about are the research that you put together as well as the gender differences that you found in your research, so, what, I guess, what...

20:12

Sheril: Let's do gender because I...

Ryan: Okay.

Sheril: ... feel like the experiment is the build up, right?

Ryan: Sure.

Sheril: Yeah, the gender differences really surprised me and irritated me, especially at the beginning. Because they seem so stereo typical of men and women and I just don't like gender stereotypes at all. But in short, so Gordon Gallup at SUNY Albany and his team did a lot of research on preferences and attitudes of kissing for well over 1000 people who are students. And what he found was, in terms of, when asked sort of why they kiss, men were very likely to say that I kiss as a means to an end, it's sort of something you have to do and you get some thing, you know, if you were kissing her you might be able to tell what she's like in bed or or she might be like, you know, be more, you kiss her so she'll get to bed, you know, all these responses like that. Whereas women tended to place a lot more emphasis on the

act of kissing itself. So I woman would say I'm kissing to figure out how my partner feels about me, whether we have a future together, if this relationship is working, whether we should pursue a deeper connection, and so...

Patrick: So, basically the Cher song.

Ryan: There's a Cher song?

Patrick: Yeah.

Sheril: It's in his kiss, well, yeah, actually, that's a good point although Cher covered that, that was not her song originally, but yeah.

Patrick: I'll give you points for saying who that was because I don't know who that was that she covered.

Sheril: I don't actually remember, it's been done so many times by different people.

Patrick: Alright, carry on.

Sheril: So, Cher's great. There are a lot of differences and so, women were much more likely to pay attention to a man's breath and teeth. Men were more likely to engage in sex without first kissing a partner where women would often, respond, is that implying I am a prostitute, what's going on, why would you ask me such a thing? So, it was over and over and over and it just, it annoyed me so I ended up calling up Dr. Gallup in Albany and we talked a lot about reproductive biology and how women really have to take the time to figure out whether they should invest the time and energy in a relationship with someone and whether that person is a good match for them. You know genetically in terms of whether they would make a commitment, in terms of just, if they are the right person to be with and if not, she needs to know that she should be looking elsewhere. And women have a, women are more sensitive to taste, sensitive to smell and we use these factors to get valuable information about a partner, both consciously and very much not consciously in terms of figuring out if we want to be them. And so, with that in mind, it starts to make a little more sense why we are seeing these very distinct answers along this harsh gender divide. One of my favorite parts of that was how women tend to complain constantly of too much tongue or they don't like all that saliva

whereas men tend to say that they prefer open mouth kissing in a new relationship. And that's kind of unique, or kind of interesting when you start thinking about what's going on when a man is open mouth kissing a woman. And in fact a man's saliva has a small amount of testosterone, the male sex hormone. And so if a man is repeatedly kissing a woman, the same woman over weeks and months, that little bit of testosterone, over time, it doesn't happen overnight, but over time it can potentially serve to enhance her libido and in that respect it would be advantageous for the man to be slipping her the tongue. It just, it starts to lay a lot of things that we hear but it gave me a little more insight into the science behind why we see these trends across genders.

Ryan: I am really glad you went into the details on that because I've tried to explain that whole tongue thing to people and they are not buying, so. I've got to make sure people pick up your book and read your descriptions which are much more articulate than probably, me going well you see his tongue is covered in testosterone.

Patrick: Ryan, selling make outs as a marital aid doesn't work. Especially when you were making out with people's wives.

Sheril: Writing this book made me realize how much misinformation is circulating. Because it wasn't just, I mean I wasn't googling for information but I kept coming across these sort of factoids both in searches and ah, you know, not in the primary literature but just I, I got a bunch of just light, sort of fun books to give me ideas on directions I might take, with what I was going to research and I kept coming across this sort of you know so-called fact, a kiss burns, you know, 26 calories which, if you put any thought into it makes absolutely no sense because we would all be emaciated if we were kissing anyone. But I couldn't figure out, do you know, why is this everywhere, why is this in real books, where is it coming from?

25:00

And it wasn't until Halloween that I was eating a Hershey's kiss and I noticed on the package that the flavor or whatever it was had 26 calories in it and I thought, okay, at some point someone wrote a kiss caused 26 calories in it and it was echoed and echoed in echoed into becoming something that we read. When you think about how many things we think we know have probably been recirculated and retold like

that game telephone when we were little kids, it's mind boggling. So I'm wondering, with even trying to do a fair job writing this book how many stories are just going to be botched by, you know, reporters who don't take the time to really read the whole chapter but pick a few sentences.

Ryan: Well, that was one of the things I loved is at the end of your book, which, I've never seen this in a science book, it's that you actually give people kind of a list of scientifically inclined kissing advice which is awesome.

Sheril: Oh, thanks. I honestly wasn't sure how I felt about doing that, that was suggested to me by maybe people because, and I like this idea of tying it together and using kissing as an example of science that we can actually learn from and improve our relationships and understand ourselves and our partners a little better. So, I thought that would be a good demonstration of how to do that. But, I also didn't want to make it too *Cosmopolitan*, you know, women's magazine pop. And I felt that way about the whole book, it was very challenging to sort of try to walk the line between becoming too technical in my descriptions and there was a lot that I cut because I was just thinking, you know, are people going to get bored by this? Not everyone is interested in how neurotransmitters work and what ganglions are, and I didn't want to dumb anything down either. And so I tried to do my best with the time I had. But it was definitely more challenging than I realized it would be. But, that's a good segue to talk about the experiment, I think.

Ryan: Yes, yes I was, alright so the experiment is actually how I first found out about this project. I actually, you'll talk about it in a second, but I actually took the survey and have been following, following the progress ever since waiting for this book to come out. I've been waiting for this book since before I had a podcast to talk about it on, so, why don't you tell people a little bit about the experiment you put together.

Patrick: We have a podcast.

Ryan: Sorry Patrick, our, our podcast. You are all very special to me.

Sheril: I just thought to myself, you know, I wasn't trained as a writer. Everything I know about writing and journalism I kind of picked up along the way as I was blogging and doing articles and things. But I thought, wow, you know I have this

opportunity to write a book about science, but how cool would it be to, as I was saying at the beginning of the conversation, you know, bring readers along on the journey and talk about the process of designing an experiment and what it's like to be in a laboratory, what it's like to have your brain scanned and then, most of all, interpreting results. What kind of conclusions you can draw from some thing and what you really can't but the media often tries to do. And so after going through a lot of the literature I realized there weren't, you know, a whole lot of questions that were testable but hadn't been pursued so much involving kissing. I know a lot of scientists, I work with a lot of scientists and I am so, I love neuroscience and I just thought, well, we see these big gender differences between men and women, so with that in mind I was interested in, my hypothesis was, would we see a difference if we could at the brains of men and women and see how they responded to kissing. And Dr. David Havel at NYU who I already mentioned has this very, ah, amazing brain scanning machine called the Magneto-encephalography machine and it measures the magnetic current and strength and direction as it's moving through a subject's brain and so I said well, could we design something that uses the machine to look at people and something about kissing. But immediately I recognized that I can't put two people in the machine and tell them to make out because one, only one head fits in the machine and two, you can't move while you're inside. But we could show people photos of couples kissing and this was interesting on many levels. Initially just because we didn't know of any study like it at this time, but, in MEG experiments, typically, people who are inside this machine are only given a single face to look at and facial experiments and some thing that involves another person, an image of a person. So this was the first experiment that we at least know of where it was two people doing some thing. So that in itself adds an interesting dimension to the experiment. But, I could go on and on so I will be quick...

Ryan: Yes, the next question is how did you pick the pictures?

