Leeds University Business School: Research and Innovation Podcast

Making sense of risk communications: framing, trust, and trade-offs

Speakers: Professor Magda Osman and Dr Sarah Jenkins

[00:00:05] **Magda:** Hello, welcome to the Research and Innovation Podcast. My name is Magda Osman, I'm the visiting professor of Policy Impact at Leeds University Business School. And I'll be talking to Sarah Jenkins today.

[00:00:22] **Sarah:** Hi, Magda, great to be here. I'm a lecturer in applied decision making at Leeds University Business School, and I'm a psychologist by trade, so I'm interested in people's judgments and decision making and working with organisations on applied questions about how to communicate risk information.

[00:00:42] **Magda:** And on that note, the theme of the podcast today will be on risk communication, but not just that, the wider issues associated with risk analysis, which we'll cover in as wide as depth as possible so we can look at the various implications for research, but also in the applied domain where it really starts to matter.

So let me start with the first question to you, Sarah. So, often evidence about risks comes from physical and natural sciences. So, what role do the social sciences play in risk communication more specifically, although we can expand that to risk analysis generally?

[00:01:32] **Sarah:** So I guess I should start off with a disclaimer, and obviously I'm a psychologist, so I have a vested interest in the role of social sciences, in risk communication. I think, broadly speaking, sometimes it's seen as a problem where if we just get the data right, then we don't need to worry about the rest, and it will just sort of naturally follow on. But we know both from the literature and the real world that that's not necessarily the case.

So over the years there's been a number of different instances where we've had good forecasts of events, but actually there's been problems in the dissemination of that information.

So back in 2009, you might have heard of the L'Aquila earthquake, and it was a series of tremors leading up to the earthquake. It had been rumbling along for a few weeks, and there'd been a meeting of this expert committee to decide what to do about it. And essentially the scientists, as seismologists you can't ever be that certain about when an earthquake is going to happen, but in the public communication around this risk, a government official basically said "Don't worry about it, people should just relax". Which was obviously a gross oversimplification and misrepresentation of the risk and people took it as, kind of, reassurance that actually this event isn't gonna be that likely.

In actual fact, there was a fairly sizable earthquake and over 300 people died. And what's really interesting about this case is actually they brought criminal proceedings off the back of some of the advice or communications that were given to that. So, you know, we had good scientific evidence about the nature of the event, what to expect. But the way that that was communicated to the public wasn't ideal and obviously, you know, with some really severe consequences.

[00:03:42] **Magda:** There's something worth flagging here, I think, which seems like a broader issue, which is where the understanding of the problem lies. And this maybe is where social sciences have a greater role to play. I think the point that you raise is that while there might be technical information about the risks and estimating the likelihood - so you are forecasting various events and their impacts - the technical details need to be translated in some way to make them accessible, but to be able to do that reasonably well requires an understanding of human behaviour and judgment decision - all of the expertise that you have.

So, as a case study, would you argue that this illustrates the need to have social scientists embedded or involved in some way?

[00:04:44] **Sarah:** Absolutely. I would agree and I would advocate that social scientists should be involved across, say, the whole warning, what we call the warning value chain. So if you think about something like issuing a weather forecast, it's a chain of communication. It starts with this physical modelling of the weather, but there's a social element in, “okay, well how is this physical science modelling actually presented? Is it done using a graphic? If so, what are the sorts of design features behind that graphic? How am I representing uncertainty in that? What sort of colours am I using?” And then there's this associated human interpretations down that chain. And ultimately, how does this forecaster choose to frame that information to others?

And you can imagine a sort of, almost never ending, you know, someone receives that weather forecast in its final form, but then they choose to communicate it to their friend or a colleague. But there's social science throughout all of that in terms of how you frame information, and communicate it accordingly.

[00:05:52] **Magda:** The assumption is that social scientists only deal with a particular kind of issue or have only relevant expertise in the specific domain. But actually, it seems to me, also from what I, you know, I've encountered that social scientists have to navigate both the technical and the social side of, well, not, not just risk, but in the context of what we're talking about today, risks.

So you have to have an appreciation of the technical aspects of it that are often just typically associated with the physical or natural sciences. So, you have to kind of, navigate a number of disciplines, right? So it's not just that you just come in and say, "right. Well, if you wanna understand how to communicate these risks to different audiences, you need to know this, you need to have an understanding of the technical properties”, right. To be able to do the evidence or the information itself, justice, right? Because otherwise you would be adding noise to an already noisy situation.

