

Podcast: What goes on inside the brain of a terrorist? This cognitive scientist made it his mission to find out



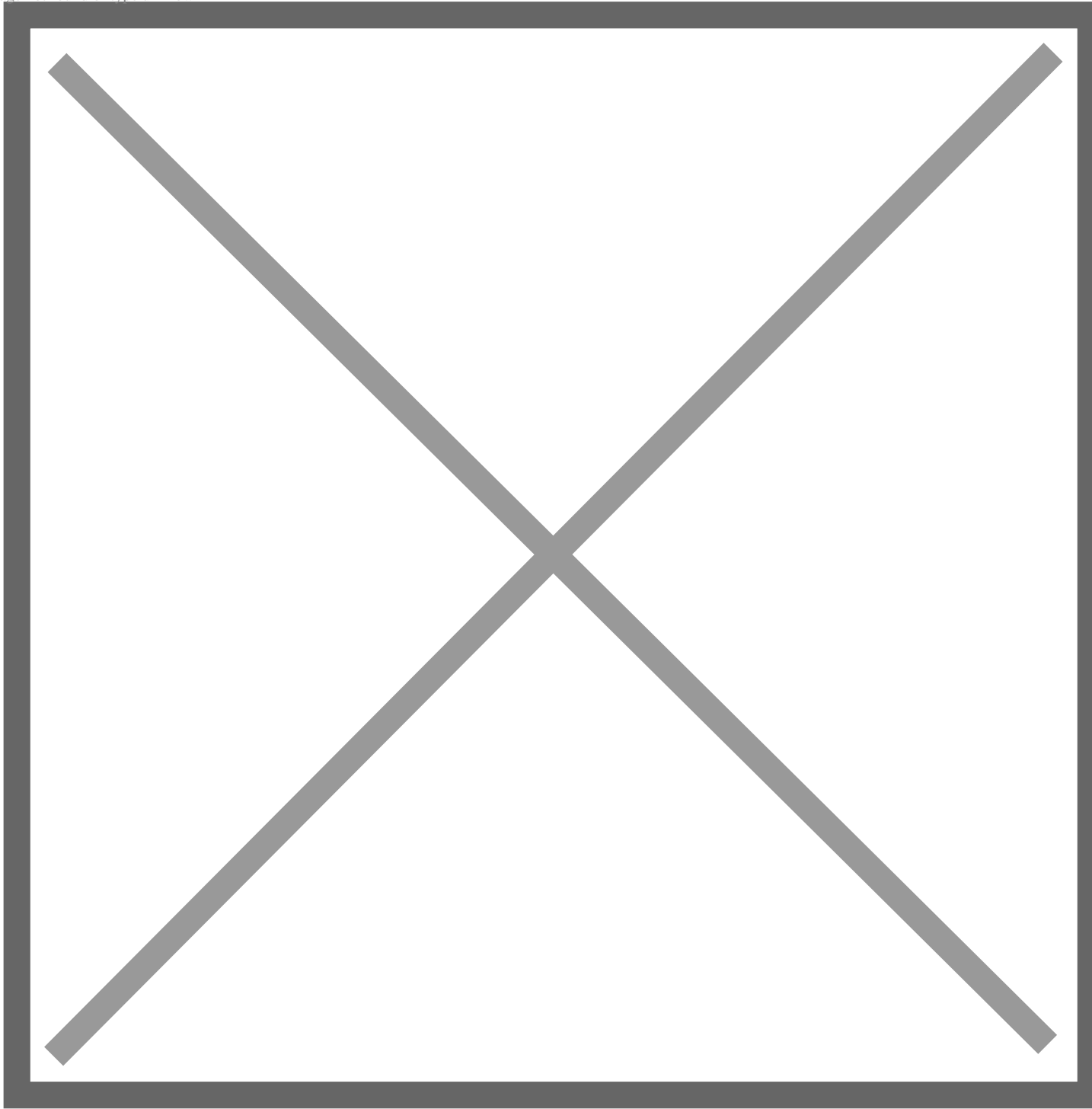
In this episode, join freelance reporter Malia Politzer and podcast host Lydia Chain as they dive into the scientific efforts to make sense of the minds of potential terrorists.

Below is the full transcript of the podcast, lightly edited for clarity. You can also subscribe to The Undark Podcast at [Apple Podcasts](#), [TuneIn](#), or [Spotify](#).

Nafees Hamid: As I was actively looking for extremist influencers, there was one guy I came across who had a little YouTube channel, small following, Moroccan individual. And he invited me up to his apartment. Now that's obviously mistake number one, you always want to meet people out in the open.

Malia Politzer: This is Nafees Hamid, a cognitive scientist. In 2014, he was in Barcelona, Spain, looking for extremists to take part in a brain study that would be the first of its kind.

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Nafees Hamid. Credit: Twitter

Nafees Hamid: At one moment in the conversation, these two other guys show up. I could feel there was just something off. I could tell that the energy was now different in the room. And then he gets up out of

the kitchen. He goes into the other room where the other two guys are, and they start speaking to each other in Arabic. And I hear the word *munafiq*. If you believe in the jihadist ideology, a *munafiq* is basically an apostate. Someone who's left the faith. And that also means that they deserve to be killed.

Malia Politzer: This is when Hamid realizes that he could be in real danger.

Nafees Hamid: And so at that moment, I can hear them speaking back and forth. I'm thinking, OK, three against one I'm in an apartment, I need to get the heck outta here.

