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What is STEM Identity? An Interview with Dan Kahan

On October 9, 2017, John Besley, the Ellis N. Brandt Professor of Public Relations at Michigan State University, interviewed Dan Kahan to understand his thinking and work on the topic of STEM identity. Dr. Kahan is the Elizabeth K. Dollard Professor of Law and Professor of Psychology at Yale Law School. Dr. Besley conducted the interview as a member of the Center for Advancement of Informal Science Education (CAISE) task force on evaluation and measurement.

A video of Dr. Kahan's interview, as well as interviews of other researchers, is available at InformalScience.org/identity.

Tell us how the projects you work on address the concept of identity in science.

There's a range of projects that my research group works on. Some are standard—I'll call them lab studies—and then others are field studies. And so the way in which identity plays in the research sort of depends what we're doing. We have a study recently, for example, on how people would form understandings of the best science for Zika and why it's here, what it can do, and what might be in the future, some of the things we need to take on in medicine to try to control its effects with vaccines. And there we used measures of people's cultural worldviews. These are scales of people employed to try to make sense of differences in risk perception and different reactions to science communication. And that's pretty uniform and standard. But like I said, we also do some field work, and there we have scales that are more fine grained and better tied to the project. So we do work, for example, with science documentary producers. They want to know whether the product is something that's going to satisfy people who like science documentaries. So we've come up with measures of what people's science curiosity would be. They might be similar to the ones we do in the lab, but they're more fined grained and focused. Same thing with advising public decision makers in places like Southeast Florida, [we] tailor them (i.e., not off the rack, but more tailored).

For the Cultural Cognition work, how does the cultural cognition measurement deal with the concept of what constitutes identity and how that fits?

I have a pretty broad understanding of what identity would be. And it's any kind of affinity group of which the members are connected, as often unconsciously as consciously, by their adherence to some sort of distinctive set of values that then will systematically shape the way that they assess information about science. If I don't know a lot about the group, then I'm probably going to start with the kinds of measures that I described at the beginning with the cultural cognition ones.

And what kind of questions does that include?

Well, it's really a 2-dimensional scheme. One of the dimensions is how individualistic or communitarian are you? Do you think that people should take care of themselves without assistance or interference from a collective, or do you believe it's part the job of the collective entity to secure the well-being of individual members and kind of roll over anybody who is in the way? And then there's another one, hierarchy egalitarianism—how do you respond to different kinds of authority? And those do a pretty good job. They're measuring dispositions that figure in risk perception for people generally. So if that's what we're doing, people generally will use those. Then the other ones tend to have more elements to them. They're taking more into account, more about where they live or what their ethnicity is, what the incomes might be and so forth.

Would somebody who is hierarchical versus egalitarian be more or less risk averse?

Neither, necessarily, because I think, although we're studying risk perception, one of the premises is that there isn't any abstract preference for risk. That these are very domain-specific kinds of outlooks. And even within them there might be differences that would defy any kind of an account of what's a risk preference. But if we look at, for example, the hierarchical and individualistic respondent, especially if one is a white male, then he's going to have very different ideas about how dangerous guns are from somebody who has egalitarian, communitarian values. For the hierarchical individualist, the gun is kind of a piece of equipment, especially if you're a man. They enable certain kinds of hierarchical roles, like being father, provider, protector. They symbolize certain kinds of individualistic virtues, like self-reliance, self-integrity, and honor. Whereas the egalitarian, communitarians, see ownership of a gun as kind of denigration of collective identity, collective engagement with other people's welfare. You're gonna do it on your own. It's kind of more against the law, against all. And then there are also associations between guns and various kinds of outlooks like patriarchy that they're skeptical about. So people have these values. In our work though, we're studying how does that influence assessment of information about risk. Do people tend to fit their assessments of risk to their values? What's good is as a matter of morality shouldn't be what's bad for society. What's base isn't going to be helping us out—a kind of dissonance avoidance strategy on top of the values at that stage.

So that approach to thinking about people's identity, how do you see it as different than others' ways of dealing with it?

Two principal differences, and one has to do with the method. And I've described that in a lot of the scholarly work we do that if it's for the general public we will use these culture measures. There are other people who have different kinds of value measures but probably are doing the same thing. They have the same idea that people will process the information in a way that's congenial to their identity measured with other kinds of variables. Those could be right or left ideology ones, for example. Or they could be some other kind of scheme that is at least related to the one we use, but is different. So that's one distinction, like how do you operationalize the identity of people that's motivating them to reason in a certain way. The other is just a difference in construct. Maybe even a different kind of problem that they're thinking about. The personality measures are pretty different from what we use, so things like the big five. There, people aren't thinking so much about people in groups, they're thinking much more about just an individual personal attribute. They don't need to worry about whether that has a kind of providence of group membership, and maybe even that would complicate things. But certainly the personality measures are very different. They're doing something different from what we're doing.