Sheril: How did I pick the pictures? Well, you know, my, I wanted to create my own taxonomy because as we were saying before, there isn't a taxonomy of kissing and I wanted to have different variables. And so I figured I would have three categories, an erotic looking kiss, a committed, sort of relationship looking kiss, and then a kiss that just looks friendly, you know, between two people who might be out somewhere.

30:08



And, ah, the easy way for me to collect them was mostly through searching the Internet which was very embarrassing at times because I did a lot of this in coffee shops where I was working at, and when you Google, like, two women kissing you get all sorts of things popping up on your screen that you are a little uncomfortable with. But I ended up collecting a lot of images and I also included same sex pairs because I think that's really important. Not everyone in the world is a heterosexual couple, and I think it's important to include everyone. So I picked up a bunch of pictures but I also thought it would be really cool to involve people in their research as well as, you know, my impression of a kiss that might look erotic could be someone else's relationship kiss. So I needed to know that I wasn't just picking these categories randomly. And so I set up a blog survey which I, I guess is the very one that you participated in, posting a bunch of these images and just asking people to respond by email, ranking the kisses if they thought they were erotic, committed, or a friendly kiss. And I wound up, through this survey, I thought I would be happy if I got 50 responses, I got like, well over 1000 coming in and I eventually had to take the pictures down because I had already run all my statistics for very, I got the significant values I needed to choose which photos to use and I couldn't stop the answers coming in because people re-posted these photos from other blog sites. And, ah, it was getting out of control in my inbox. But, ah, so I had these nine pictures and each picture was shown, there were 360 trials for a subject in the machine, so each image, each of the nine was showing to a subject looking at them 40 times, and we were just measuring the brain response to looking at each photo. And I expected we would see a difference between men's reactions in this machine and women because we had people from different ages, coming from all different countries, different sexualities, looking at them. And men tend to have a much stronger response because to visual, sexual imagery. Well, what we found was completely different and that was that images of same-sex couples kissing evoked a stronger and quicker response than opposite sex pairs. I don't know if this is getting hard to follow because I realize I actually did the experiment and I'm trying to describe it quickly. But, but the outcome of the experiment, you know, one that we expected was the classic case of how science works, you know, you can't predict how an experiment's going to go or it wouldn't be science. So what I think what was so important to talk about in the chapter is that you have to be careful about how you report the results because I didn't want anyone to read this book and come away thinking well, homosexual kissing is somehow inherently different than heterosexual kissing, because it's not and what the experiment probably reflected was something in neuroscience called the frequency affect. In your science experiments using an MEG, we would see a stronger response because

something isn't encountered on a day today basis as often as something, else. So in the language study for example if you heard the word cable you wouldn't have as strong a response in that person as if they heard the word, like, ibex. And most people who were in this machine probably we're seeing opposite sex kisses, male-female pairs, kissing on the street, kissing on film, a lot more regularly than male-male or female-female pairs kissing. So, probably, what we saw was an artifact, an artifact of that phenomenon. But it was really fun to do and I think it makes a lot more sense in the book, at least I hope it does. But, I love sort of taking readers along for the ride and we have that manuscript almost ready to submit and we're hoping that it ends up in an open access journal so ideally anyone interested in reading about the study it's self will be able to login and see it, read the results.

Ryan: Yeah, when it gets published you'll have to come back on talk to us about the results, in detail when everyone can read it open access.

Charlie: So that was...

Sheril: We have the manuscript pretty much done so it's exciting it's at this stage.

Charlie: That was some great detail and in depth science there but I wanted to lighten it up a little bit and I was thinking about the, the evolution of kissing and how it's probably very rapid in this age of highly sexualized advertising and Hollywood and movies all over the place. So I was wondering, A couple of questions, how do you think kissing has changed, say, in the last 50 years with the advent of modern media. Secondly, what's your favorite kiss from a movie. And, three, how do you think kissing is continuing to evolve, especially now that you are a scientist studying kissing and as you know there is no such thing as the independent observer so, by studying kissing you were actually probably going to change it ever so slightly, yourself. So, what's your favorite kiss?

35:00

Sheril: I don't know if I give myself that much credit. OK, let's see, if I remember all that, my favorite, well I have a few favorite movie kisses. You have to love the kiss in *The Notebook* but I also thought that it was a great kiss in *Brokeback Mountain* where, just so passionate, it's just such a great kiss. But then you can't not love *Lady And The Tramp* though it's really hard...

Charlie: Oh man, *Lady And The Tramp* is a good one.

Sheril: ...at least for me. *Lady And The Tramp* is a great one. And there's this wonderful movie, maybe you've seen it, *Cinema Paradiso* which has this wonderful scene of alternate kisses towards the end of the film that's really, really sweet. So, it might depend on my mood. In terms of how it's changing in the past 50 years or so, well, I mean, we export kissing, right? Like, kissing, kissing is a wonderful balance of a behavior that is both nature and nurture. So, we have this drive to kiss but it is so influenced by our culture and our personal experiences, what we are comfortable with and what we see day-to-day. And so in many parts of the world where may be kissing is practiced but not publicly, I mean, China and Japan, the Middle East, well the Middle East it's still pretty private but, especially in many of the Asian countries, because of, I think, culturally how much more present kissing is in the films exported by Hollywood and elsewhere that make their way around the world, younger couples are starting to kiss in public a lot more. And so I think we are just seeing the behavior becoming more acceptable than ever. Raising less eyebrows, raising fewer eyebrows, and so that's kind of interesting.

Charlie: Very interesting.

Sheril: But, kissing, kissing will continue to change. Some of the, one of the chapters I sort of glance at what the future of kissing might be and start talking about, well not just virtual, but of course there are things like Second Life where people are kissing through their computers, other avatars, which to those who don't use Second Life sounds very strange but it seems to be very popular in the virtual world. And there's video games, like, there's this game called Love Plus, a Japanese video game where there's not only love kissing their computer girlfriend, there is a guy who married his video game girlfriend in a ceremony that was publicly cast around the world via WebCam.

Charlie: I'm sure there's still a chemical response that he, that he had from the virtual kiss I suppose. Why wouldn't there be?

Sheril: Well, he had a strong connection, well, in that particular game by kissing her and he just had to tap her face with a stylus pen. But, I mean, people really enjoyed kissing, people are going to continue to find evermore ways to do it. Robotics, supposedly the first functional female adult companion robot debuted last year and

she can do also it's of things but she was created with a male audience in mind but they are making another robot for women and my question is, well if women are so much more focused on kissing and kissing is part of sex and kissing being such a valuable part of the connection with someone or you know maybe some thing, would his female clients request that there's some kind of kissing function. And is that, in fact, something that can be programmed? Probably not because there's so many other factors, do you know when you were kissing someone, you're up close and personal and so many other factors are involved then probably what robotics can control. But, you know, the world is changing every day so who can predict what things will be like with technology in the next couple of decades. But the biggest thing I think, the thing my girlfriends and I think some of my guy friends were most keen on as I was writing this book, was looking at the way the dating landscape is changing. As more and more people go online looking for love and it's kind of interesting when you think about it because here we have evolved these cues that we depend on. Like, being next to someone, recognizing how they smell, I mean it's not something we are consciously doing but it plays a big role in our response to them. And all the sudden when we're online dating we're taking almost all of those cues away, it's entirely visual and we're trying to assess someone via a photograph on the screen. And then we start looking at online dating trends people are often very dishonest about what they're really like in a profile. Women tend to say they are thinner, men tend to say they are taller. Ah, you know, women who are blonde or have long straight hair get more contacts then women with short hair. I mean they're all these strange things that push people to be dishonest and so when we are dating online, what are we missing out on that, might will be passing over someone who, if we were in the same room, might be an ideally suited partner for us. So, but at the same time, the dating pool is bigger than ever so there are definitely some benefits as well. It makes you really think how are we changing this natural way that we evolved to recognize good partners? Can we keep up with technology?