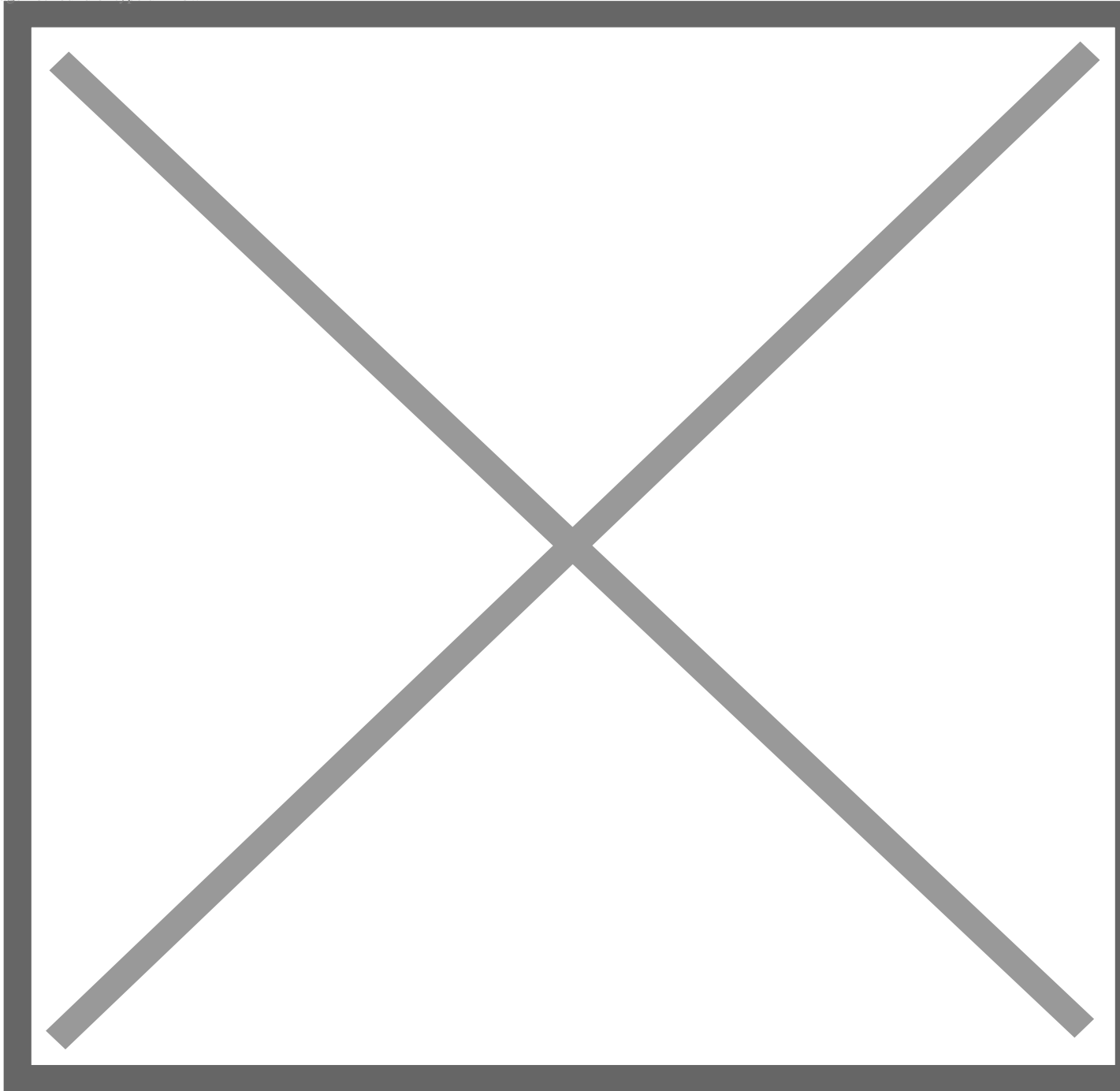
Malia Politzer: The apartment is on the second floor. And the only exit is through the living room, where the three men are talking. So he opens the kitchen window.

Nafees Hamid: So I was able to step out of the window, step onto the ledge, step onto the awning, but I actually kind of slipped off of it. And then just running the heck out of there as fast as I possibly could.

Lydia Chain: This is the Undark Podcast. I'm Lydia Chain. Hamid had been trying to get this radicalized person to participate in a research study. He was looking for extremists willing to answer questions about their beliefs while functional magnetic resonance imaging technology monitored blood flow in their brains. Hamid hoped that would reveal something new about how their brains processed decisions that led them to violence. Amid all the interest in counterterrorism and deradicalization efforts, field studies on active extremists remain rare because they are difficult — and occasionally dangerous. But Hamid and other social scientists at the global research organization ARTIS International are attempting to better understand the extremist brain to give counterterrorists more tools to use to pull people back from violence.

Malia Politzer has the story.

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Malia Politzer.

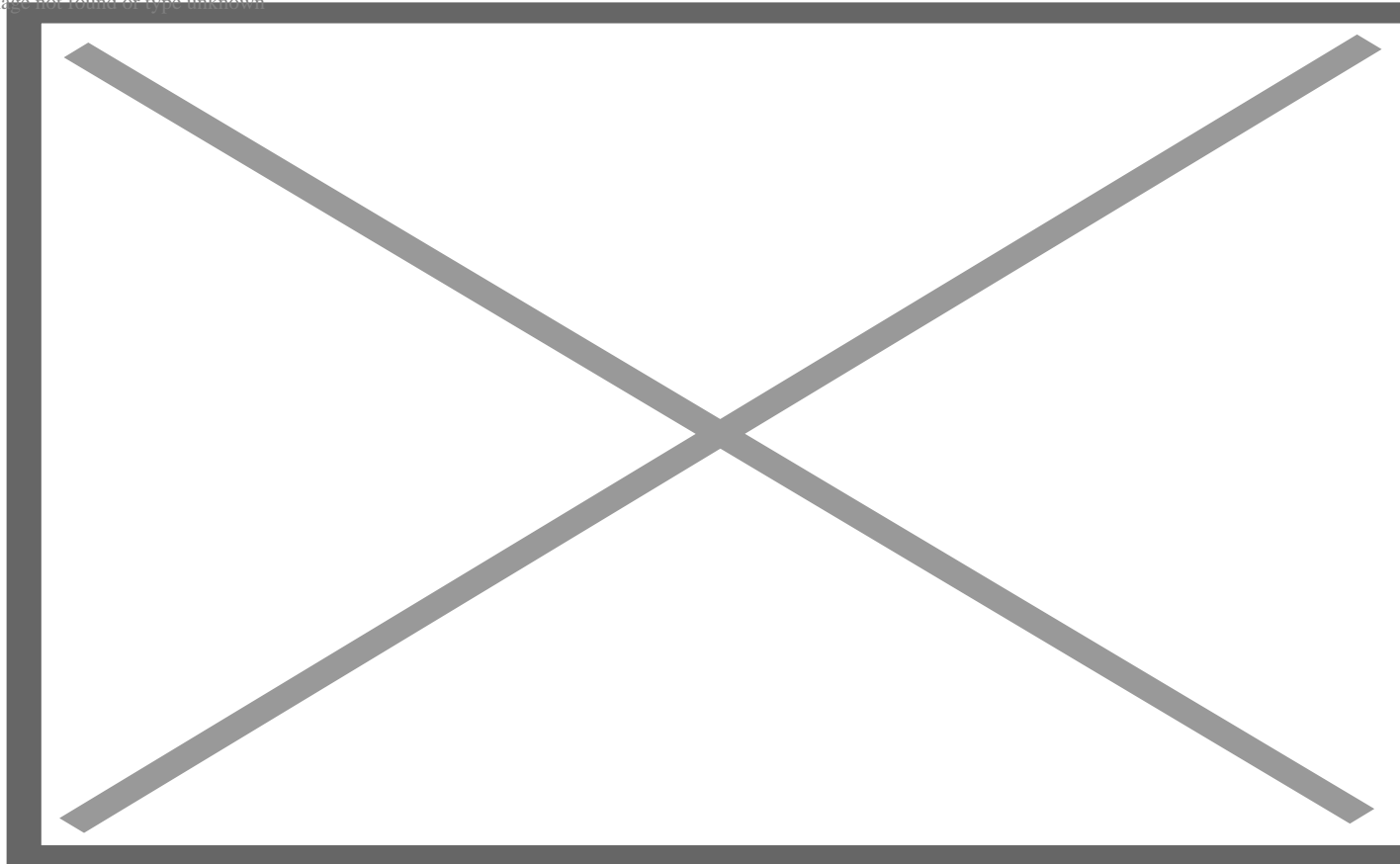
Malia Politzer: To understand the research that had Hamid jumping out of windows, we have to go back to 2001. To Sept. 11, the day a group of terrorists crashed two airplanes into the twin towers and the Pentagon.