In the science education literature, they talk about the idea of having identity as a scientist or as somebody who is part of a scientific community or somebody who could do science. Any sense of where that would map on?

I think that there are a couple things that are relevant in thinking about that and the relationships to the work that we and others might be doing on public risk perception or on science communication. One is that the people involved might be using a different kind of reasoning process if they're in a professional domain. So professionals, whether it's science documentary producers, or scientists. We did a study on judges and lawyers versus the lay public. They might have a way of assessing information that avoids many of the kinds of confirmation biases and dissonance-avoidance strategies that we usually look at in our work when they're in their own domain, but then when they're not in their own domain they're very likely to display the kinds of things we're talking about. And we've done the research I mentioned on judges and lawyers, and that's what we see there. If they're in domain, they think like a lawyer, which is very distinctive, but they still have the same kinds of reactions and information about risks. So that's one thing to think about with the STEM people. The other is like whether, in fact, being somebody who is involved in the study of science furnishes you with some kind of habits of mind that generally work against these group kind of dispositions and maybe they do. I think I would say that there are certain kinds of individual differences that are relevant to this effect. And then those might be correlated a bit with being in the sciences. And maybe that's too abstract, but we studied science curiosity, for example, and science curiosity, I think, it's connected to an alternative identity that people who are members of these groups can have. But it tends to mitigate some of the effect. So I think more science curious people who are doing STEM and becoming "science geeks" so you would try to figure that out. But for sure I've seen work that shows that people tend to have

very domain-specific immunity to these kinds of effects. It's not that they're different kinds of people reasoning in a different kind of way generally.

At AAAS last year, you gave a talk on science curiosity. Can we talk a little bit more about how you think the concept of [science] curiosity might be related to the concept of a STEM identity and why that's important?

Well, I would say that this disposition we measure with a scale for science curiosity, it seems to predict that people will have a kind of resistance to motivated reasoning. At least when people are in a domain in which what they're trying to do is enjoy science knowledge for its own sake, they're reasoning very differently from how they would reason outside of that domain and how others who probably aren't as interested in science reasoning, even in the domain of watching a science documentary. But there is this relationship between being curious about science and not showing as strong a degree of the motivated reasoning as people who are moderate or low in science curiosity. That might actually be an influence that works within the STEM field or within professions that use that kind of science. But I don't think it's connected specifically to the identity of scientists. We see lots of people who are only modest in their abilities to comprehend scientific information who still have very high levels of science curiosity. Here's something: The principle of perplexity. Every time you think you've gotten some data that helps you answer one question, there is a conservation of complexity so that you have at least one more question that you realize you don't have any answer to, and so you're getting to this. I'm not sure what the relationship is between science curiosity and going into the STEM programs. But if it does motivate people to do that then they're going to have this resistance. But it might be just because they're curious people, not because they happen to be scientists.

I can imagine that there are people who are curious about science who are not scientists. But I can't imagine somebody who is a scientist who is not curious. Really, there's a quadrant.

Well, maybe. But maybe they just have a kind of narrower scope, too, for their curiosity. I'm just conjecturing that there are people who are going to trip up if they're trying to do conditional probability problems who aren't very adept at recognizing that when you have covariant essential kinds of reasoning tasks for science can still have high science curiosity that they can still enjoy just the spectacle, the kind of awe of people using scientific reasoning to solve these kinds of problems. At the same time, it isn't the case, at least when you look at a general public sample that everybody who can do the conditional probability problem blindfolded or detect covariance from 800 meters, they just don't care. They're not really interested in science that they're good at, that kind of stuff. But then it doesn't translate, at least in the kind of intrinsic interest in science that we're trying to measure. So how it's distributed among scientists would be an open question. Give me a sample, I'd love to find out.

We've talked about measurement. And we talked a little bit about the cultural world views. So this introduces three things. Because there's this question about intersectionality and how things overlap.

Actually, that's a very relevant and interesting question because we oftentimes see interactions between the world views and other kinds of characteristics. So somebody who's a hierarchical individualistic, it will matter a lot whether that person is white and whether the person is a man. There's the white male effect which everybody's probably familiar with that suggests that white males are just less concerned with all manner of risk than minorities or women. But it turns out that that's a little overstated. That the effect is being driven almost entirely, at least in the domains in which people are measuring this, by white men who happen also to be hierarchical and individualistic. You can control for their values, than people who are egalitarian, you don't see the same effect. And so I think it's the identity itself has something to say about how people should behave and think based on their gender and their race. So that's really quite interesting.