[00:06:58] **Sarah:** Yeah, and I think you're kind of emphasising the general move towards this sort of interdisciplinary nature of communicating risk. And social scientists often act as these, sort of, intermediaries between the two worlds.

And that's something that I do quite a lot of in my work with the Met Office, where I'm a social scientist. So some of the things that we've been focusing on is actually how do you translate this physical modelling output into something that's understandable for the user. And we are particularly interested in looking at, “okay, well how are we, what sort of language are we using to frame these forecasts and disseminate them into warnings?”

So there's been a huge amount of literature looking at how people use verbal probability expressions. So by that, I mean that saying something is unlikely to happen or there's a chance of event X happening, and we know that actually there's a huge amount of variability in how people understand those.

So if I ask you to imagine an unlikely creature, if you just have a quick think about what it looks like, what it sounds like, I'm gonna take a punt and suggest that you might be thinking of something mythical that doesn't actually in real life. So I've just said something is unlikely, and I might have meant actually that was a 20% chance of something happening, but you've just interpreted me as it being indicative of something that's effectively 0%, right? This mythical unicorn, unfortunately doesn't exist. Some of the work that I've been doing with the Met Office involves, “okay, well, how can we improve people's understanding of these sorts of expressions such that we're both on the same page?”

There's often this assumption that if we say something in one way, then communication has happened and our audience understands it as intended. But we know that supplementing these sorts of expressions with numerical information can actually improve people's understanding. And you might be familiar with, in your weather app, the probability of precipitation and that sometimes, gets around the focus in your attention on say, rain *not* happening. If I tell you that there's a 50% chance of rain, I'm framing your thinking in terms of rain being possible.

[00:09:33] **Magda:** Yeah. Just to flag, while your direct expertise is within a number of different, domains, applied domains, what you are talking about is something that is general, right? So there are different ways in which people use modelling, or forecasting, in the finance sector or, you know, around economics or predicting various outcomes like social unrest, right?

So, it's not specific to a particular domain, you know, these are very general issues where you have technical techniques used to start estimating various effects occurring. And that will impact people in a number of different ways. People will have to make some decisions on, you know, and these are, and when we mean people, we mean, you know, either experts in a particular domain as well as the public or special interest groups or whoever.

So, what you are getting at and the kinds of things that you do aren't just specific to the kind of work that you do with the Met Office. It's also, you know, you take any policy area or economic or you know, financial or medical, whatever, all of this applies, right?

So, you know, there's presumably, work that exists that shows that it's the same problems you are confronting, you are having to solve, are not specific any particular domain.

[00:11:05] **Sarah:** Absolutely. And we've got a range of examples working with different organisations. So, for instance, we've done work with food risk assessors, so off the back of their risk assessment for say, a particular hormone that's found in food, how do they, actually communicate this in a numerical format? There's a choice over whether I'm choosing to frame exposure in terms of hours or versus days. And we know that that has implications for how that information is understood, and then the associated risks managed.

[00:11:39] **Magda:** Yeah. This is where it starts getting a bit more complicated because it's the relationship between risk and uncertainty. So, for instance, the Bank of England for a long time would communicate, you know, its forecasts, but then have fan charts that indicate the range

of uncertainty associated with the forecasters, indicating how noisy it is, right. So this is a kind of visual representation. So it's another illustrator of how you'd have to navigate between the technical side of estimating risks as well as the uncertainties associated with those estimates and actually allowing people to sort of interpret them in a way that actually is meaningful, because you have to make decisions on that basis, which I think I will use as a segue to the second question that I'm keen to get your insights on.

Given of our understanding of, as those who are interested in risk, our understanding of research in risk analysis, what would you say are key elements that have been overlooked or even misunderstood when it comes to risk communication?

[00:13:01] **Sarah:** So, fairly frequently after I'll give a talk, I'll often get people come up to me and say, you know, "I want... I've got this problem. What's my solution?" As if there is this sort of perfect solution to risk communication and, you know, some sort of recipe that if we use all the right ingredients, then we'll get the results that we want. And that's kind of reflected in some of those, sort of, previous thinking in risk communication. So all we need to do is give them the numbers. But it kind of misses the nuances in that it depends on the purpose of your risk communication and also even something as simple as giving them numbers begs the question of, well, exactly how?

So, one of the really common differences in the way that you present risk, and you often see it in certain tabloids, we can talk about the differences between relative risk. So you might hear that eating bacon doubles your risk of cancer, versus, well, actually, let's look at the data on what does doubling your risk actually mean?

