Beth Bamford:

Research is really important because by definition, it's the only way to get new knowledge. There's so much that isn't yet known that it's just a cool time to be in science.

Cole Cullen:

Well, I think at the end of the day, what really gets us out of bed in the morning is just the curiosity, trying to understand things we didn't understand the day before. Welcome to Reach, the podcast that tells the stories of researchers,, their studies and how their work impacts you and the world you live in. I'm Cole Cullen.

Beth Bamford:

And I'm Beth Bamford. In this episode, our last of the season, we're going to talk about how your job affects your family, inequities in special education, and the climate change to be. When I get home from work, I'm thinking about things that I didn't get done at work, the meetings that I had.

Cole Cullen:

Probably checking emails.

Beth Bamford:

Oh, checking emails. I really want to just be present for my family. I don't want to be thinking about work.

Cole Cullen:

I have a longer commute, so I actually have some time to shift gears from work to home, but sometimes it's not long enough and sometimes I'll bring a bad day home. Well, it turns out if you bring a bad day home, that can actually affect the family.

Beth Bamford:

You may remember a Dr. Orfeu Buxton from the family episode. Dr. Buxton is from the College of Health and Human Development, and he was part of the Work, Family, and Health Study. He is going to talk about how a parent's work schedule affects the family.

Orfeu Buxton:

The Work, Family, and Health Study was a major initiative of the National Institutes of Health Centers for Disease Control and Prevention and National Institute of Occupational Safety and Health, and those groups came together to try to frame better interventions around flexible work. In particular, the goals of the project were to reduce work-family conflict. This conflict is a stressor. Sumi Lee published a paper on the daily antecedents to sleep and stress, and we examined how sleep and stressors interact. We saw that work-family conflict as one stressor along with a sense of time inadequacy for oneself such as for exercise or a time inadequacy with a child. All those three stressors influence sleep, and sleep influenced each of those three stressors. We collected daily diaries in about 100 workers, and what we found was that the stressors of work-family conflict, time inadequacy for child, and time inadequacy for self delayed sleep onset, meaning it took them longer to fall asleep, and that seemed to happen on a daily basis.

Those stressors did not influence sleep duration or quality. In turn, sleep duration and quality, but not sleep latency influenced the occurrence of the stressors the next day. So on days after people had shorter sleep than their usual or poor sleep quality than their usual, they were more likely to experience stressors the next day. That takes a moment to wrap one's head around, because you usually think of stressors as in just influencing sleep. But in this case, we saw sleep influencing the perception and occurrence of stressors. And so that's one possible mechanism whereby not sleeping well one night leads to the next day having more stressors.

Cole Cullen:

It almost sounds like it could be a snowball, because if you had a stressful day because you didn't get to sleep the night before, it might affect the night's sleep, so where does it ever end?

Orfeu Buxton:

That's one dirty and messy rocky snowball. In another paper by Katie Lawson, we also saw that positive work experiences come home. And their adolescent children of the mothers in the Work Family Study can detect their mother's mood, whether it's more positive, whether it's more negative. And if you compare notes on what the mom said about positive or negative work experiences during the day and the child's report of their mood when they got home, the parents, or the moms in this case, positive work experiences influenced youth health. They have more positive affect, less negative affect, fewer physical health symptoms, and longer sleep duration and better sleep quality. The opposite is also true in that study. More negative work experiences in the parent, the kids can tell and their health is affected. They have a worse mood and affect, more physical health symptoms, shorter sleep duration, and poorer sleep quality. This is the bringing work home. We want to bring home just the positive ideally, but work has a big role in adults' life, not only in the adult stress and health and sleep, but the kids mood, affect, stress, and sleep.

In the Work Family Health Study, we designed over several years a workplace intervention that we rolled out in two corporations at 56 different work sites. The intervention was really to teach managers, to train managers first, to be aware of and appreciate their workers' work and family needs such that they could assist one day with reducing the work-family conflict in those workers. These weren't suggestions. This was a randomized controlled trial. We had some sites where they just went about their usual practice and we collected data in half the sites, and the other half of the sites got this intervention that intervened on managers' practices to have them use greater family-supportive supervisor behaviors, and then how to change the culture of work to be more focused on the results, introduce schedule flexibility such that people could attend to their non-work responsibilities.

This had a variety of other components, but the key ones included increasing the culture and structure of work around schedule control where possible to allow flexibility for workers to work when and where they need it. We saw a couple of striking things. In the case of sleep, we found that a year later those employees were sleeping longer and reported being less sleep deprived. Their sleep was more sufficient a year later. To have a one year sustained effect in a randomized controlled trial is a pretty big deal. We also saw that they had less work-family conflict and less of the stress from this work-non-work conflict. They had better positive affect, more time for exercise, and more time for their children with this flexible intervention. They took this flexibility, made use of it, and felt better for it.