40:00

Patrick: Right. So, I've got a couple of quick questions. One is sort of dialing it back and I want you to talk about why the lips might be especially important and how we view somebody and how, why they might be important in, I don't know, why they might be especially sensitive to touch or other things. And the other thing I want to talk about is a study that we talked about on this show back a while where we

talked about going in for a kiss, left versus right and how the results of going in a different way might be surprising to a partner and might be a good thing or it might backfire.

Sheril: Sure. Okay, well, the first one, so our lips are just packed with sensitive nerve endings. So, as I was saying earlier, you know, the slightest brush is going to going to send chemical signals to our brain and help us decide what to do next and probably feel very good in most cases. But, why, why are our lips so attractive, why do they look the way they do? They are, you know, they're intensely alluring, they are different color than the rest of our face. Ah, one of the theories is, I spoke to V.S. Ramachandran out at UC Sand Diego about this, it may have to do with why humans are so primed to recognize the color red and it's not just on the face. I mean, human cultures often name red third after words for black and white in various different people from the world as they develop language, red seems to play this very important role. And so, Rama, well, Ramachandran thinks it has a lot to do with how important that color was as a signal for ancestors to find ripe fruit in the brush. I mean, red stands out, so those who could detect it we're probably most likely to find food first, you know, have that sustenance and survive and pass on their genes. I mean, there is a lot more involved and I don't mean to make it sound like it's just those stories but, he said that red is probably hardwired in our brains to get recognized, to get noticed. And overtime, that color signal, already so important for a food reward, became emphasized on parts of the female anatomy, on the genitals. And so we see, in so many primate species, when a female is in estrus she has a very flamboyant, very bright red posterior as a signal to all the men that, do you know, she, she is fertile. But our ancestors at some point sit upright and signals shifted, they were co-opted, and the buttocks kind of, the breast in women's bodies, and the lips, as zoologist Desmond Morris describes them, may be a genital echo, genital echo, sorry for mumbling. And so he says our lips are actually mimicking the texture, shape and composition of the female genitals and work as a sexual signal to the opposite sex. They swell when we are aroused, they are more plump, human lips are uniquely inverted compared to other species already but when a woman has a lot of estrogen her lips tend to be plumper so it actually is a somewhat reliable indicator of fertility. Although so many women now, I think, create the same look through means that aren't quite as natural. But, Desmond Morris actually even tested, you know, how, how is red such a powerful signal. He showed male volunteers photos of women wearing various shades of lipstick on their lips and the men we're consistently choosing the photos of the brightest, reddest, most I guess, aroused looking lips as the most attractive. And so, he has

this quote where he says, you know, "lipstick manufacturers we're actually creating a super labia" which sounds kind of funny when you think about it but there's probably a lot to that. And so, it's, it's one possibility at least. There weren't as many theories about lips and kissing in the literature, in the primary literature, as I would have expected. There are a lot of ideas floating out there on things like Wikipedia but...

Ryan: Well hopefully someone will use your book to go and correct Wikipedia.

Charlie: Right.

Sheril: I'm not one of those people who says I'm proud to use the university of Google, I mean that's ridiculous, anything and everything out of the Internet so you have to be pretty careful.

Ryan: Definitely, well that's why you went to the primary literature and when you went to the primary literature, so did they, what did you learn about which way people like to lean or tilt?

Sheril: Oh, oh, right, Onur Güntürkün, excuse me I'm mispronouncing his name, Onur Güntürkün, i'm probably pronouncing it wrong. There was a study published in *Nature*, where the researcher was interested in head tilt and so he went around to airports and beaches and public parks and he just took notes as he watched people kissing.

45:04

And they couldn't be encumbered by luggage, it had to just be a clear head tilt tilt. And you know it sounds a bit voyeuristic when you think about it, I was surprised that was in *Nature*. But it's kind of interesting end it opens up a lot of questions. And, anyway, in his results he reported that 2/3 of us I have a tendency to turn to the left, which does, I'm sorry, I said that wrong. 2/3 of us lean to the right when we go in for a kiss. And we don't exactly know why this is. He thinks it might be a head tilt preference that's developed in utero as an unborn infant is tilting its head back-and-forth. Some others have suggested this could have to do with nursing because so many women cradle their baby to the left when they are nursing which would

make the infants head turn up to the right as it's using it's lips so it's comforted and you know feels, feels very loved and this is something that develops later in life but it...

Patrick: I'm actually surprised, you know given the number of right handed people that it's not higher.

Sheril: Right, right. Well they don't seem to be correlated exactly.

Ryan: Yeah, I am a right turner but I am left-handed but I know that I turn to the right by default. Sometimes I go left and mix it up, you know, throw a curveball.

Patrick: Yeah. Yeah. Headbutt the girl.

Sheril: Yeah, I've actually...

(Crosstalk)

Sheril: ...that's the one thing I can no longer figure out which way I would naturally go because I have become more aware of the head tilt so I think I just, I mix it up too. But, they've done, there was an experiment on, I think I mentioned in the book, where they listed, they have people kissing dolls just to see which way they would tilt in a different experiment and it was still this 2/3 going to the right without signals from the other person. Because, you know, part of this might be explained by, well, it might have to do with what the first person is doing because it could instantaneously be accommodated by the other person. Like, if one person, you know, leans right and the other persons going to lean right and it happens, it looks instantaneous, but it's not. So, I don't really know but, some of the neuroscientists that I was talking to throughout the study, throughout the research had some really intriguing ideas of what you could do beyond this to test it. Like, you know, someone I spoke to in Chicago said maybe we could invite strangers and have them kiss and see if there are more head collisions. It hasn't been done but it would be interesting to do. I am not sure if there is an applied, an application for that research beyond just it's an interesting question, but it is an interesting question, why do we do it. And do we become comfortable with our partner and we wind up with a particular kissing style or is it something that we just seem to get right more of the time than we don't.

Ryan: I just hope they weren't using that new doll for the kissing head tilt study...

Patrick: Yeah.

Ryan: It wouldn't work.

Sheril: Oh, yeah, yeah. That was, that was the direction my research took that I wasn't prepared for.

Ryan: You can, you can leave that realm to Mary Roach, that's her...

Sheril: Yeah.

Ryan: I really wanted to make a joke about how your book had advice at the end which *Bonk* didn't. But, by the end of *Bonk* I was pretty much ready to be done reading about that stuff.

Sheril: Well, you know, I was starting to feel, as I was writing the book, first of all, you know, I never thought I'd be writing a book about kissing. It's not my background, it's a great topic, it's a topic that people are interested in and I did a blog post about it and it just sort of spun out of control and became very popular and a lot of scientists got involved in it and a book was born. But, you know I tend to be a bit bashful so, just, doing kissing at times would make me quite red in the face and I wasn't quite sure I was comfortable with it. And it wasn't until I happened to coincidentally arrive in San Francisco and be walking around the city and saw that Mary Roach was giving a book talk about *Bonk* at the time, where I was able to listen to, sort of, her experiences and the reaction she got, I got a lot more encouraged that if she go all the way I could at least get to first base and then I wouldn't be too embarrassed.

Ryan: Well, on that note, we have had Mary on the show before and she's great, so we were really excited to talk to you as well and get you're perspective on, on a different aspect of the human sexuality and spreading, and spreading real knowledge about that to the popular public. Which, there are a lot of, like you said there are a lot of sources out there spreading dis-information about chocolates and caloric intake but, it's good that you have a book...