Well, it might go from something from two in 10,000 to four in 10,000. And actually realistically, for the joy I get from eating bacon, is it necessarily worth, a risk that I need to, or I'm happy to tolerate. And you know, there's real world examples of this all the time.

So, there was the pill scare when women were told that there was a risk of blood clots. It led to real-world pregnancy spikes, because all of a sudden these women were scared and sort of placing more weight than perhaps they would've done had they had the full information.

Again, we know lots of things about how people interpret, say, percentages versus frequencies. So I might hear that a risk of something is 3%, or I could choose to frame it as saying, "okay, well you've got a three out of a hundred risk", and actually people seem to handle these frequency formats better. So even something as innocuous as you're saying, "well, let's just give them the numerical data", is kind of, you know, there is no perfect solution.

And it depends on what you're trying to achieve. In the pill example, if we wanted to stop people taking the pill, then you could argue that actually the way it was framed was adequate. But if we're, you know, interested in people's informed choice, then perhaps that wasn't necessarily the way to go.

[00:15:39] **Magda:** I think that there are a number of, let's say, sort of controversial issues that we contend with currently, where this matter about relative risk and absolute risk really matters. So this is what you are getting at, basically, which is that you either present the absolute, which allows you to then make sort of a reasonable inference, or you present relative risk, which can be very dramatic, but actually trivial differences if you are actually trying to

make, you know, an informed decision about this, which suggests, you know, something maybe broader as a point, which is the wilful efforts to, let's say, mislead. Because what you are getting at is that, you know, if there's a, a policy decision might be taken, and so the choice of framing of the risk information is not often by accident. It could be deliberate, in order to inform a particular choice of behaviour, and this isn't sort of specific just to the policy world. You could see the same thing play out in, you know, the way products might be marketed or a particular business or firm that might be trying to communicate its successes while actually hiding the fact that it's, you know, tanking, by presenting sort of relative rather than an absolute risk.

So again, I think the point I'm trying to emphasize here in the work that you do is that it has huge world implications, right? Because it matters, you know, it's, these aren't trivial problems. These are really significant problems.

I think the thing that I'm interested in following up, before we move on is, around sort of what's overlooked or misunderstood. And one of the things you talked about, which is risk tolerance, I think is probably worth exploring because I don't think, I think people understand or have heard of risk appetite or risk perceptions, right? So it's probably worth exploring, given that you have done quite a bit of work in the area.

[00:17:56] **Sarah:** Yeah, and it chimes in with perhaps something else that's been overlooked in the literature, which is that actually we have really much focused on risk perceptions. So we know a lot about the sorts of characteristics that influence how risky something is perceived to be. So we know that things that people don't know a huge amount about, or that seem quite abstract or uncontrollable - think something like nuclear power - people typically have higher risk perceptions for than something that say they're more in control of.

So, you know, one of the classic examples is that people are generally more worried about the safety associated with taking a flight rather than driving in a car because they're not the ones piloting the airplane. So we're not necessarily that good at perceiving risks, anyway, in accordance with the sort of objective information. But the idea of, of kind of, risk tolerance is that it's the missing piece of the puzzle.

So we know that people's risk receptions aren't necessarily a great indicator of whether they're going to take action or, engage in protective behaviour or not. And the idea with risk tolerance is actually, it represents something about the sort of trade-off that people are making. So I might think that, say, owning a particular product is, quite risky, say, my new smart robot Hoover. I acknowledge that there might be a risk with, say someone hacking my data or the Hoover going rogue and knocking over my collection of wine bottles, but the benefits of having this robot Hoover, I might think, “well, actually, those are enough to outweigh the risks associated with having it”. Actually, maybe it's this risk tolerance that will influence whether I'm likely to buy the product, or engage in safety behaviours around it. So I might choose to change my wifi password or read the manufacturer instructions and actually risk tolerance is this trade-off.

And we've got a certain amount of evidence to suggest that although an individual's, when you've probably heard the term of risk appetite differs according to individual characteristics, we've got evidence to say that, okay, risk tolerance is somewhat a product of say, whether you are male or female, but also it works in interaction with context.

[00:20:38] **Magda:** Yeah, academics love pointing out things where there's some kind of paradox, right? So that what looks like something that is inexplicable, is, well, we'll just call it a paradox. A sort of, a nice kind of quirk, when actually it's just that we failed to actually look at the more specific issues that might explain it.