Scott Atran: I looked at the TV and I said, “Well, the world’s never going to be the same.”

Malia Politzer: This is Scott Atran, a cultural anthropologist and psychologist. When 9/11 happened, he was at his home in France, watching the news.

Scott Atran: The pundits and the politicians started talking about the suicide bombers as either being absolutely crazy and out of their minds or very cunning rational actors. And that got me very interested in trying to understand: Who were these people? It’s an evolutionary puzzle. You don’t sacrifice your own life or those you hold dear for things you’ll never be able to realize, and they won’t be able to realize. Just goes against evolutionary logic. So why did they do it? What motivated them? Were they truly crazy? Which I didn’t believe for a moment. Were they just cunning rational actors pushed to the extreme? That I didn’t believe either. There was something about what they believed in and why that seemed to me the key. So I decided to actually try to get to know them.

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Scott Atran. Credit: Jon Jay College of Criminal Justice

Malia Politzer: Atran began studying the question and became one of the few scientists at the time whose research centered on interviews with active extremists.

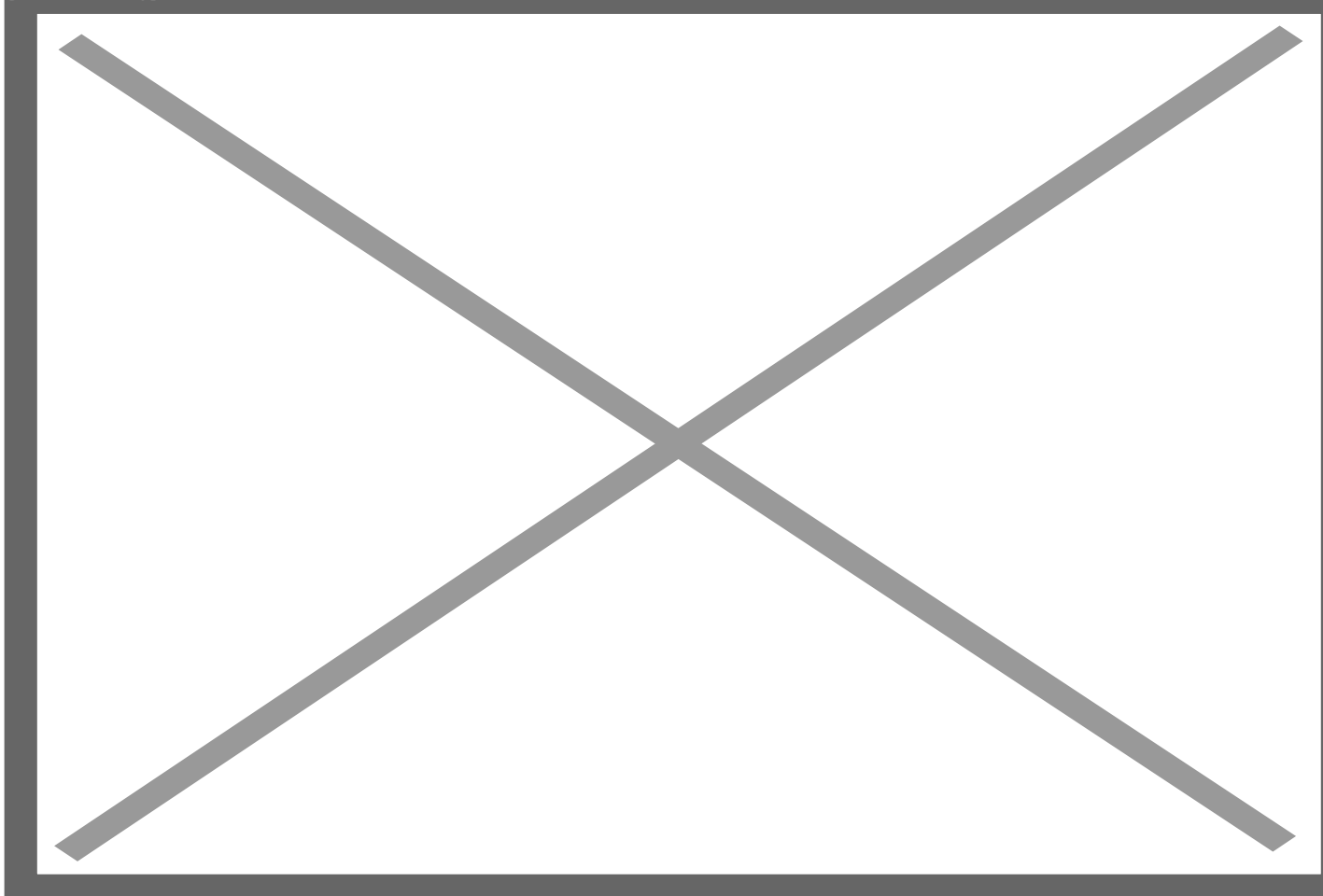
Liesbeth van der Heide: After 9/11 what we saw is a big increase in the attention to the topic of

terrorism, understandably.

Malia Politzer: This is Liesbeth van der Heide, a senior research fellow at the International Center for Counter-Terrorism [in The Hague, Netherlands].