One thing that's not on this question list, but I think is important for understanding your perspective, is the question of when people choose to use a particular identity, and those factors that make it more or less likely that someone might draw on one identity versus another.

Well, people do different things with scientific information. One of the things they might do is just either cherry pick or read it in ways that are supportive of the kinds of factual claims that have become identified with their cultural view. But at least some of those people may have something else that they do in their life that involves using science to guide them in making accurate decisions. And there's a literature on this. And so you have characters like scientists who don't believe in evolution but still study it or use parts of the evolutionary theory in their work. Maybe they're doctors looking at things like genetic propensity to diseases. Well, in effect, and this is work by a man named Solomon Hameed, they think one way about the theory of evolution when they're at work where they use it to be good doctors and another way about it at home being good Muslims, and where that role is enabled by a certain kind of skepticism. You have a similar thing that seems to be going on with farmers who are extremely skeptical about climate change but probably use climate change science more than any other private sector or group especially would. And then there are too, like I said before, things that are probably extensions of this, and they all fit together in some way. But people who are in different domains using their habits of mind in ways that are distinct, the habits of mind they would use to think about science in a setting in which their group identity is more salient. Like their cultural identity is more salient. I would say it's really an important thing to study how the different kinds of reasoning styles interact. Is it the case that people who have a cultural world view have different attitudes about science when they're in their science-use domain? I think everybody has that to some extent. But it's easier to observe and think about when it's somebody who has a professional domain.

The ones you talk about were contextual ones that come with workplaces or different parts of their life. What about in the more broad—you've also written about the broader communication environment. Things that communicators do that might lead me to—

Well, I think that everybody—people have these world views. They probably figure out what science knows actually in part through the contact that they have with other members of their groups. All of these groups have people in them who know a lot about science. They all have means of transmitting that knowledge to their members. And obviously if there was a group out there that consistently misled its members about what science knows it probably would be at a real disadvantage in perpetuating itself against other ways of life. So most of the time, the kind of contact that people have with their group probably helps them to figure out things that they aren't in a position to figure out by themselves. And also they're not every day talking to scientists about these things, they're talking to the people they know. At the same time, there can be a kind of a pathological version of this mode of science comprehension if the identity that people share in that group becomes entangled with some position and that's at issue in science. Then you're making them choose between behind who they are and knowing what science knows. And if you put them to that choice, then people are going to resolve it in favor of being consistent with other people who share their identity. And so you get kind of stuck in that way. That's something you should try to avoid happening, and if it does happen, fix it.

Can you give examples of times that science communicators sort of pushed people into . . .

Well, sure. I think actually it's quite interesting to try to imagine cases where things could have gone either way. But the HPV vaccine is a great example. It's the only childhood vaccine, universal childhood vaccine, that the CDC hasn't made onto the list of vaccines that are routinely required as a condition of school enrollment. And the reason is is that it went through a different sort of process from every other childhood vaccine. It's introduction to the public was through democratic politics because science communicators, but mainly private interest, initiated a legislative process to consider the risk and benefits of the vaccine. In all the other cases it's been administrative and so people are learning this information really only at the point where they're going to be using it from somebody who's a professional like their doctor. So that's a good example of how the science communication environment, which is just the sum total of cues and influences that help people align themselves with the best scientific information, was distorted and denigrated. And I don't think intentionally at all. I mean, nobody could have wanted that. But at least by a certain amount of recklessness and opportunism by certain science communicators, maybe professional ones but maybe too some who are just parts of different professions, i.e., market-driven versus the professions. Everybody made that mistake to some extent.

What about in the case of climate change?

Yeah. And I think something like that happened at some point with climate change. It's a premise of our research that no technology or form of science is born with the kinds of entanglements in people's identity that causes polarization. Something about the career of that risk caused that to happen. There's too much variance over time and across space to think that the potential to cause these sorts of polarized disputes is essential or resides inside the risk. Something happens. With climate change then I'm convinced that that is the story, but I don't know what the story is. I mean, there are people who've done really interesting stuff on how climate change attitudes have changed over time and what the relationship was between that science and the political parties and so forth. But I still think that it's just so vast and complicated and a lot of it happened when people weren't looking, that it's going to be hard to reconstruct what happened there. Unlike [the] HPV story, because it happened while we were watching. We knew what to look for, and it was relatively small.

But I don't—I mean, even in climate change there's too much variance across countries for you to think "well, it has to be something inherent in the risk itself."

Are there issues that were initially entangled in identity that have become untangled?