Patrick: not to mention oysters and rhino horn and...

Ryan: I did a little oyster beer on...

Sheril: Sea cucumbers!

Ryan: That's true.

Sheril: A species I worked on in grad school, sea cucumbers, it's purported as an aphrodisiac and I was around, like, thousands of them and I'm pretty sure it's not.

Ryan: Well, it makes about as much sense as an oyster, I mean, that's a sea booger, you know, that's really, just, uuchhhghh.

Sheril: Yeah, I...

Patrick: It's a lot better than the sea cucumber.

Ryan: That's true.

Patrick: No, I am thinking of sea urchin, that's terrible. Sea urchin is terrible.

50:00

Sheril: Sea urchin, well they're...

Charlie: Sea cucumber is a pretty nasty thing.

Ryan: Yeah, I mean, sea cucumber, sea urchins are spikey, that's going to mess you up if you try to use that as an aphrodisiac.

Sheril: That's true. That's true. I think it might have to do with the fact but so much of the oyster and the sea cucumber are their gonads. Maybe because they are so full of gonads people think that has to do with fertility, I have no idea. So watch, someone will solve that one day and they will tell a story but, who knows.

Ryan: Well, I was, I thought it was Aphrodite, didn't she come out of an oyster shell?

Sheril: Ah, see, that's probably part of the reason too. That was really good, I didn't think of that.

Ben: Ryan.

Ryan: What?

Ben: It's because oysters look like female genitalia.

Ryan: That's, okay, that's...

Patrick: I guess every shell fish does if that's, except for snails...

Ryan: Every...

Patrick: They look like male genitalia, so, whatever, you can...

Ben: That's right.

Sheril: In that case sea cucumbers make a lot more sense.

Ryan: Yeah, yeah.

Patrick: Right.

Ryan: So, any sort of suggestively shaped mollusk, I guess humans will eat for, I mean, it really doesn't take that much convincing to get people to use something as an aphrodisiac. We're, most people are desperate, so.

Patrick: Yeah, yeah, I don't know why people are so desperate, it seems like it's...

Ryan: Just tilt to the right and close your eyes and get it over with.

Patrick: In another, in another six years or so I'll probably be...

Ben: We are the wrong demographic to be speculating.

Ryan: That's true, that's true. Well, Sheril, I think we've taken up enough time, enough of your time tonight but we do want to thank you again for coming and chatting with us for a little bit.

Sheril: Ah, thank you so much, this was fun and happy Valentine's Day.

Ryan: Exactly. Happy Valentine's Day to you, I hope it's a good one. And just so people know, they can go to [sciencesortof.com](http://sciencesortof.com) where we will have links to Sheril's blog, Sheril's website, you'll be able to, there will be links to buy the book on Amazon, I wrote a review which I put on the Paleo Cave blog so I will link to that review. And I think those are just about all the links you'll need. Any, any other topics that came up randomly I'll throw up links there as needed. So [sciencesortof.com](http://sciencesortof.com) is the place to go to get all the links associated with everything we talked about today. And thanks again Sheril.

Sheril: Alright, terrific, thanks!

Charlie: I know what I'm thinking about, I'm thinking about getting a nice, bitter kiss from lady hops with what are we drinking.

Music

Ryan: Alright, well as Charlie said, we all need an oral hop infusion after that interview and we are all going to tilt our heads to a certain direction and partake in a beverage. So, so let's go around the table. Charlie?

Charlie: I'm continuing the California IPA Tour and today I have the Mission Brewery IPA from San Diego County. It's quite delicious. It has two different hops, Cascade and Centennial and it's got a little malt, so it's got a little brown ale hint, so it might be an IPA that Patrick would enjoy too.

Patrick: Sounds good.

Ryan: What are you drinking Patrick, what are you enjoying if not Charlie's beer?

Patrick: Well, Valentine's Day, like, seems like the perfect day for a Spanish Red and that's what I'm drinking. Spanish Rioja, La Vendimia. It's a, it's a nice red, it's not too dry and it's got, I would say, lots of cherry and maybe, like, blackberry or something. So, not too bad for a fairly inexpensive red.

Ryan: Nice. Well, Ben, we know you don't have Valentine's Day up in Canada, so are you drinking anything special for this week?

Ben: We call it make out day.

Ryan: Make out day?

Ben: Yeah, yeah. And ah...

Ryan: Make out Tuesday like Pancake Tuesday in Britain but it's Make out Tuesday.

Ben: Ah, yeah, that's right. So, on make out Tuesday, I want to continue on with this malted theme. The Tiger malt didn't work for me last time so today I'm drinking Ovaltine, rich chocolatey Ovaltine. It's getting cold outside baby.

Patrick: It is cold up there in Canada I'll bet.

Charlie: It's important to have strong bones in the cold.

Ben: That's right.

Ryan: Strong chocolatey bones. Okay guys, I'm tired, I was tired of Ben out-doing us with his Chin Chin grass jellies and things like that.

Patrick: Yes.

Ryan: And I also heard that it was an aphrodisiac so I went out and bought myself a bottle of Kelpie Seaweed ale, ale brewed with seaweed.

Charlie: Whoa. Does it have, like, that savory taste?

Ryan: I haven't tried it yet. So, basically, it's, I've also been trying to expand my horizons and drink more foreign beers Mr. Ben Canada. So basically, the Scottish fields, the Scottish used to fertilize there barley fields with seaweed so the beer had this very specific taste. And they are trying to re-create that recipe by putting seaweed into the mash while they make the beer.

55:07

Patrick: Hmmm, how do they get the salt out of there?

Ryan: I don't know, but it's, the ingredients are malted barley bree, hops, and seaweed. It's a dark...

Patrick: Alright. Sip it up.

Ryan: ...dark ale. Let's see what we got here.

Charlie: Yeah so seaweed gives the umami taste which is like the savory, meaty brothy taste too in Japanese food.

Ryan: You know what I'm tasting kind of the salty sea-ness less than I tasted it with the oyster stout of a previous episode.

Patrick: Big surprise.

Charlie: Yeah, that, that oyster stout sounded like...

Patrick: Ah, it sounded kinda good.

Ryan: Distinctive malty...

Patrick: To me, to me.

Ryan: So, it's a very dark ale, it's got a lot of, kind of, cocoa...

Patrick: This sounds great.

Ryan: Oh, actually, mmm, oh, wow, the aroma is really coming through though. You're definitely, you're definitely getting some kelp in that. (Snif sound). Yep. Oh, yeah, that's like a beach in Santa Cruz, that's...

Charlie: Tastes like low tide.

Ryan: There's the aftertaste, yeah, that's an aftertaste. Alright.

Patrick: So, it sounds like you're getting 1.5, 2 star range here?

Ryan: Ummmm....

Charlie: Sounds like you're not getting a kiss tonight.

Ryan: Let's, let's see how it opens up when it warms. Let's see...

Patrick: Yeah, that should only improve.

Ryan: Yep, nothing... stewing in the sun.

Charlie: Yeah, all I know, low tide smells better on a hot day.

Patrick: Yeah.

Ryan: It's like, oh, it's like that, it's like, oh, yeah.

Patrick: Well, maybe we should go somewhere where there is no low tide. How about Cedar Rapids?

Charlie: Bam. Like that.

Ryan: It's like I just finished eating sushi.

Charlie: That's good.

Ben: That sounds good.

Ryan: Well, not like the fish part. If I was only eating the pressed kelp mashed part, what they wrap in.

Ben: That's good.

Ryan: Alright, that's fair.

Ben: I'd like that.