So I think the, at least from my understanding, where the work you've done around risk tolerance aligns with this is that, there's an effort to sort of gauge what the public appetite is around risks, or what the public perceptions are of risks. So, you know, there's a new policy or there's a new product or a new service, particularly a lot of things that, you know, where we're interested around sort of AI, Generative AI, you know, all all of that kind of stuff. Digital technologies.

There's, you know, you run a survey and you look at public risk perceptions and is used to, in theory, inform how people are going to respond. So you could sort of track their sales of the products that they're being, that, you know, they're asked to make sort of risk perceptions about, or indicate their risk perceptions. And the paradox is that, well, you know, they might indicate that there's a high level of risk and so that the risk perceptions are high, but actually it doesn't seem to correspond with their behaviour. So people still buy stuff. So this is the trade-off.

So it's not actually a paradox, it's just the measures that we use that actually assess and understand people's different controls of risk is just not done sufficiently well enough, right. So you, I'm guessing, although I don't want to put words in your mouth, so you answer this, the solving the paradox between risk perceptions and behaviour is easy, is just in effect, you just need, you need to understand where they're making the trade-offs to then use that as a predictive, mechanism, or at least that's that what you data shows.

[00:22:51] **Sarah:** Absolutely. I would argue that, and again, kind of cycling back to where we started in the podcast, which is that it's the social sciences that allow us to take different elements of this. You know, we are not just solely focusing on the one measure of risk perception, we also need to consider the tolerance.

And then on a related note, your risk tolerance has implications for how you choose to communicate risk information to others. And we know that, you know, how we seek and share information also then in turn affects risk perception. So, it's very much about bringing these things together rather than looking at them in in silo.

[00:23:30] **Magda:** Yeah, I mean the other thing, if people get sort of put off by the fact that you are talking in terms of social science, you could just as easily reframe this as behavioural economic, or, behavioural sciences, right? Because the language of trade-offs, in effect, at least for the work that you've done, is looking at, well, what is the utility of against whatever the costs are. So, and the utility could be a number of things, right? So you just absorb the costs, knowing that the overall utility is, this is where you'd be performing the trade-off, in line with actually buying the thing or using the service, knowing that there are risks associated with them.

Could be easily done as a kind of, you know, formal calculation if you were inclined that way to do this from a kind of behavioural economic perspective. So, this is genuinely a multidisciplinary approach.

[00:24:29] **Sarah:** Yeah, I mean, another example, we could frame it as, avoiding costs. At the moment I've been talking about it in terms of benefits. But if you think about, you know, one of the problems with communicating information, say around natural hazards, you know, I might tell you that there's a tsunami coming, but actually someone that receives that information has got to trade-off the risk of that tsunami coming and devastating their home versus avoiding the inconvenience of having to leave my home where it might get looted, or avoiding the sort of time and effort costs of being away, not knowing what to do with my pet. So again, we are talking about the same thing, but it's a framing issue.

[00:25:11] **Magda:** Yeah. I mean, I'm very sympathetic to this. It is just that, in effect what we have to do is sort of make ourselves amenable, so the insights that we can provide, the ones that are actually implemented, right? Because if you are put off by, "oh, well, we employ a bunch of psychologists and they told us this", then the assumption is that they just do survey work.

And actually, yeah, there are many, many sort of strings to our bow. Of course, I would say this also because I'm fundamentally a psychologist like you, but with other moving parts. I think, yeah, one other thing which I would say, which you know may be of interest also is that, again, it's kind of reference to paradoxes, which effectively can be solved, it's just that you are ignoring other relevant literature, is in the context of cyber security. There's a lot of work that's been done to try to gauge the public's perceptions of risks associated with different kinds of exposures to vulnerabilities that they might have.

Of course, this also is relevant for businesses and policy and, and the like. So again, you sort of see a difference here between their perceptions of risk and what they trust. And so this is referred to as the “risk-trust paradox”. The interesting thing there, which is sort of parallel to what you are saying about differences between perceptions of risk and tolerance of risk, is that, and this often ignores a lot of the work that's been done sort of decades ago in social science around trust.

So you have, you can trust as an attitude - so it's just general reflection of what you trust - and then, something much more specific, which is trust in choice, which is what you are actually going to do, that reflects a choice that you are going to make, which reflects a different kind of trust, right?

So this is where it's parallel to what you are talking about in terms of perceptions and tolerance. Because in order to tolerate something and then actually act on that, you have to perform a trade-off, right? So it's actually the same. So what we're prepared to sort of accept as risks, is different in kind because when we actually have to put trust in something because we have to use various services that might lend themselves to hacks and, you know, a whole load of other cybersecurity vulnerabilities, we still use those services.