Liesbeth van der Heide: Right along with that though came a couple of very noticeable gaps that became more noteworthy as the years passed along, the biggest one being a lack of primary sources used in terrorism studies.

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Liesbeth van der Heide. Credit: Leiden University

Malia Politzer: In fact, a 2006 meta-review showed that less than a third of peer-reviewed studies between 1995 to 1999 were based on any empirical data. In other words, few researchers were actually talking to extremists. This gap remained significant even after 9/11, and there were a couple of very good reasons for this.

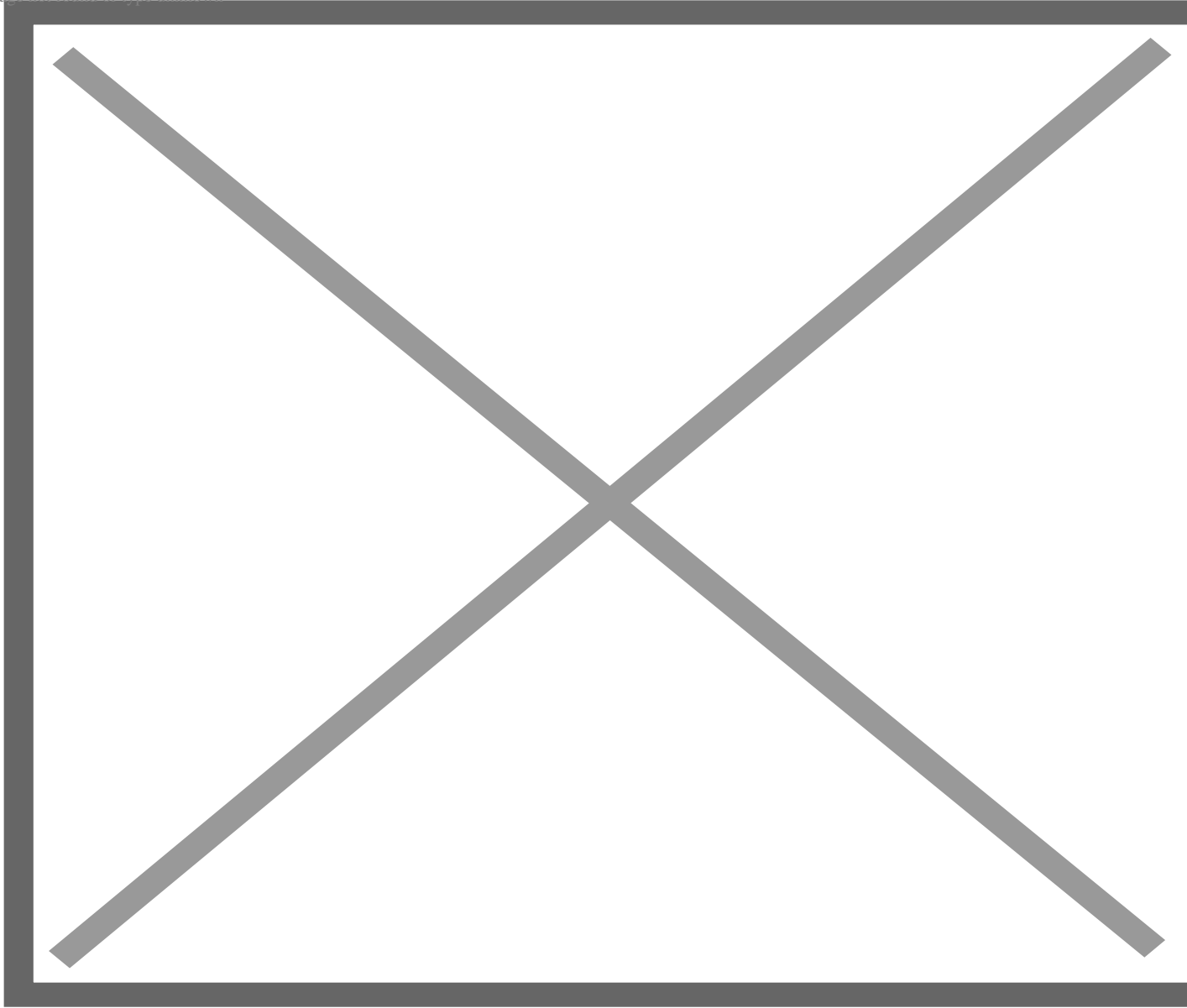
Liesbeth van der Heide: The most valued source in terrorism research is access to terrorists themselves, their own accounts, their own stories. However, governments are often not that keen on granting access

to terrorists. In many cases of successful attacks, the perpetrator dies in the attack, hence no possibilities to interview the perpetrator.

Richard Davis: You know, when it came to examining acts of terrorism, both domestically and internationally, we understood who did it. We understood what they did. And we understood when they did it. But we didn't understand why they did it. There was very little evidence about what the motivations were that were actually driving people to commit these acts.

Malia Politzer: This is Richard Davis. In 2005, he was on a team President George W. Bush had asked to develop a new strategy to prevent terrorism over the long term.

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Richard Davis. Credit: LinkedIn

Richard Davis: One of the things that became evident during my time as a policymaker was that in order to really address this problem over the long term, we needed to do research in the field, overseas, with the groups that were perpetrating these heinous acts.

Malia Politzer: He was trying to come to grips with his new role when he came across Atran's research.

Richard Davis: He talked about trekking with jihadists in Southeast Asia and in the Middle East spending time with Hezbollah, Hamas, and other armed groups. He was a pure scientist, an anthropologist that was concentrating on the problem of human existence and why people chose the pathways they did.

Malia Politzer: After Davis left the White House, he, Atran, and another researcher, Marc Sageman, set up ARTIS, an organization dedicated to on-the-ground research into violence reduction. Their work would lead them to the front lines of conflict all over the world to better understand what motivates extremists to act violently and how to stop them, and more recently, to uncover how operatives are manipulating even those that aren't radicalized into taking violent action.

Watching the Twin Towers fall, Atran thought one important concept at play might be something called "sacred values," a theory developed in the 1990s and 2000s by social psychologists like Jonathan Baron and Philip Tetlock. They are values so precious, that people are unwilling to exchange them for any amount of money, or other material gain. They are so strong that under the right circumstances, people might even be willing to sacrifice their lives if those values are threatened.

For many people, family would be a sacred value. Most parents wouldn't be willing to exchange their children for any amount of money. They might even be willing to kill or sacrifice their own life to protect their child. Other sacred values can be more abstract like democracy, freedom of speech, or religious affiliation.