Susan McHale was the lead author on a separate paper that then examined their children. I mentioned before how toxic work exposures can go home with the parent and have negative effects on their children. Well, the flexible intervention at the workplace compared to a control group in an intent to treat randomized controlled trial, the youth in the intervention employees group had shorter sleep

latency, they fell asleep easier, they had higher sleep quality, they had reduced variability in their sleep so that it became more regular. It didn't influence their sleep duration, but it had multiple beneficial outcomes in the children of the parents randomized to the intervention. So it's possible to change our workplace culture and have it affect not only our employees but our employees' children.

Cole Cullen:

Correct me if I'm wrong, but it seems like you've spent your career doing the sleep thing and it's cool, but it's the connection to the family and what sleep and your study does to affect a family that really gets your juices flowing. Is that fair?

Orfeu Buxton:

I have several lines of research and I'm not sure that I am able to pick a favorite. I think the parenting is very practical and impactful. And I have two teenage sons, and we work hard at parenting. And we understand that this is a struggle and it takes a long time, and you have to be at your best all the time. And keeping in mind that sleep is a key part of that, being better for everyone is focusing. And sleep as a priority just can make a family function better in a whole bunch of ways, especially with children or teens who might otherwise be pretty cranky and causing a lot of negative vibes. Just prefer not that.

Cole Cullen:

Cranky teens. Do you know anything about cranky teens, Beth?

Beth Bamford:

Yes. I have one, one cranky teen in my house.

Cole Cullen:

And we have two cranky teens and a 12-year old who will be a teenager in just a few weeks, so-

Beth Bamford:

That's three, Cole.

Cole Cullen:

That is three teenage boys. Yeah. There will be plenty of cranky to go around.

Beth Bamford:

Not limited to teens.

Cole Cullen:

Not limited to teens. Exactly. Our next story comes from Dr. Paul Morgan of the College of Education. He's going to discuss his findings around special education inequities.

Paul Morgan:

I try and understand what happens to children over time as they move through school and how we can better help children, especially those children who might be at risk for having disabilities or maybe struggling academically or behaviorally in school. When special education was starting as a field, there

was an observation made anecdotally that many of the children who were being identified as having disabilities were racial and ethnic minorities. If you look at the general US school age population, about 14 percent of those children are black or African American. If you look at the percentage of children who are in special education who are black or African American, it's about 20 percent, and that disparity or differences led some to infer that the way that schools identify children as having disabilities may be biased. And that has led over time to concern that we don't want to be misidentifying children as having disabilities who don't have disabilities. Of course, we don't want a situation where we're saying kids don't have disabilities who do, and we want to be particularly sensitive if there's racial bias in the way that children are being identified.

Prior studies really had not investigated for the potential of bias appropriately, so we attempted to do so using large scale nationally representative data that includes individual measures of children's achievement, their behavior or the family's socioeconomic background, other characteristics of the children, their parents, their schools. We approximated this contrast between similar situated students. And what we found when we did so is that contrary to the general conventional wisdom and the emphasis in federal legislation of policy, that instead if we looked at children who were otherwise the same observationally, that students who were white were far more likely to be receiving special education services than children who are racial and ethnic minorities or those from non-English speaking households. And the magnitude of the disparities are quite large. We're talking a difference of 60 to 70 percent in relative odds of being identified as having a disability and so receiving services. We've now replicated these findings again and again and again across, at this point, about a 40 nationally representative samples.

It's a very robust empirical finding, and it also is consistent with a good deal of reporting in public health, where public health researchers have found that amongst otherwise similar children, children who are white tend to be identified as having health conditions including disabilities, and receiving treatments for those conditions more often than children displaying the same symptomatology who are of color. So for us, it's suggested that there are inequities in the system, that these services which are quite costly for schools to provide, that these services are tending to be given to what might be characterized as more traditionally advantaged children and their families.

Cole Cullen:

According to your studies, according to what you found, if you have a child of color standing beside a white kid, from what you found, why is the white kid a little more likely to get the necessary services?

Paul Morgan:

Why that is? That's a good question. Our data don't allow us to really report on the mechanisms. Now, there are many mechanisms that have been advanced because this problem has again been reported in other fields. In public health, it's been reported that pediatricians and other health practitioners tend to be more responsive to English-speaking and white families, that they solicit developmental concerns from white English-speaking families more often. Minority families often report difficulty obtaining services including health services for their children. Health clinics, pediatricians who might be the first to identify a child as having, say, autism, a speech language impairment, or another type of disorder, access to those providers may be more limited in minority communities.