We might say that we find them risky or we might distrust them, but when we actually have to act in a way that uses a whole load of services on our phone, on our laptop, or wherever, smart home, we actually end up indicating that we are trusting that, right, so that it's a trust that we're, we're indicating through choice.

So what the point here is that there's an analogue of this in many other spaces which reflect the same thing, which is you're just not paying attention to relevant work that actually can explain

what looks like a contradiction when it actually isn't. I mean, there's a separate issue around whether you then want to say this reflects more kind of rational cognition rather than irrational cognition. We'll save that for another time.

The other thing which I know that you are interested in, that you've done some work in, which I think is probably worth highlighting is whether or not there are profound differences between experts and non-experts, the lay public, around risk and what implications that has for how you craft risk communications for different audiences.

[00:29:07] **Sarah:** So I think this kind of taps into the "that there's a perfect solution and if we just give them information, then you know, all will be okay." And the kind of inherent in that is this assumption that actually as experts, we are the ones with the best knowledge. And somehow we are different to say the public, but actually we might see that, you know, experts and the public have differences in in the levels of their risk receptions. But we know that actually the general basis of them is pretty similar, so they might be still thinking about the sort of consequences associated with the risk. But they don't weight it as heavily as say the public because they have differing priorities.

So we see this in food risk assessors. They still take into account whether this, say, particular chemical is harmful to children or the elderly, but actually that's kind of weighted differently versus your average Joe Public.

There's a huge amount of literature in the medical decision-making research showing that doctors still show base-rate neglect. So basically, the doctors underweight statistical information and over rely on say something about a characteristic of the patient. So, "oh, she's a female and she's a smoker, so I'm gonna focus on that versus actually what I know about this actually quite rare disease." So, although experts might have differing levels of perceived risk, we don't really see any fundamental differences in the way that experts and the public, actually think about risks.

[00:30:56] **Magda:** Yeah, this isn't an assault on experts, so we're not using this as some kind of vehicle to bash experts, including ourselves. But it's probably useful to flag, at least within the risk analysis community, what's potentially misunderstood, not just by others outside of the research community, but even within it, is that the problems that need to be solved, the audience, mostly the public, because they need to be the ones that actually are dealt with in terms of how to communicate information to them.

And once you do, you know, I mean, save the fact that even if you could come up with the perfect version of that, that's still not gonna solve problems in terms of how people then make decisions off that. But the problem is often that it's assumed that it's the public that have the issue rather than the communication of risks across a number of expert channels.

Right? So that that's something that also needs addressing because we're all making different kinds of value judgements and weighting things in different ways depending on our relevant expertise. So that's confronted in these different situations where you have a number of different types of expertise where it's not aligned.

So I mean, I suspect both of us have encountered situations in a number of different applied domains where we are required to make suggestions to help, where we often see that people

who would characterise themselves as experts often fall into the same traps that levied the Joe Public.

But that doesn't deny the relevance of expertise or the, you know, there it's useful to have people who have spent decades of their life trying to understand something in particular. Otherwise we'd be out of a job.

So there's another thing that you raised earlier, which is around the potential deviations from what could be objective risk. So, what would even look like properties where people could say, "well that's, you know, those are features of risk communication that make it objective"?

[00:33:18] **Sarah:** If we were being videoed, I think you would see neon signs going up above my head in that it's perhaps a bit of a red herring to suggest that risk communication can ever be objective in that. I've alluded to this earlier on, which is, it depends on our purpose. Are we purely just disseminating information or do we want to be seen as trustworthy sources of information? Do we want to get people to do what we want them to do?

So often we say, "okay, well the goal of risk communication is to get people to understand". Actually, we equate understanding to compliance and that if people just do what we want, then we are fine. So there's sort of an element as to which, well, is risk communication ever a neutral thing? Which kind of leads us down to a possibly more philosophical discussion around the ethics of risk communication, right? So to what extent should we be paternalistic versus allowing people autonomy with the, "well, we'll give them the information and they'll make the decision", and cycling back to trade-offs, depending on what's right for them.

But I guess there are, well, I guess we could define as objective elements in risk communication. So, we're obviously talking about risk communication, which is based on scientific evidence, that most of the time is fairly well defined. We can be objective if we're open and transparent about uncertainties involved. So, sometimes there's this prevailing view that actually if we tell people that we're, you know, the science is uncertain, then somehow they won't trust us. But actually, there's a lot of evidence to suggest that being open about uncertainty is a good thing and it enables people to make informed decisions.