Charlie: It's vegan I guess.

Ben: You think they just kinda got lazy with this beer and they came back after a year and said "Oh god we forgot about that beer, oh, it washed into the ocean we better fish it out it taste like seaweed but maybe this..."

Patrick: It's marketing.

Ryan: I am suspecting you really don't know how beer is made Ben. Beer washing out to sea, we better collect it?

Ben: It's in Scotland...

Patrick: It doesn't grow on bushes?

Ben: The ocean regularly ...

Crosstalk

Ryan: ...like the idea of a brewer that just forgot he was making beer, like, oh, I stopped... I can't do a Scottish accent.

Ben: There's seaweed in this beer

Patrick: Loch...

Ryan: Loch...

Patrick: Okay, anyway.

Charlie: Well, speaking of egregious displays of naivety...

Music

Announcer: Hey Ya'll, it's Trailer Trash Talk.

Ryan: Tell us about *Cedar Rapids* Patrick.

Patrick: I will if I get the opportunity. This week, this week on Trailer Trash Talk, *Cedar Rapids*. *Cedar Rapids* is directed by Miguel Arteta and it stars Ed Helms of *The Office* and John C. Reilly as well as Sigourney Weaver and Anne Heche and others. The basic premise is that Ed Helms is an insurance salesman and he goes to a conference. Ah, he's never left his hometown so getting on a plane, renting a car and going to a big hotel, all a big deal to him. And it so happens that the conference is in Cedar Rapids Iowa. And there he runs into conference veteran, all around troublemaker and instigator of misconduct, John C. Reilly and hilarity ensues.

Ryan: Yes.

Patrick: I've got my opinion but let's go around the table and get somebody else's first. Ben what did you think? What do you think about America?

Ben: I thought that this, so, the main character, what's his name, the actor?

Charlie: Ed Helms.

Patrick: Tim is the character name but Ed Helms is the actor.

Ryan: He's Andy Bernard, he's the Nard-Dog.

Ben: That's, yeah, that's right. Do you think that he's been typecast as like a nerdy guy with a boring job?

Ryan: I think he has been typecast as a guy who exudes absolute sincerity.



Charlie: Yeah.

Ryan: Which, I guess a pretty...

Ben: ...boring thing.

Ryan: A vague typecasting but I think that's, he just get's casts as really sincere people.

Charlie: I think he'd be a fun guy to have around.

1:00:02

Ryan: Oh yeah, he actually can play the banjo, they are not thinking that when it's on *The Office*. I've seen him play. Oh and he's also missing a tooth.

Patrick: Oh.

Ryan: Like, in *The Hangover*, when he's like, when he wakes up with a tooth missing, that's really because he actually doesn't have a tooth, he wears a prosthetic.

Charlie: That's right.

Patrick: Hmmmm, a prosthetic?

Ryan: Yeah, a prosthetic tooth.

Patrick: Are they called prosthetic teeth? I'm not sure..

Ryan: Yeah, what would you call it?

Patrick: A bridge, I've heard.

Ryan: You know he can nash it, nash it with teeth... nash it with teeth.

Patrick False teeth.

Ryan: You can only nash teeth...

Charlie: False teeth...

Patrick: A denture, a single denture. You can, I don't know, that is not true, you can nash bony plates, you can nash any hard part in your mouth, they just, I'm not getting drawn into this, go ahead, Ben, what, tell me about...

Ben: Well, it was fantastic, I thought this trailer was great, lots of stuff happened, it looked like it was really fun, but I probably won't go see this movie because it doesn't look fun enough. I like John C. Reilly a lot though.

Patrick: He's Canadian you should know.

Ben: Is he?

Ryan: You don't know him? I thought he owed you \$20?

Patrick: I'm thinkin' he is. I thought, somebody Wikipedia John C. Reilly...

Ryan: The podcast goes quiet as we all type John C. Reilly.

Charlie: All I know is, while you guys type that I just want to say his character Dr. Steve Brule is my favorite TV character of the last year.

Patrick: Yeah.

Ryan: Stop drop and roll Dudley...

Ben: So, yeah, so I like John C. Reilly.

Ryan: He's, an Illinoisnian, he's from Illinois.

Patrick: He's Ill.

Ryan: Straight up Ill.

Patrick: That's practically Canada.

Ryan: You're really just trying to get that hate mail sent to Patrick@sciencesortof.com aren't you?

Patrick: It's just across the lake, it's not that big a deal.

Ryan: I think Canada is just across the lake from us.

Patrick: Well, it's true, it is.

Ryan: Well, alright. So, Charlie, what did you think...

Charlie: Ever wonder why ice cubes taste so boring? It's made out of water dummy. Put some juice in there, put that in your milk.

Ryan: This is the best assignment I have ever had because I love cool cars.

Patrick: Okay. Ben, Ben, are you going long or short on this thing?

Ryan: You're already going long or short, Charlie and I haven't even given our opinions.

Patrick: Well, we're going, well, one at a time...

Ryan: What!?! This is a, this is a format change.

Patrick: Ben's going to tell us...

Ben: Okay, I'm going...

Patrick: Alright, alright, alright.

Ben: I'm going short.

Patrick: Alright, never mind then.

Ben: No one's going to see this movie because it's February. Nobody sees movies in February.

Patrick: Okay, Charlie...

Charlie: Yeah.

Patrick: Too late for the Oscars.

Charlie: I'm a real big John C. Reilly fan. I liked him in several different movies and I like him most is Dr. Steve Brule on the *Tim and Eric Show* so I'm going long.

Ryan: Apples. They are good for your body, they are good for your mind, here have an apple. For your health, try some.

Patrick: Ryan Haupt! You are up next on Trailer Trash Talk.

Ryan: Alright, sorry Charlie, we are recording, um, I thought this looked really funny. I like Ed Helms in his sincerity. This looks kind of like, this is like the sequel to *Super Bad* when they all get boring jobs because life doesn't really work out and then they get to cut loose at a conference for a weekend. So that's where I see this, I actually, I don't know if this is something I, I feel like I want to see this in theaters, I probably won't get around to it. But it's at Sundance right now and I feel like a comedy that makes it to Sundance it's probably got something a little bit more than just being comedic going for it, it's probably got some heart there as well.

Charlie: Oh, you know it's going to get all sad at one point.

Ryan: I'm going to go long.

Charlie: Get all Shakespearean comedy.

Ryan: Yeah, I'm going to go long.

Patrick: Yeah, so, I see it as, like, I mean a little bit of *The Office* I guess, just, probably because Ed Helms is in it I'm not sure it would remind me of that otherwise. *Step Brothers*, it's got some *Step Brothers* mixed in there with John C.

Reilly man-child.

Charlie: That was good.

Patrick: Yeah. And then, what was the George Clooney flick where he is flying around...

Ryan: *Up in the Air*.

Patrick: Yeah, *Up in the Air*, yeah, a little bit of *Up in the Air* thrown in there. That's where the heart is going to come in I guess at some point. All these lonely travelers with no, no homebase, no place to feel...

Ryan: See, I always saw *Up in the Air* as...

Patrick: ...centered...

Ryan: As an adult *Fight Club*.

Patrick: *Fight Club* was an adult *Fight Club*.

Ryan: Well, *Fight Club* is a, is an angst, is a boy, is a movie for, like, angsty young men, it's not for people who have embraced adulthood, I don't think. It's about embracing adulthood, but I don't think that's the message that gets through. I might, I should do a blog post about about why *Up In The Air* is an adult version of *Fight Club*.

1:05:13

Patrick: Didn't, yeah, I guess you should, because I, I am not seeing it. Um, what did we just talk about that was, as being like, the juvenile version of *Fight Club*?