Scott Atran: You can no more give up a value you truly hold sacred, than you can give up yourself. And in fact, one of the peculiar things about human beings is that once they're attached to such values, they become even more important than the physical body that is the vessel of those values.

Malia Politzer: Another important concept ARTIS researchers found that intersected with sacred values is that of the devoted and rational actor.

Scott Atran: A devoted actor is an actor willing to sacrifice the totality of his or her material interests for the sake of cause and comrades.

Malia Politzer: Atran says that everyone is a rational actor in some contexts, and a devoted actor in others. Rational actors make decisions based on pros and cons. Devoted actors, on the other hand, are motivated primarily by their beliefs, and they are willing to make costly sacrifices when their sacred values are put under threat.

ARTIS found that the type of sacrifice devoted actors are willing to make depends on their ideology or that of the group they belong to. They also found that people whose identity was fused to that of a group sharing sacred values were willing to sacrifice more to defend not just their values, but also other members of that group.

For example, ARTIS studied Catalan independentists and found that many were willing to lose their jobs or go to jail — sacrificing their freedom or financial stability — if it meant they could vote in an independence referendum from Spain.

But for groups with more violent ideologies like jihadis, ARTIS saw that they were willing to kill or die for their cause or their comrades. And these were the people ARTIS researchers were the most interested in understanding.

Scott Atran: So we decided to go to Iraq and to go to the battlefield itself to find out why these soldiers were fighting.

Malia Politzer: They found that among members of the various forces fighting ISIS, those who said they were most willing to fight and die for abstract values like nationhood, heritage, and religion tended to prioritize those values even over their social groups, like family.

Scott Atran: The ISIS and P.K.K. [Kurdistan Workers' Party] guys were saying "We're even willing to abandon our comrades, that we fought and died with, if they forsake their values."

Malia Politzer: All this work led Atran to wonder if sacred values were so deep and powerful that the brain actually processed them differently than more everyday issues.

Scott Atran: So then we thought, OK, let's find a bunch of radicals and put them in an fMRI and see what's going on in their brains. Let's do some brain studies.

Malia Politzer: Now, it's important to keep in mind that using brain scans in this way is controversial, and that experts are still trying to understand the limitations of fMRI research.

Despite this, the Artis team believed that looking at extremists' brains could give them real insight into the role that sacred values might play in their motivations and decision making. It would be the first time that anyone tried to do anything like this.

Nafees Hamid: This is how science works. You know, you go into the unknown, you try to explore things that nobody else has explored.

Malia Politzer: And this is where Hamid came in. ARTIS hired him to help design the brain studies. It would be the first time that anyone had tried to do anything like this.

But first, they needed to find a group of extremists and convince them to have their brains scanned while answering questions about their most deeply held beliefs. So they decided to go to Spain.

Nafees Hamid: So Spain usually ranks in one of the top countries for jihadist-linked radicalization in Europe, according to Europol. And the Barcelona region is the number one hotspot for recruitment, and the two major Sunni populations, which are the ones we were interested in, are Pakistanis and Moroccans.

Malia Politzer: The ARTIS researchers wanted to do two separate studies, one to see what was

happening in the brains of those on the edge of radicalization and another that would look at active extremists. Hamid was in charge of recruitment. He quickly realized that finding the right participants would not be easy.

Nafees Hamid: I sort of didn't do it very well to begin with. I mean, at one point I, it was like the dumbest technique I could have possibly used, 'cause it could have gotten me arrested. I opened up my laptop in a cafe and started watching ISIS videos, thinking that maybe someone might walk behind me, see the videos and be like, "Hey, so you're a part of the tribe, huh?" And then we would start a conversation. Needless to say that did not work out.

Malia Politzer: And to begin with, things didn't get much better. You've already heard how Hamid had to jump out of a window to escape a potential participant.

Eventually, though, through trial and error, Hamid found a recruitment strategy that worked. He built relationships with trustworthy members of each community. When he found potential participants, he'd give them surveys designed to assess their sacred values.

Nafees Hamid: The issues that were sacred across the board for all participants, even the non-extremist participants in our survey studies, were never caricature the prophet Muhammad and being against gay marriage. Values that tended to be more non-sacred were things like halal food being served in public centers or Islamic teaching being taught in public schools.

Malia Politzer: They used this information to design the two studies involving devoted actors with jihadist ideologies in these populations. The first one focused on young first- and second-generation Moroccan immigrants in the early stages of the radicalization process.

Nafees Hamid: Which basically meant that they supported a cause championed by jihadist groups. So we wanted to see, OK, this is a population that's vulnerable to recruitment. How can we examine what would increase their likelihood of getting pulled into one of these groups? And one crucial concept is this idea of social exclusion.

Malia Politzer: The effects of social exclusion have been studied in social psychology for a long time. Social exclusion can mean marginalization or acts of discrimination or bullying. Even discrimination at a group-level like racism.

Nafees Hamid: And so you see this a lot in parts of the Middle East, including in Syria, where ISIS was able to conquer a lot of territory, where there were groups of people who felt like they were not included in the governing decisions by [President] Bashar al-Assad, for example. They felt as an entire community, they didn't have their voices heard.

Malia Politzer: The ARTIS team tested the effects of social exclusion on sacred values by having participants play a digital game. They then manipulated the game play to make some of the participants feel left out and ignored.

Nafees Hamid: And this is an experiment that's been used all over the world, dozens of countries. And it's

incredibly powerful. Even though sometimes participants will come out saying, “Oh, this didn’t really affect me.” You can see the skin conductance reaction. You can see the testosterone and cortisol reactions. You can see the EEG reactions. You can see this is really having such a strong effect on this person on an unconscious level.

Malia Politzer: After playing the game, the participants lie down in a functional magnetic resonance imaging machine, fMRI, which captures blood flow in the brain.

Nafees Hamid: Depending on where it goes, you can make an inference that that part of the brain is more active for that particular task.

Malia Politzer: As the participants are lying down, they look up and see a screen. On it are a series of values, like “Muhammad should never be characterized” or “Halal food should be served in public schools.”

Nafees Hamid: And underneath each value, they have a scale. And that scale is a willingness to fight and die scale.

Malia Politzer: While the participants rank these values, the fMRI machine is recording what is happening in a particular part of their brain.

Nafees Hamid: This is a part of the brain; it’s called the left inferior frontal gyrus. It’s oftentimes used for rule processing. It’s normally active when people are processing sacred values. But what we found was that people who were socially excluded, now for their non-sacred values this part of the brain came online.