Yeah, well, maybe this is an example—it's smoking. People think that attitudes change because of information. They're most certainly wrong, I mean, the peak smoking in the United States was probably 1979, and we didn't have the internet, but it still didn't take that long for the surgeon general's report to percolate out to society. People knew about that. It was only when public health officials started to untangle, disentangle cigarette use from various kinds of identities, and cigarette companies were very good at this. They had Marlborough Man for one group, but they had Virginia Slims, right? And that's what made smoking seem cool to people even though they had that knowledge. That's what the public health community took aim at. Whether people know more about cigarettes? I don't know if that's the case, but they definitely have a different attitude about it. And you can just go to Europe, for example, and you think that these things are driven by knowledge, if you go to the Netherlands, in addition to seeing people all over the place on their bicycles they have cigarettes dangling out of their mouth. So there's a lot of variance in that too. A lot of space that makes you realize that these are mutable kinds of associations.

Let me see, we talked about tools and resources.

Yeah, I mean, I think these are tools—the kinds of empirical methods that we're using that would enrich the practice of professions that use science. And we talked about our science documentary use. But I think that it's still going to be the case that those professionals are gonna need the assistance of social scientists who study this even if it's fairly perfunctory, just to test hypotheses. You know, there's a kind of division of labor on these things.

When you think of people who are doing the most interesting work on identity and science communication, who do you think of?

I think of lots of people that I've worked with, that's my M.O. [modus operandi], I try to find people like you and like them and examine our shared interest. But I think that Hank Jenkins Smith is doing great work. John Gastil. But, you know, this is identity in the form that I described. And I realize it shouldn't be a contested kind of concept but that people are doing different things with identity, that's clear. It's just a kind of scholastic mistake to say, "well, we should have one understanding of what identity is." So if I think of the people who do that work, e.g., Ellen Peters, I mean, some of these people are looking at how identity—the group identify—affects people's information processing [and] interacts with all kinds of other things. Like on these deliberative panels in John Gastil's case, or in Ellen Peters case, numeracy. A certain kind of critical reasoning how does that interact with—and ironically surprisingly that the more science comprehending you are, the larger usually the effect that a motivated reasoning has on your positions on these entangled risks.

We should talk about that a little bit. This idea, and it's one of the truly fun things in social science that's not obvious, right?

Yeah, not obvious.

Can you talk about this idea that sometimes identity and science knowledge interact in a way where they have the opposite effect than what you might think?

Well, a perfectly plausible hypothesis would be that the reason we have disputes and confusion and conflicts about risks like climate change is that people don't know a lot of science, and we don't think the way that scientists do, i.e., scientists are more analytic, deliberate, conscious. They use the slow kind of reasoning that Kahneman describes as "System 2." Whereas members of the public tend to think of things in a rapid, intuitive, largely unconscious way, it's a fast "System 1" way of thinking. And you might have thought well, people who use System 2, they understand the evidence better and can reason about it. They're gonna basically go with the evidence. Where the people who don't understand how to think that way are likely to rely on heuristics like "what do my friends think?" and become polarized. But we have done, and others too, lots of studies that show that the people who are the most polarized are also the most cognitively proficient—the ones who are mostly likely to be using System 2. And at that point you have to kind of reevaluate what you thought was going on when people were forming these identity-expressive or identity-protective kinds of risk perceptions. They're not making a mistake. The problem isn't that they're irrational, the problem is that they're too rational. They're engaging this information in a way that's most relevant to their lives, and nobody, no individual member of the public, can do anything about climate change. Their carbon footprint is too small, their boats are just getting lost in the sea of boats. It doesn't matter if they make a mistake in this context. But if they make a mistake in their own community, given what climate change has now become a kind of symbol of group loyalty, they could be in a lot of trouble. So it makes sense for them really to use their cognitive capacities to understand what the relationship is between these issues and

their identity. And the more cognitive horsepower that you have right beneath the hood, the more proficient you're going to be in doing that. It's a kind of System 2 motivated reasoning. And that's something we've been studying about identity, including with experiments that will catch people in the act of using these kinds of actually remarkable and beautiful capacities to reason well in a way that actually perpetuates their belief in the position that's dominant in their group.

Is there anything else I should ask about identity?

Okay. Yeah, you know, at least I am a real, just instrumentalist. I'm trying to do what makes sense. And my thought isn't that there really are hierarchical individualists or something like this. All of these things are models, like the Bohr-Rutherford atom. If they work, if they enable people to understand and explain behavior, to predict it and also to engage it in ways that are positive for social welfare, then that's a good theory. A theory isn't good because it's true in some sense. It's unlikely that a theory that didn't have some points of contact with these things we can't see or explain would be very useful. But in all these cases, to me the question is only the utility of the views, and to me that's what is interesting for people who do empirical work. To test which of these theories will be the best for us, unhindered by the idea that somehow you're describing a reality out there. These things are unobservable, and we try to have theories about them based on things we tend to observe. The one that works best—that's the one we should be going with. Or the ones that are best for this purpose, as opposed to that purpose that's what our attitude should be.