Ryan: *Calvin and Hobbes*.

Patrick: Yes, that's right. I guess we didn't talk about it, you blogged about it.

Ryan: Yeah, I wrote an article on iFanboy, about my study in stripes after I finished *Calvin and Hobbes* and cried.

Charlie: *Black Swan* is like a dark, messed up version of *Fight Club* which is saying something.

Ryan: Yeah, I heard, *Black Swan* is basically *Fight Club* with ballet.

Patrick: Which is, yeah, sure, why not? Men fight and women dance, okay. *Fight Club*.

Charlie: Men do too. Dude dance-off.

Ryan: Sometimes...

Patrick: Dance-off.

Charlie: People challenge each other to dance-offs. It can happen.

Ryan: A walk-off. It's a walk-off.

Patrick: I guess men, like, ballet was, men were the central characters until the 1800s, I guess and then women started taking over. Ah, yeah, thumbs up, thumbs down, it's tough I'm not the biggest Ed Helms fan, I am a big John C. Reilly fan. I think I'll go long. So is that two long, two short? What just happened there?

Ryan: I thought Charlie went long. So three long, one short.

Charlie: I went long. I really like John C. Reilly, I couldn't even really like see the trailer, all I could see was him.

Patrick: Right.

Ryan: But what if, what if John C. Reilly and Danny McBride made a movie together, Charlie?

Charlie: Ah, I would go bankrupt and lose my job because I would just watch it over and over and over again at the theater.

Ryan: Nice.

Charlie: Until I ran out of money.

Ryan: Alright.

Charlie: That's that.

Ryan: That was that.

Charlie: That's my kryptonite right there.

Ryan: For your health.

Patrick: Alright, well if you were wondering what we are talking about when we say long and short, we are buying and selling, ah, pseudo-securities on the Hollywood stock exchange which is at [hsx.com](http://hsx.com). You can go to [hsx.com](http://hsx.com), sign up for an account, get some free money, fake money, buy and sell movie securities that are tied to how the movies do in, at the box office in real life and join our league, the Science sort of League. Yeah, that's basically it, so we will look for you there. But, some people prefer not to interact with us on the Hollywood Stock Exchange, but prefer other media, like email, voicemail, comments on our blogs and web pages, etc. And we call that the Paleo POW.

Ryan: POW!!!!

Music

Ryan: So, as Patrick just mentioned that the Paleo POW is the segment of the show each week where we do some feedback, because a lot of times you guys give great feedback that makes us feel warm and fuzzy on Valentine's Day. But it also often times leads to more science discussion and illuminates topics we might not have considered or clarifies things from the perspective of the non-scientist and

those are all valuable additions to the show and we feel like it's important to highlight those. So, with that in mind, We'll let Charlie, Charlie get us dug-in for the long ride.

Charlie: Alright, so our first, Paleo POW is an email sent to, sent to paleopals@sciencesortof.com. And it is in response to a, a Trailer Trash Talk that we did a week or two ago regarding mountain top removal mining in West Virginia. And Kimberly writes "Perhaps I interpreted you all wrong, but mountaintop removal is a huge problem in West Virginia. I did a service project there while I was in college. We were in a small town whose name escapes me right now. The people living there came to speak with us as we discussed ways to get clean water to them. One man spoke about his daughter's fight with ovarian cancer, she is only eight years old. She drank the towns water that had been compromised by the sludge pools left over from the removal and she, along with several other children, are very sick with life-threatening forms of cancer. After my experience, I do not take mountain top removal very lightly. So many people are uninformed, I just wanted to throw out some of this information to you guys. I think it's important and I'm hoping that your fan base will think it's important as well."

1:10:10

And she continues in a second email, "Forgive me but I would like to add this as well. Several of the mountain tops can be used for wind energy. In fact, there are several environmental organizations fighting to have wind farms established. The altitude is perfect and a change over to a more environmentally friendly form of energy will benefit the state economy and the health of the people living there. Thanks for allowing your fans to add their opinions. Thanks again, Kim." Alright, so, first off, we love feedback, we love corrective feedback, positive feedback, negative feedback, or just feedback that adds to our discussion on the show. And this is, these are all excellent points that Kim makes. We also agree that mountain top removal mining is incredibly environmentally destructive and compromises the health of everybody in the vicinity of these actions. When we gave a thumbs down on the trailer of the documentary that was documenting mountain top removal we were only criticizing the trailer itself. We were not trying to defend the practices of mountaintop removal but the trailer in itself was criticizing. I don't know if you, you guys have anything to add?



Patrick: Ah, well yeah, I specifically remember saying that you know it's going to be tough to get rid of coal as an energy source for the United States and for lots of other countries in the world that are highly dependent upon coal. But I remember saying in that episode that I hoped that we as a country could commit finding another way to get our coal other than mountain top removal, which was obviously a poor choice.

Ryan: And I remember the people in the town from that documentary seemed ready to embrace alternative energy but I know having lived in West Virginia, that West Virginia, because of a propaganda campaign, from big coal, is not ready for that. There are people that refuse the notion of wind farms on West Virginia Mountain tops simply because they don't think wind farms would look nice. And the alternative argument that, well, neither does mountain top removal, doesn't seem to bother them because it's more likely that if there are wind farms, the wind farms will be visible whereas mountaintop removal tends to be out of sight, out of mind. So, it's a long, it's going to be a long battle to get West Virginia a place that is geothermal, wind farm friendly before it's coal friendly, coal is such a huge part of the culture and identity of the state, they're not gonna give that up, you know?

Charlie: The transition to alternative energy resources is fraught with several hardships. Nine of those hardships we discussed back an episode 51 so you guys can check that out at the website [www.sciencesortof.com](http://www.sciencesortof.com). We are all for alternative energy, it's just going to be, it's going to be a transition, it's going to be difficult to wean ourselves off these, easily acquired fossil fuel resources.

Ryan: Yes, especially when there are groups actively, groups with a lot more money pushing against that change. I mean, there are billboards, you drive to West Virginia and see billboards that say "EPA bureaucrats are trying to steal West Virginia jobs", basically saying if the EPA stops mountain top removal, they are hurting West Virginia, so.

Charlie: So, Kim, thanks, thanks for the email, thanks for the awesome feedback and we are happy to share the opinions of our listeners with the rest of the show and the Paleo Posse, so...

Ryan: And thanks for going and helping a town in West Virginia, that's awesome. I appreciate that...

Patrick: Yeah.

Ryan: ... but, things, things would definitely be better if we had fusion, fusion reactors, right Ben?

Ben: Oh yeah. So, my Paleo POW, comes from a dude named Cam from Santa Cruz and his email goes like this: "Hi, I am a 16 year old aspiring scientist from Santa Cruz California and I have been more and more deeply delving into the mysteries of plasma and how said plasma cooperates with electric magnetic fields, for the overall goal of producing energy. In other words the cold war's tokamak reactor. I recently read Ryan's Marvel article and the realness and possibility of Iron Man and I am curious about what you know in this field of science and what you're willing to tell me. Any valid information is excepted and in the future I hope to perfect this abandoned Cold War project. Many thanks, Cam." So, Cam, we can talk a little bit about tokamak reactors. The idea is, kind of, how should I put it?

1:15:00

So, if you have a bare electric charge, like an electron or a proton, and it's in a magnetic field environment, these protons and electrons will just kind of spin in a circle, magnetic field lines, okay? So they kind of move in little circles them, that explains why you end up with Northern Lights in the North Pole and the South Pole, but not around the equator, incidentally. And so, one idea here was that you could take hot ions, or, so, an ionized gas. So, protons, electrons of hydrogen and...