Malia Politzer: And he says this had really worrying implications when it comes to deradicalization efforts.

Nafees Hamid: Because non-sacred values are the negotiable part of someone’s ideology. It’s the part that you’re willing to deliberate on and think about, you’re willing to negotiate on. What ends up happening is the more you end up socially excluding someone, our evidence suggests, the more values move out of the non-sacred category and into the sacred category. So the actual space, the negotiation space, is actually diminishing. And that’s making it a lot harder for you if you want to pull this person back from the edge of violence. You now have fewer tools in your toolkit with which you could do that.

Malia Politzer: Trying to figure out some of those tools was the goal of their next study, the one on people who were already radicalized. Through surveys, they’d identified a group of first-generation Pakistani immigrants who said they were willing to carry out personal acts of armed jihad.

Nafees Hamid: These were supporters of Lashkar-e-Taiba, which is a terrorist group based out of Pakistan that fights on the Kashmir issue. It’s an associate of al-Qaida. We wanted to ask, OK, with these guys, what could we do to potentially pull them back from the edge of violence?

Malia Politzer: This group was also invited to sit in the fMRI. Like the Moroccan participants, they were asked to rank their willingness to fight and die for each value. When they were done, while they were still in the fMRI, the scientists showed them how their rankings compared to those of the average Pakistani in Barcelona.

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Nafees Hamid: And in reality, this was, this was made up data because we wanted to do an experimental manipulation.

Malia Politzer: Half the time, they made the average Pakistani agree with participants' ratings.

Nafees Hamid: And in the other half of the times, the response was lower, showing that the general Pakistani community is less willing to engage in violence than they are.

Malia Politzer: After getting out of the fMRI, the participants retook the survey. They had a choice; they could change their rankings to align with those of their peers, or they could keep them the same. The scientists looked at two specific regions of the brain, one involved in self-reflection and another involved in subjective values.

Nafees Hamid: Now, normally these two parts of the brain work in tandem when making a decision. Imagine you're out in a restaurant and you see a nice tiramisu for dessert. And you think, God, I really want that tiramisu, that would be your ventromedial prefrontal cortex. I want. Now, then you may stop and think, hang on, it's a lot of calories. That would be your dorsolateral prefrontal cortex. You're stopping, you're deliberating. You're thinking, you're hemming and hawing. These two parts of the brain work back and forth like this.

Malia Politzer: The ARTIS team says that when these active supporters of an extremist group were processing their sacred values, the part of the brain associated with deliberation shut down. And they say it wasn't working in tandem with the part of the brain associated with subjective values anymore.

Nafees Hamid: So if our interpretation of the data is correct, what that could mean is that when someone's really at that moment of willing to fight and die for a sacred value, that is not the moment in which they are thinking and deliberating and self-reflecting about what they're going to do.

Malia Politzer: Hamid says that this is the moment when sacred values are basically running the show. And for Scott Atran, this shows something very important.

Scott Atran: Response to sacred values is an almost automatic response. That is, it's a rule-bound response, it's you gotta do it. You gotta do it because it's right no matter the consequences. You don't think about the consequences.

Malia Politzer: But this automatic response, it seemed to change when they realized that they were out of sync with their peers.

Nafees Hamid: So what we found was that they actively lowered their willingness to fight and die, their own personal willingness to fight and die, to conform to the peers' average response. And not only that, we saw that that part of the brain that was previously offline, came online. Indicating that perhaps in the moment when you realize that you're out of step with your peers, that's kind of a moment of deliberation, self-reflection coming back online.

Malia Politzer: If the findings hold up, the implications could be really important. While it's unlikely that peer influence would change an extremist's beliefs, it might be able to prevent them from acting violently by nudging them back towards the rational actor mindset. And this is where social exclusion comes in.

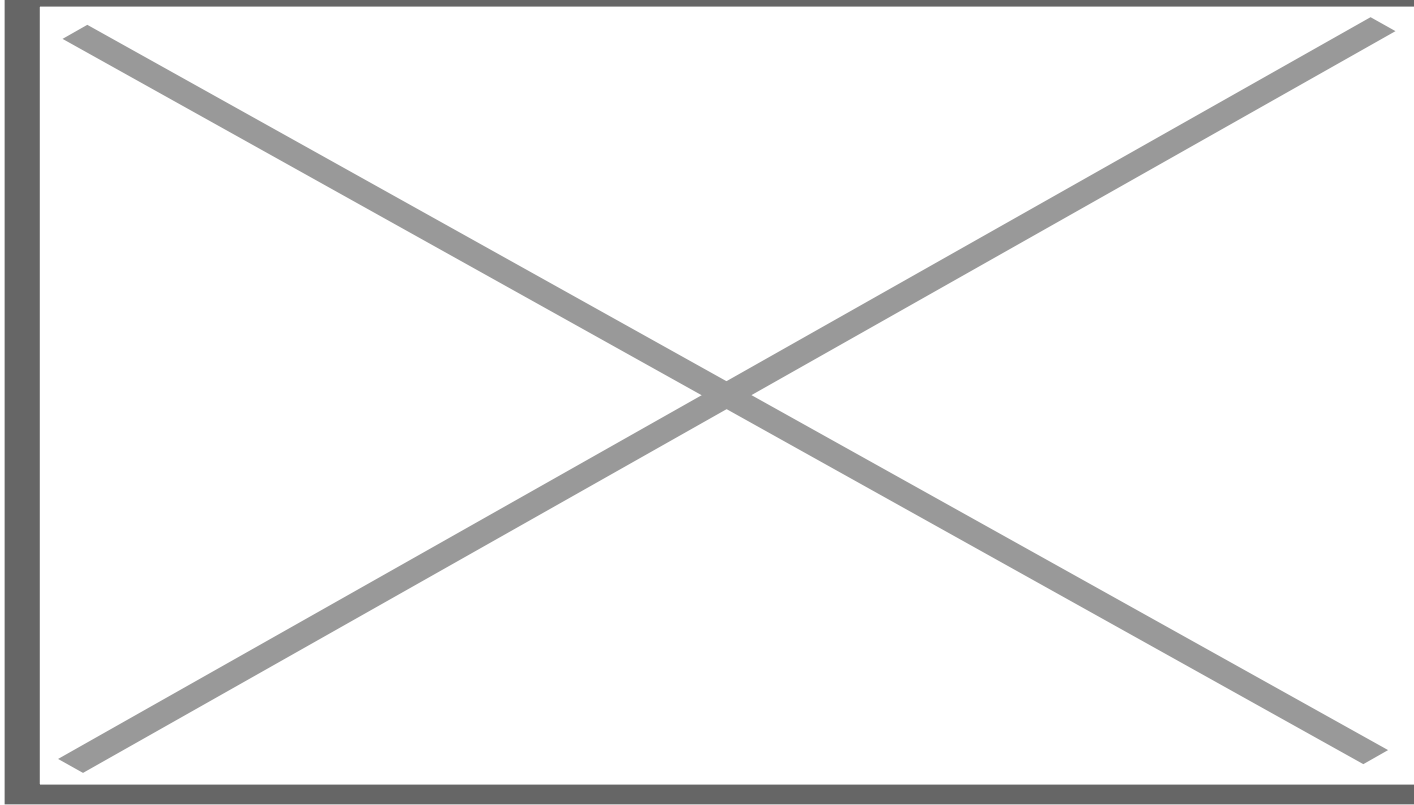
Nafees Hamid: There's a key component here that connects us back to the first study, which is this only has an effect depending on who you see as your peer group. You don't care about the social norms of your enemy. If you feel socially excluded by a community, their social norms won't have an impact on you because you don't see them as your peers. That shows a secondary problem with social exclusion. Not only does it push people closer to the edge of violence, it now removes this tool that we've now discovered that can effectively pull people back from the edge of violence. The social norms of that broader community is no longer going to have an impact on that person because they don't see those people as part of their identity anymore.