I mean, we've spoken quite a bit about framing in this podcast, but again, there's things that you can do to make it more objective. So, if I am always consistent in the way that I choose to frame information, I can't be argued to be kind of trying to steer you to make one decision or the other. So those are just a couple of examples about how we could try and tilt it towards objectiveness, but I wouldn't necessarily say it's ever solely objective.

[00:35:50] **Magda:** Let me throw this at you then, because, yeah, I am extremely sympathetic to the things that you are saying, and I'd say generally I'd agree, but if you were gonna mount a defence, you could say, yeah - and this is an ongoing discussion within the risk analysis community - which is, you know, we're not dealing with truth claims because, you know, ultimately we're trying to communicate or uncover what's likely to happen in the future, right?

So in order for, I don't know, business policy, wherever you pick the sector, is going to have to make some kind of formal decisions about that. So they're not truth claims, they're just claims about what might likely happen, but you'd still argue that the agreed procedures that the community has settled on, around how to perform the analysis is one that is objective.

Because it's a convention that we all use, or we've agreed we should use in the same way as yeah, maybe risk communication has its kind of principles in that it cares about what the goal of the communication is, what the form is that it takes, what the audience is, right? So those are things that are standardised in the sense that we need to consider when we are actually designing risk communication. So from that point of view, say that those are properties that indicate that it's objective, right?

So just so that we can avoid, you know, because you were kind of getting at this, people levelling rocks at us and saying, "oh, well the whole thing is just subjective then." So yeah, “why should we pay any attention to you? Especially if you are a social scientist, you know, because the whole thing subjective."

You go, "no, no. We're actually trying to design things that actually are standardised and consistently applied."

[00:37:52] **Sarah:** Yeah. And on that last point I was, I was literally just about to mention this sort of, it's grounded in consistent principles, or this sort of recipe for communication.

[00:38:03] **Magda:** in the absence of just making stuff up, and then sort of seeing how that pans out, we're arming people with very practical things to do, right. And we can also assess the extent to which they actually work.

I think that even, you can craft sort of relevant risk communications that you could even suggest to, people in, you know, the policy world or ministers or whoever, that have to hold press conferences and speak to the public, but I think we can all call to minds sort of absolute howlers where they just completely sort of failed, but that that's not the failure of risk comms itself or those researchers that have sort of developed work that actually shows, "well, these are the things you should at least avoid". Right.

So just like the example that you gave at the start, which is that you could carefully craft relevant risk communications. It's just that the person may completely ignore all of that, and then some kind of epic fail. In this case is actually, well, the example that you gave, you know, it's actually deadly, right? There are lethal consequences to someone failing to do their job.

So to the positive spin on this is just, yeah, what we have actually is helpful. It's just that sometimes the problem is it's ignored, right?

[00:39:24] **Sarah:** I would agree with that.

[00:39:27] **Magda:** Well, let's end on an up note then. As a kind of summary of the things that you had said - if you were going to try to integrate the things that you were saying in a practical sense, so you would definitely need to have people work within an organisation from the start to end, in terms of how you would be crafting the communication of risk. And that could also include, you know, how you even sort of communicate risks from a risk assessment to a risk manager and the like, right? So it's across the chain. So, you know, risk communication isn't simply something at the end.

Those who actually are involved in that, who are the experts often are multidisciplinary in their expertise. And I think the other thing to flag, which is related to the risk tolerance work that you've been doing is that bit's the most, one of the most promising areas which allows people to use, how people understand risks to then predict their actual behaviour. Because that's kind of what we're in the business of, right? So if you wanted to start moving into a research literature and actually formally start sort of measuring risk tolerance, that would be a way to effectively do useful things to try to predict what's gonna happen next in terms of actual behaviour.

[00:40:57] **Sarah:** Yeah. Thanks Magda. I think that's a pretty good summary. One thing just to add is that the value of expertise and, you know, the risk communication literature has been around for decades and it's taken us to this point and I think we're at a really exciting time to be able to move things even further forward, whilst recognising that actually we don't always have all the answers, but we can help get us there.

[00:41:26] **Magda:** That's great. I think it's important to, to make that point. So, I'll end it here. Hopefully what we covered will be of interest or potentially of use to those who are listening. And if anybody is interested in following up any of the details, there are links in the show notes to this episode.

Goodbye from myself, Magda Osman.

[00:41:49] **Sarah:** And goodbye from me, Sarah Jenkins.

ENDS