Ryan: They have to be decoupled, they are not in...

Ben: That's right, they are in a plasma. So if you take one of these gases where all of the electrons have been knocked off of the protons, you call that gas a plasma.

Ryan: Not the same thing as blood plasma.

Ben: No, different. Much different guys. Then, then you put that in a magnetic field, then the particles in the plasma gas will be forced to follow the magnetic field lines. And so the great insight was that if you make a big donut shaped magnetic field line, then all of the different charges will be stuck going into a circle and they won't be able to expand outward or inward. And so the idea here was you take, this hot,

hot ionized gas, this plasma and you put it in one of these toroidal, donut-shaped magnetic fields, and then you shrink the magnetic fields. So, so here's an analogy. So let's say, imagine that you could get power from having lions fighting each other if you had enough lions in a dense enough cage and then, so you put them in this donut shaped cage and then shrunk the radius of the cage small enough so that they had to fight. Then you could extract energy. And so what happens is the density and the heat and the pressure in this plasma, inside of a tokamak reactor is so high that the nuclei begin to fuse with each other and turn into helium nuclei and that produces energy. It's not cold fusion, it's hot fusion and you can generate energy that way. The problem with this is it takes a lot of energy to confined the magnetic field into a doughnut shape especially a donut shape that small. Too much in fact, it always costs more energy, so far, in terms of any tokamak that anybody's built, to make the energy, the magnetic field lines small enough to fit inside that doughnut. It always takes more power to do that then it does, then the power that is generated through the fusion. So, I mean, they have working tokamaks, they just don't, they don't have energy producing ones, ones that produce a net amount of energy. I hope that answers your question, it's certainly interesting, I encourage you to keep on studying. Physics is a lot of fun.

Ryan: And the reason we kind of let Ben tackle that one was because when I wrote those Iron Man articles, I used both Ben and Jacob as resources because they helped me out with a lot of ideas and a lot of just back-and-forth conversations that happened about these things and we basically decided that Tony Stark being the tech wizard that he is, not only built the Arc Reactor at Stark Industries, as a giant tokamak, but was able to miniaturize it down to fit inside his chest without killing him. Our basic working premise was that if Tony Stark has a superpower is the ability to take things that should barely fit in a single room and put them in a boot or in his chest or in a helmet and that is his super power.

Charlie: Well, we've got some more Paleo POWS. We done got some more Paleo POWS to get to.

Ryan: Yes sir, getter done.

Patrick: Chaw on.

Ryan: To chaw on.

Charlie: Chaw on.

Ryan: Um, yeah, sure, I'll go.

Patrick: Alright, yeah, sure.

Ryan: I'll go next if that's okay Charlie.

Charlie: This campfire ain't done yet.

Ryan: So, I have a Paleo POW from super fan Sarah and she crocheted a three dimensional Brachiolope, little, like plush toy thing.

Patrick: Which is her Facebook profile picture at the moment.

Ryan: It is her Facebook profile picture at the moment and Ben and Charlie haven't seen this yet so I'm going to send it to them because I love getting the live on air reactions. She also wants us to come up with a name for him. So she does referred to it as a him so we have a gender identity for this little brachiolope, so we just have to come up with a name for him and, I mean, the goal is to basically get her on a mass production line because this thing is adorable and I want to take him home with me.

1:20:05

Patrick: Amen.

Ryan: So, we need to come up with a name for this guy right now.

Patrick: Ah, let's see.

Ryan: Horny Little Foot. What? What's wrong? What is it? What's wrong with that? What's wrong with that?

Charlie: Where's the picture?

Ryan: I just forwarded it to you.

Charlie: Where, on my email?

Ryan: Yes, on your email!

Charlie: Finally, it showed up. Jeesh.

Ryan: I'm sorry...

Charlie: Speed of light. Speed of light. I'm disappointed in technology.

Patrick: Clarence.

Ryan: You goin' with Clarence?

Patrick: Clarence.

Charlie: Oh, that is amazing!

Ben: Whoa, holy crow, look at that! That's amazing! Wow, nice work.

Patrick: Are you looking at Clarence there, Ben?

Ryan: I don't think we're going to, I don't think his name is Clarence.

Ben: I think I'm looking at Diefenbaker.

Charlie: It looks, it reminds me of a tadpole or a pollywog, so I'm thinking Brachiowog.

Ben: It reminds me of a very famous Canadian prime Minister during the Cold War, John Diefenbaker. Looks just like him.

Charlie: Nobody, nobody gets that reference.

Ben: It doesn't matter, it's a great name for a great brachiolope.

Patrick: Approximately 4% at one of our listeners get that joke.

Ben: The others should learn more history...

Ryan: You and your statistics.

Charlie: It is by far the cutest brachiolope I have ever seen.

Patrick: And Ryan?

Ryan: I'm...

Patrick: You still sticking with Horny...

Ryan: No, no, no I'm abandoning Horny Little Foot, that's weird.

Patrick: A little bit.

Ryan: Hmmmm. This is tough, it's hard to come up with names for fake animals. I mean I already came up with brachiolope, that was hard enough. I'm tired.

Charlie: This is, this is a brachiowog.

Patrick: Did you? I...

Charlie: Particularly fascinating about it is displaying antlers at such a young age and so it's, the brachiolope apparently grows antlers at a very young age whereas other species don't begin to grow antlers until they reach adolescence.

Ryan: I'm going with Barnabas L. Openheimer.

Ben: Barnabas L. Openheimer huh?

Ryan: Yep. Barnabas L. Openheimer, III Esquire.

Patrick: I know you are just wanting somebody to ask what the L stands for so...

Ryan: Lopez.

Patrick: Alright, well, Sarah hopefully you can pick from those choices.

Ryan: Yeah, we should have mentioned is that Sarah is the one that gets to decide which name actually, actually gets, I will email these names to you Sarah so you don't have to run remember them and write them down.

Ben: Sarah the thing that you need to know is that in Canada there's a Cold War, nuclear, nuclear fallout shelter and it's called the Diefenbunker, named after Diefenbaker.

Ryan: Is that where you keep recording from and why your connection is so bad?

Ben: That's right, the Diefenbunker. You gotta name the thing Diefenbaker.

Ryan: Alright, well, thank you so much Sarah, this is incredible. We're going to put him up in the Brachiolope gallery for all to see and hopefully when you get your Etsy store up and running the orders will come pouring in. So go to [sciencesortof.com](http://sciencesortof.com), links in the show, we will link to the brachiolope gallery but it's also in the left hand side of the site.

Charlie: I think Ben's connection is a little shoddy because I am convinced he's one of the physicists in *Primer* and so I don't, he may not even be in the same time as us and so, the connection is a little weird.

Ryan: Fair enough. Well, Patrick what are you bringing to the Paleo POW tonight?

Patrick: Ah, I have a piece of criticism from Kate. And Kate writes us an email that says "Why the extreme gender imbalance?" That's the subject. She goes on to say hey guys, she really likes the show but she "can't help noticing that the only woman she ever hears does the intro to the show and the Trailer Trash Talk intro and the outro." She says we've had one guest on since she's been listening and that was the show where we have the Wienersmiths on as a couple, science couple, science-ish, science sort of, couple. And she's gone through some of the show notes for our interviews page, one of the other, and it looks like we've had six women guests in 70 something episodes. She points out that the gender imbalance in science is

pretty bad but she thinks it's not as bad as our particular show seems to indicate that it is. She points out that her particular department is about 20% woman in terms of faculty and more in terms of grad students. She wishes we had a woman host but, you know, gives us a pass in that we have to have a good rapport with her, with our fellow host, and says you know if we don't have a good rapport with any women scientists then that is what it is.

