Transcript of American Scientist Podcast

Lily:
Can art and science work together to help humanity tackle some of its overwhelming problems, such as climate change? I'm Lily Pinchbeck, an intern multimedia reporter for American Scientist Magazine. You're joining us today for a podcast based on a talk cohosted by American Scientist with Dr. Jennifer Landin, an associate professor at North Carolina State University in the Department of Biological Sciences. Landin is interested in the importance of art and visuals to communicate scientific ideas, and especially in using art as a tool for environmental education. In this podcast, Landin explores how art can be the right "tool" to stimulate emotion in a way that science is less suited to do. In doing so, Landin argues that art may be crucial for changing our behavior in the face of climate change. Landin begins by explaining the similarities between art and science.

Jennifer Landin:

So many people think that art and science are two opposite ends of the spectrum. For me, though, they're almost identical. Both engage creativity. If there's a scientist out there, you know, that research design is really incredibly creative. And both science and art require a focus on detail, and the power of observation. Both use mathematics and expertise in a set of skills in the use of specialized equipment, both intensely focus on concepts or subjects with the goal of thoroughly understanding them and communicating that knowledge. And both are seeing a shift toward community involvement. So this piece is a snow drawing by Sonia Hinrichsen. And it was produced by the coordinated efforts of volunteers just as citizen science does for research projects.

Lily:

Here Landin shows an image of a birds-eye view of a complex sprawling web of detailed spirals drawn in the snow. She goes on to explain what she sees to be the key difference between art and science: emotion. She will reference Sonia Hinrichsen's snow drawing as an illustration of the countless connections and overlaps between art and science.

Jennifer Landin:

I think that the main difference between art and science is that science tries to remove emotion from its process as an attempt to limit bias. Art on the other hand, actively tries to engage in emotion, to bring in a personal relationship; there are benefits to both.

There's a saying, use the right tool for the job. The job in this case is solving some major environmental problems. Science, and scientists have done and are doing a lot of important work in this field producing knowledge. But I think it's time to think about switching tools, and

start working more intentionally with artists because it's long overdue to engage people emotionally with these issues.

I like this image because I think it's symbolic of this idea. While we're on separate paths, there are tons of connections and inner-woven parts between art and science. The end product is dizzying and complex, but it's so much cooler and much more rewarding than two non overlapping lines.

Lily:
Landin studied forestry and vertebrate biology. She has had both art and science jobs——she has been a medical researcher, mural painter, graphic designer, and scientific illustrator. She went on to get her PhD in science education, focusing on drawing as a tool for learning biology. She then created and taught a class at NC state about biological illustration, choosing to teach it as a science class. Landin explains what teaching her class taught her. She has found that an artistic depiction of a natural object can sometimes have more impact on the viewer than the actual object alone.

Jennifer Landin:

There are two major things I've learned from teaching this course. One is that pretty much anything in the natural world is astonishingly complex and amazing when you slow down and look at it closely.

This detailed complexity, according to psychology researcher, Dr. Keltner is a component of awe; an emotion that I'm beginning to focus on in my work and ecology and environmental issues.

Art can be life changing. My students say things like, I'm seeing the world differently now. Or there's so much detail in the world, it makes my days much more vibrant. I hope you agree that there's a lot of emotion in this language. Even though I'm only teaching facts about natural history and comparative anatomy, the world is such a phenomenal place that my students and I can't help but feel in awe of it. And that has been shown over and over again in the research. When people are exposed to nature and look closely, it inspires awe.

The second thing I've learned by teaching this course is how engaged people are with my students' work. These pieces are so phenomenal, so impressive. But they're pretty much just reproductions of the specimens my students are observing.

So these illustrations start with this complex, intricate, natural subject. And then that's combined with the effort and energy and skill and time of human creation.

It becomes something different, more beautiful, and more human.

A relationship forms between the illustrator and the observer, something more than the relationship between the specimen and the observer. I think it's because there's a story in these illustrations.

I think a lot about the creation of visuals, how to teach observation and visual communication, and how art and visuals influence what people think.

Lily:
When coupled with science, art reveals science's inherent complexity and beauty. In doing so, this pairing can be inspiring and even life changing. Through art, scientific findings and specimens become more human and engaging. After explaining this power that science illustrations can hold, Landin explores what scientists and artists can use this power for. She explains that art may be the perfect tool to educate and mobilize people in response to climate change. The impartial, factual nature of climate research can be offset by art to spark real behavioral change.

Jennifer Landin:

Environmental problems are not really complicated. Every species uses up its resources, every species creates waste. Our species is exceptionally good at it. We are the cause of our environmental problems. But that also means that we can be the solution through understanding and our behaviors. And our species is unique in that aspect: We can understand what we're doing, and we have the power to change. For those people who don't know what we're doing, that's easy, we can spread information, both art and science can do that. It's the behavioral change that is harder to manage.

For example, we know that wearing a mask prevents the spread of disease. But getting people to do it is so much more complicated. That's because there are other aspects involved, emotional aspects of identity or community status, maybe embarrassment or fear. So dealing with problems is uncomfortable. Nobody likes to do that. And certainly making changes in our behavior can be difficult because of habit. Or it may even make us feel isolated from our friends and family or insecure because the outcomes due to this change are uncertain. We have to make facing problems and really learning about them pleasant. And even more importantly, we need to make change rewarding.