Cole Cullen:

I would imagine that this is a touchy subject.

Paul Morgan:

It is a touchy subject.

Cole Cullen:

And so I want to ask, I mean, are you saying it's more about money and language challenges than color of someone's skin?

Paul Morgan:

Not every disparity is evidence of discrimination. Children who are black in the US are about twice as likely to have asthma as children who are white. Now does that mean that pediatricians in the US are racially biased in how they diagnose asthma? What turns out to instead be the explanation is that unfortunately, children who are black are much more likely to be exposed to the environmental risk factors for asthma, and as a result, more likely to be diagnosed as having the condition. So it's not so much a question of racial bias. It's more a question of social class inequities that are disproportionately experienced by children of color. The context may matter also in terms of the likelihood of disability identification.

Another potential explanation is there are great differences in schooling and school resources. On average it costs schools about twice as much to provide special ed services as it does general education services. If you're in a more advantaged school setting, a better resource school setting, your academic difficulties might be noticed more readily than if you're going to a less resourced school where academic difficulties are more common. Something that kind of ties into this, there's a lot of reporting of unrecognized disability in the juvenile justice and adult prison population where kids are functionally illiterate and never got any kind of extra help. And you can make an argument that boy, if you don't know how to read and no one's helping you, what are your long-term employment opportunities? Probably pretty limited. To me, it's an issue of social justice than inequity in terms of making sure that we have a level playing field in terms of who's getting care and support. You want every child to have as much opportunity as possible.

I'm trying to conduct research that I think arrives at what we think is the quote right answer. Not the accepted answer, but the true answer. We've had research coming out that's really conflicted with kind of the conventional way of doing business. I feel like we've conducted the research rigorously, and it's maybe not the final answer, but it's an evidence-based answer to the problem. That's an answer that I think is important for us to know, and I want to know it not based on my anecdotal evidence. I want to know it on the basis of some kind of scientific investigation.

Beth Bamford:

Our final story features Michael Mann from the Department of Meteorology and Atmospheric Science.

Cole Cullen:

Dr. Mann was in our climate change episode talking about a very specific part of his research. He also had a lot of good things to say about climate change in general and kind of the social aspects and the political aspects around it, and we felt it was an important message to share.

Michael Mann:

I was sort of a science nerd growing up. Went off to UC Berkeley to double major in Applied Math and Physics, then followed up by going to graduate school in Physics at Yale University studying theoretical physics. Ultimately decided to move into a different field, into the field of climate modeling.

Cole Cullen:

You gave up theoretical physics?

Michael Mann:

Absolutely.

Cole Cullen:

That must've been a hard thing to-

Michael Mann:

Well, it's funny, because it led me down a completely different path that I never would have envisioned and certainly would not have pursued if I'd stayed in theoretical physics, a path that has led me to the center of one of the more contentious issues that we deal with today in our politics, the issue of climate change. And so people sometimes ask me if I could do that over again, and if I came to that same fork in the road, would I make the same decision? And indeed I would, even though it's not what I had set out to do. Being in a position to inform the larger societal conversation about climate change is something I consider myself privileged to be in a position to do.

Cole Cullen:

The study of climate science I'm assuming was not as a hot topic issue or as an attractive subject to go after when you decided to go that direction, is that fair to say?

Michael Mann:

Yeah, it was emerging, I would say, as an issue not just in science, but an issue that had political ramifications. This was back in the early 1990s when I moved, when I switched into geology and geophysics and started studying climate science. This was a time when there was still a somewhat of a legitimate debate within the scientific community. There was not yet a consensus among the scientists that we had seen, that we could detect, observe now the impact of human activity on our climate. There's this unprecedented change that's taking place today, an unprecedented warming of our planet, and by implication it probably has to do with us. And over the next four or five years is really when the science progressed to the point that we were able to conclude that rather decisively. And that of course made climate change an even more contentious issue politically, because the science had deep implications for matters of policy.

As the science has become more decisive, the political and sort of the public discourse over climate change has become, forgive the pun, more heated, more contentious. And that is indeed because the science of climate, which indicates that we're warming the planet and indicates that this is already having some damaging impacts on us and our environment, the implication of the science is increasingly clear that we need to move away from our reliance on fossil fuels for energy. And of course there are powerful vested interests, namely fossil fuel interests who understandably are very pleased with our addiction to fossil fuels, and they'd like to see things stay that way. And so it's become a very divisive issue in our politics. We see that now today in the form of the first president of the United States who

literally rejects the science of climate change, who has dismissed it, as many of us have heard, as a hoax perpetrated by the Chinese.