1:25:08

She goes on to point out that we were recently asked to give a male our opinion on what a good drink might be to impress a date. I can't remember if he told us that that date was a male or female. But we assumed it was a female and in fact we said to impress a "girl" and she would like to point out that she thinks someone dating is not really a girl anymore and it's a woman.

Ryan: Wait, so we were quoting his question, the question was "if I go on a date and want to impress a girl, what drink should I get? PS, I don't really like beers or ciders. Any other drink I could go for." And the question from anonymous so it could have been a female asking.

Patrick: It could have been a female, yeah. I guess.

Ryan: We did make an assumption on that one.

Patrick: Yes. So she's hoping to hear from more women. Well, you know, so I hope you're happy to hear a woman scientist interviewed on this show. As far as girl goes, you point out that you know, maybe that's an unconscious sexual bias. I admit, I certainly call any woman my age, or younger, a girl. I guess, the older I get, the older girls get.

Charlie: Yeah, I mean, language is a tricky thing, it changes with locality. I mean, first off, I totally agree. We need more women on the show

Patrick: Sure.

Charlie: I mean, hands-down. Like, there's no question about that. The girl thing, I mean, I call everybody my age a kid still.



Ryan: Yeah.

Charlie: I'm pushing 30 and I call everybody a kid. I'm like, you kids want to go to the bar, and you know, kids shouldn't go to the bar and kids don't go to the bar. We are all pushing 30, but that's just a colloquialism and so I think that's what we were doing with using girl instead of woman. I mean, it's just my own mind when I say woman I think of my mom and her friends or something. It just doesn't work for me, so...

Ryan: We're just trying to make ourselves all feel young.

Charlie: Yeah, I think that's what it is.

Patrick: Possibly. I certainly say, use a boy in the same context.

Charlie: Yeah, likewise.

Patrick: I'm really likely to say guy or boy than man, so.

Ryan: Sure.

Charlie: Yeah.

Patrick: Yeah, but, you know maybe her point...

Charlie: Man sounds weird.

Patrick: Her point was that it subconsciously ingrained in our...

Charlie: Yeah.

Patrick: ...so maybe it is, I don't...

Ryan: Well, it's also, we are a casual, conversation or so, you know. We just speak on the show the way that we that we speak and we don't try to, we don't try to speak more intelligently and this shows seems to warrant which isn't very intelligent, or, I guess, it isn't very formal.

Ben: Ryan, dig up, dig up.

Patrick: All right so I actually made some notes about how to respond to this. My first point was that yes we are aware of the gender imbalance and we work to get more female guests when we can. My second point was that your quick assessment of how many women we've had on the show was possibly a little biased because you say seven females in 70 episodes.

Ryan: She said six.

Patrick: Okay, we counted up and came to seven right, I think, Ryan?

Ryan: Eight if we include tonight.

Patrick: Okay. Anyway...

Charlie: That's just being kind of pedantic anyways.

Patrick: That comes out to about 10% which would be worse than, say, the average science department, I guess. But I would like to point out that we an interview every show. So if you figure we only do an interview in half of our shows, I'm not even sure we do an interview and half of our shows, but if we did, that would be seven females in 35 shows or eight if you count tonight which would be the 20% mark which you set for, which your department faculty achieved. While not equality it's a little better than what you gave us credit for. Also, we don't get paid to do our show, we don't do it full-time, we do the best we can and if you are going to ask us to get more females on as guests, you know, please send us a recommendation of someone, of a woman we can get on the show and why they would be a good interview rather than just pointing out the fact that we have more men than women on the show. But, you know, thanks for listening and we appreciate the feedback. But I would like to close by saying we are aware of the gender imbalance, we work to get more women on the show and please send us some recommendations, thanks.

Ryan: And if you would like to send us a recommendation you can do so by emailing [paleopals@sciencesortof.com](mailto:paleopals@sciencesortof.com) or if you want us to hear your voice you can call our voicemail line and that's a lot of fun. We've actually been getting some voicemails

but this week we are running a little long so we are going to save those for, soon, I guess is the best...

Patrick: Soon...

Ryan: Save for soon. But if you wanted to call us you can call 312-Paleopals and that's 312-725-3672, that's how you reach us. You can leave your name and number and where you were calling from, no, don't leave your number, that's weird.

1:30:03

Don't, don't leave your number. Give us your name, where are you calling from, your question or comment, your concern, your critique, whatever it is you want to say, you know. Tell us what you're cooking for dinner tonight, tell us what you drinking it would be fun, tell us what you drink while you listen to the show. Even if it's a cup of tea or something, that's great and we, and we are excited to hear about it. You can also do iTunes, right Ben? Right, Ben? Right, Ben?

Ben: iTunes is fantastic, please leave lots of reviews especially if you live in Canada.

Ryan: Yes, and if you live in Canada you can also join our Facebook page which you can find at [Facebook.com/sciencesortof](https://www.facebook.com/sciencesortof). And we also have a Twitter page at [twitter.com/sciencesortof](https://twitter.com/sciencesortof). We are all on Twitter, we are all tweeting at highly variable degrees and we also have the Paleo Cave blog. But, the fact of the matter is that all of this stuff is easily accessible through [sciencesortof.com](https://www.sciencesortof.com). If you go to [sciencesortof.com](https://www.sciencesortof.com) you will see the show notes, episode 73, as well as show notes for all of our episodes which will have links to the stories we talked about, links to the people we talked about, we will have links to all of Sheril's stuff including her website, her blog, links to the book, links to my review of her book, all of that is available in the show notes as well as the brachiolope gallery. More information about us, more information about how to connect with the show and become involved, affiliate links and all kinds of fun stuff.

Patrick: Yeah, right on.

Ryan: Science sort of, it's your one stop window shop for science.

Patrick: And sort of.

Ryan: And sort of. So that was this week show. You got any closing thoughts guys? How are you doing, how are you doing over there? It's Valentine's Day, let's show the love. I love you guys.

Patrick: I am feeling the love.

Ben: Sort of.

Ryan: Okay, so, Ben is done. Ben is done with love.

Charlie: He still keeps science in his heart though.

Ryan: He does keep science in his heart.

Patrick: Yeah, especially on Valentine's Day.

Ryan: Yes.

Ben: That's right.

Ryan: That's all for this week, thanks for joining us for episode 73, I Heart Science. We will see you next week for episode 74. Will be sure to bring you a whole lot more science...

Patrick, Ben, Charlie: Sort of.

Announcer: Thanks for listening to Science sort of. Our show notes are available at [sciencesortof.com](http://sciencesortof.com), which will have links to all the stories we talked about today. You can follow us on [twitter@twitter.com/sciencesortof](https://twitter.com/sciencesortof), you can get in touch with us at [paleopals@sciencesortof.com](mailto:paleopals@sciencesortof.com) or on our Facebook fan page. A great way you can support the show is by subscribing to our feed on iTunes and writing a review so other people have a better chance of finding the show. And if you have a friend you think might be interested, tell them to give us a try. That's all for this week. Thanks for listening, and see you next time on Science sort of.

Music

Ryan: Need a minute Ben?

Patrick: Go left, go left.

Ryan: Give him a kiss.

Ben: Alright.

Ryan: Gutsiest move I ever saw man.

Charlie: Yes.

Ryan: Did you get the reference Charlie?

Charlie: Hell yeah dude that's the best movie ever made.

Ryan: Best movie about volleyball ever made.

Charlie: Yeah.

Ryan: Alright, improving international relations Ben, thanks.

Transcriptions provided by Denny Henke of [Beardyguycreative.com](http://Beardyguycreative.com)