Science, with its intentional removal of emotion, has a hard time with this. But art, there you go. We are bombarded with thousands of pieces of information every moment, we need emotion to determine which pieces of information are important. To actually like a little gateway in your brain, you have got to have a bit of emotional engagement in order to pay attention to it. And so that emotion affects attention, which then impacts knowledge, learning and memory. Likewise, I've noticed from teaching this biological illustration class, that knowledge changes our level of attention, which can then impact our emotion. So it can go both ways, the emotion impacts our knowledge and the knowledge can impact our emotions.

When my students or I learn about the organism we're drawing, that knowledge makes an emotional impression. We come to love our subject, even if it's an insect or a tiny plant or a marine worm.

Many researchers have looked at the effectiveness of facts in information versus emotion in changing behaviors. These studies have ranged from topics of smoking rates or alcohol consumption, to nutrition, communicable disease, social media and technology, and driving behaviors. Over and over and over again, the findings point to the ineffectiveness of facts to change minds or behaviors. As a teacher that hurts, but I also know that it's not quite accurate because education level is a major predictor of healthful behaviors. So facts can influence people, but generally only if they're repeated many, many times. So, if we want that influence on behavior, there has got to be multiple, multiple exposures. Unfortunately, most of the American public is not engaged with environmental topics, especially not consistently for multiple exposures over time. Only 30 percent of people in a 2010 National Poll thought climate change was a serious problem, and only 12 percent passed an energy literacy survey.

Recently, I've been reading a lot about emotion as an impetus for positive behavioral change. I was inspired by a program I observed that uses a lot of emotion in its pro-environmental messaging. When I started my observations, I expected to learn some new approaches for teaching in a nontraditional, out-of-classroom environment. And I did get a lot of those helpful skills and tools, but I really started reflecting on emotion that can positively influence our relationship to the natural world. So the first emotion I focused on was awe. Research into awe in behavioral shifts only really started in the past 10 to 15 years. So far, the research indicates that awe of nature can influence behavior by shifting the scale of our own importance. When we're exposed to the complexity or grandeur of nature, the view of ourselves gets smaller, we become more humble. Then that humility leads to more prosocial behaviors like crediting outside forces for our success and helping each other and making more ethical or generous decisions. There's a lot done by psychology researchers, most notably Keltner, Stellar and Piff. My favorite study had these research participants look up at this impressively tall stand of trees. Or they looked up at an impressively tall building for one minute. Then the researcher accidentally drops a box of pens. The participants who were looking at the trees picked up more pens on average.

The other emotion I've become interested in is empathy. Research here is much more sparse. There's just starting to be some interesting findings coming out of medical schools. In the past decade or two medical schools have started incorporating art studies. As a matter of fact, Yale medical school now requires it. So at first, this was to teach future doctors about potential art therapy. But then a bunch of really well-designed studies came out about how studying art can build observation skills, and improve the ability of doctors to diagnose many conditions. Now, researchers are just starting to look at the ability of art to build empathetic connections, like reading a patient's eyes to determine their emotional state.

Lily:

Because of the power of emotion, art is able to affect behavioral change, and it can help us retain information. Landin explains the neuroscience behind why emotions can help us learn.

Jennifer Landin:
There are multiple areas of the brain but there's a lot of focus on the amygdala, that if you're trying to learn something new, you kind of have to trigger that spot, or multiple related spots, in order for the information to kind of be captured because it has to be important. And so importance is an emotional response, that this is valuable, this is needed.

Lily:
Throughout this podcast, Dr. Jennifer Landin has addressed how visual art allows people to connect emotionally to scientific findings. She has explained how crucial art may be in getting us to modify our behavior in the face of climate change. Let's hear her final words on the pressing need for emotion and visual art to be in collaboration with science.

Jennifer Landin:
I focus a lot on art and emotion in this talk. I love science. And I don't want to dismiss it. It's incredibly important at helping us understand our world. And in creating new knowledge and predicting outcomes. It's important to remove emotion and bias as much as possible when we're trying to understand something outside ourselves.

But at a certain point, we know the big picture. And we know the outcome if we do nothing. At that point, we need to hand that information over to the artists and the storytellers and the culture keepers. These are the people who will influence others to make a needed change. And we are at least 35 years past that point when it comes to environmental issues like climate change. Ecologists know that our current interactions with our environment are more frightening than most nonscientists would ever believe. We know the projected outcome is not good.

At this point, it is a cultural problem. We are missing a personal connection with nature and even more importantly, we're missing our value of that connection. But we have to realize, especially with COVID, how much our society can shift in such a small amount of time. If we want to act, we can, if we want to learn, we can. As scientists, we need to actively seek out culture keepers to help us. And as artists, we need to start emphasizing this content in our work. We all need to work together to make this change we so desperately need.

You've been listening to a podcast from American Scientist, published by Sigma Xi, the Scientific Research Honor Society. This podcast was produced from a talk given at American Scientist's virtual seminar series, cosponsored by Sigma Xi, Science Communicators of North Carolina, and the North Carolina Biotechnology Center. I'm Lily Pinchbeck. Thank you for joining us!