That's unprecedented, and the fact that we've reached that point in politics speaks to the deep partisan divide that now exists on the issue of climate change and what to do about it. And you know, it's funny, because we often do frame these discussions in terms of belief. And there's a wonderful statement that was made by the great science communicator, Neil deGrasse Tyson, who has said that the great thing about science is that it's true whether or not you believe it. And that's important, because in today's politics, people have always felt entitled to their own opinions, right? But we've now ventured into a world where people feel entitled to their own facts, and that makes it very challenging to have the worthy discussion slash debate that we need to have about what to do about this problem. It's a worthy debate in our politics about how do we go about solving this problem, and there's a role for conservatives and progressives at the table in debating those solutions, but we can't have that meaningful and very important debate until we can get past the fake debate about whether the problem exists.

On the other hand, we are seeing some forward movement when it comes to the partisan politics of this issue. The shift isn't just with the Democrats. In the most recent climate hearing of the House Science Committee, the Republicans on the committee did not contest the scientific evidence. That's a positive development even in an environment that might seem oppressive right now when it comes to matters like climate change.

Cole Cullen:

I'm an average guy. What can I do? What can I do to help not destroy our planet?

Michael Mann:

Yeah. Anybody can make a difference. Simply talking about this issue, making sure that it doesn't become something we can't discuss in polite company out of fear of offending. We have to talk about this problem. It's the greatest threat that we face as a civilization. And that's not me, that's our national security leaders speaking who have pointed to climate change as a great threat multiplier. It's taking existing tensions and amplifying them. We have to talk about it. We have to hold our policymakers accountable, and that means voting for politicians who will be willing to do what's in our interest rather than the bidding of the special interests.

There are lots of things that we can do in our daily lives that reduce our carbon footprint, and in many cases, these are things that... We call them no regrets. They save us money, they make us healthier, feel better about ourselves, and they decrease our carbon emissions. Driving a electric vehicle or using public transportation or bicycling to school or work when you can, being more efficient in our use of resources, recycling. And therein lies the rub. There are all these voluntary things that we can do, but to achieve the sorts of mass changes in collective behavior that we will need if we're going to bring our carbon emissions down, we need an incentive. We need a price signal, as the economists would say. Faced with two equivalent choices, most people will make the choice that's more favorable for the planet.

We need policy that incentivizes a shift away from fossil fuels towards renewable energy, and does that take the form of a carbon tax or a cap and trade system or explicit subsidies, incentives for renewable energy? There are all sorts of creative approaches that we can discuss, but the bottom line is we need policies that lead us all in the direction we need to go. I have to say, I find it sort of odd and a bit distressing, but also amusing when someone like Bill Gates says, "We need a miracle in order to solve

this problem." We don't need a miracle. We've already got it. We've got renewable energy, we've got wind, we've got solar. It's out there. It's just a matter of incentivizing and scaling up that technology.

Cole Cullen:

We are nearing the end.

Michael Mann:

You mean of the interview?

Cole Cullen:

Yes.

Michael Mann:

Maybe I was a little too gloomy in my depiction of the problem.

Cole Cullen:

No, actually I'm kind of... I don't want to say I'm surprised, but you aren't gloomy.

Michael Mann:

The reality is that I am genuinely optimistic that we'll tackle this problem. We've done it before. We've faced adversity, this country. The mobilization to win the second world war, the space race, we've done this before. We've never been a country that says, "Oh, we can't do this," And I don't think that's going to be true here either. I think we will tackle this problem. And part of what gives me inspiration, optimism is the voice of the young folks. They're coming out now and asserting themselves and taking hold of the narrative. If they don't speak up and act out, they lose an opportunity to try to preserve their own future.

And so I am inspired by these young folks who are demonstrating. They are taking politicians to task, they are marching, they are demanding that their parents act on this problem, and they're demanding that we vote on this issue in future elections. They can't vote yet. They don't yet have the reins of power, so they need us to represent them and their future in the actions that we take today to make sure that we do not mortgage now the planet for them and future generations.

Beth Bamford:

Thank you for listening to Reach. And a special things to Drs. Orfeu Buxton, Paul Morgan, and Michael Mann.

Cole Cullen:

And don't forget all the episodes of Reach can be found on our website. Please consider making a contribution to WPSU so that we can bring you content like this. Visit wpsu.org/donate. Thanks.