Malia Politzer: These were the first studies involving brain scans of extremists ever published. They received a lot of attention from other academics in the field.

Patricia Churchland: It was a tremendous breakthrough. And in a way, it seemed odd to me that it had taken so long for anyone to really do the science that needed to be done.

Malia Politzer: Patricia Churchland is a neurophilosopher at the University of California, San Diego. She works at the interface of neuroscience and philosophy and reviewed the peer influence article for publication.

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Patricia Churchland. Credit: Cold Spring Harbor Laboratory

Patricia Churchland: Now having said that, it is of course something that the researchers recognize, and that we all recognize, and that is that using functional MRI to explore these kinds of phenomena is the best we can do right now, but it isn't wonderfully good. You can see some differences at, shall we say, a gross level, and they are significant. But for us to go deeper, we need better kinds of tools to explore the human brain.

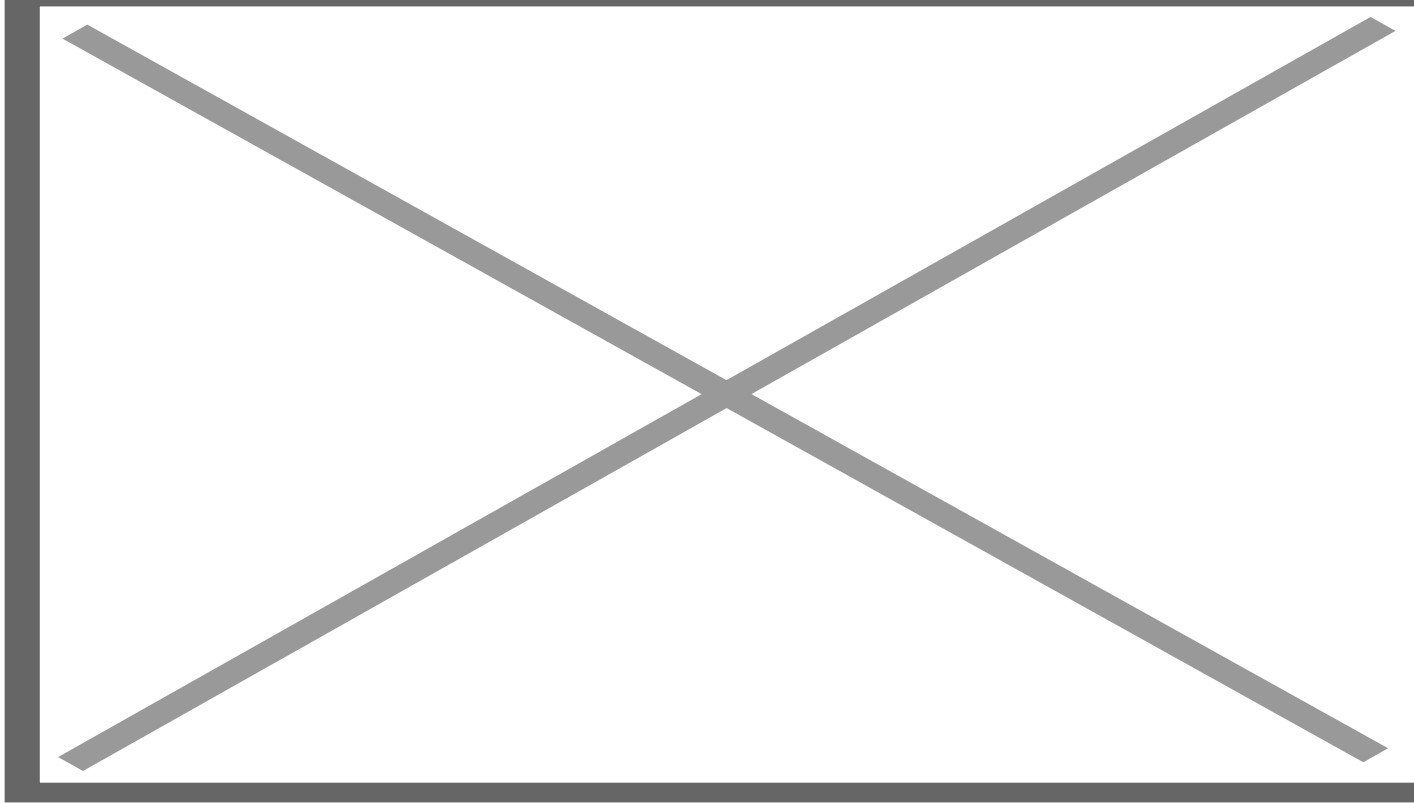
Malia Politzer: Not every neuroscientist was convinced by the results.

Russell Poldrack: So, yeah, this pattern of what we call reverse inference has come to be, you know, really strongly questioned in the neuroscience literature over the last couple of decades.

Malia Politzer: This is Russell Poldrack, a neuroscientist at Stanford University.

Russell Poldrack: The main problem is that when we see activity in a particular region, we can't necessarily infer that that tells us that some particular thing is going on in the mind, unless we know that that thing in the mind is the only reason that that area is ever active. And there's... we don't know of any brain regions that only activate for one single thing.

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Russell Poldrack. Credit: Alcalde

When I read these two studies, you know, my basic takeaway was that I haven't really learned anything more about what's going on in the mind of extremists than I knew before I had read the studies. And that's because the pattern of inference that they're using is one that we know to be unreliable for really telling us much about what's going on in a person's head.

Malia Politzer: Essentially, what Poldrack is saying is that he doesn't think it's possible to draw definitive conclusions around sacred and non-sacred values based on looking at activity in specific parts of the brain.

Russell Poldrack: In this case, it may well be that, you know, sacred values are just, you know, more easily accessible. And so you don't have to work as hard to retrieve the information. That doesn't really tell us that they're being processed by one brain system more than another.

Malia Politzer: Nafees says they aimed to control for as many of those factors as possible.

Nafees Hamid: So we measured familiarity, accessibility, certainty, saliency, emotional intensity, attitude strength. And sure enough, values that were sacred were higher on all of those different factors, but none

of those factors explain the neural activity that we saw. None of them predicted that neural response. Sacredness was the only dimension that actually correlated with the neural activity that we saw. So that's what increases our confidence that the neural activity that we're witnessing is something that is unique to sacredness and not to any of these other potential confounds.

Malia Politzer: Despite these questions and limitations, Liesbeth van der Heide from the International Center for Counter-Terrorism believes that their findings could have real implications for policy decisions.

Liesbeth van der Heide: Most programs focusing on reintegrating or rehabilitating terrorist offenders have long focused on the ideological side of things, trying to bring about cognitive change, or trying to distance a person from his or her extremist beliefs. I think the two studies don't necessarily change all of our thinking around what to do to stop people from joining terrorist groups or how to deradicalize them. I do think they strengthen a couple of trends that are already ongoing, one being that we shouldn't overfocus on ideology. We know that that's a very difficult endeavor, and basically what this research tells us is that maybe we should not focus on that at all or at least not as much as we tend to do now.

Malia Politzer: In fact, Scott Atran believes that trying to convince someone that their sacred values are wrong could have unintended consequences.

Scott Atran: All the studies, the behavioral and the neural studies show us that attempting simply to dismiss other people's sacred values or to get them simply to change their minds about them not only don't work, they backfire and they make the situation worse. When sacred values are involved, you need a very different negotiating strategy or approach where you recognize and respect the values of the others, to the extent that they can be tolerated. You may actually have to fight to the death when people are committed. There's just no negotiation possible.

Malia Politzer: Since the studies came out, ARTIS researchers have received calls from governments all over the world who wanted to learn more. Their findings on sacred values also pave the way for counter-terrorism researchers to better understand other types of extremist behavior — like those on the far left, or the far right.

Liesbeth van der Heide: Overall in the field right now, one of the big questions is: Is everything we've been doing over the past two decades, is that exactly the same, regardless of whether we're dealing with jihadi or right-wing offenders for example? In my opinion this study shows us that the concept of sacred values is not something that's confined to just jihadi offenders. So it would underline the idea that the baseline of what we're trying to do in deradicalization and disengagement, in counterterrorism, is, and should be, applicable, regardless of what type of ideology lies behind it.

Malia Politzer: And, for ARTIS, the next frontier of sacred values research has led them to study online social networks, and how entire populations, even those that aren't already radicalized, can become vulnerable to manipulation.

Richard Davis: So we do see states at present manipulating populations by placing those values under

threat.

Malia Politzer: Richard Davis says that through targeted social media and misinformation campaigns, people can be made to think their sacred values, for example personal freedom, safety or even democracy, are at risk. He says that this can be dangerous.

Richard Davis: When sacralized values are put under threat, you can move people to action. You know, if you just take the Capitol riots as an example, there were foreign operations that were articulating that the election was not free and fair, that it was stolen. And so, basically placing the nation under threat, the nation as a sacred value to a lot of American-loving folks. Some just took to the street. There were others that decided to use violent acts in their expression of their frustration or expression of their defense of their values.

Malia Politzer: ARTIS believes that specific foreign actors are using sacred values research to try to manipulate entire populations.

Richard Davis: The best influence operations and best actors on the planet are coming out of Russia. They are really good. I've got to hand it to them. They understand influence and persuasion.

Malia Politzer: And Davis thinks that we may be seeing more events like the Capitol riots in the future.

Richard Davis: The more outcomes that nation-states get that are favorable to them, the more they realize, and they learn through the process of, how to do this. And so we think the problem is going to be more acute, not less, going forward.

Lydia Chain: Malia thanks for joining us.

Malia Politzer: Thank you so much for having me.

Lydia Chain: One thing I was curious about is whether Hamid and the team had thought about or received any criticism for profiling as they set up the study, especially since those two larger populations already face discrimination and racism.

Malia Politzer: Yeah, that's a really interesting question. You know, I did ask Nafees about that and he brought up a couple of really interesting points. First, the goal of this study was to find actual extremists that they could work with. And one of the reasons they went to Barcelona is because that's where a lot of the extremists are drawn from. And these are the two populations where they see the most activity. And in fact, they also have done work on other populations too. They've done work on Catalan independentists. They've also looked at people on the far right. So they're not only focusing on jihadis but for these two particular studies, those are the populations of interest to them.

He was also very careful to point out that for them to find the people to actually come in and take the brain scans they had to survey a *ton* of people. And the vast, vast, vast majority of the populations, both the

Pakistani and the Moroccans, were not, like, anywhere near to ... they weren't extreme at all. [Laughs]. Like, not even a little bit. But they were designing the studies so they could find the very few people who were in that category, so they could actually do scans on people who were active extremists. And this brings to the second point which is there's a real problem in neuroscience studies which is they are disproportionately on basically White college students, and then they use the findings of those studies to make generalities about all of humanity. And that's something that is inherently problematic. So they wanted to talk to people that were already active extremists or people who were in the process of radicalizing and not just White college students who were imagining what they might feel or think if they were being radicalized.

Lydia Chain: At the end of the story, Davis talks about some of the new ways radicalization happens. What are they looking into next?

Malia Politzer: Yeah, so ARTIS is in a really interesting place right now because they've always been a really field-based organization, but right now, partially because of Covid and for some other reasons, they have started to move into the online space. And one of the reasons is because right now that's where a lot of radicalization is happening, both of jihadis and also people on the far right. A lot of people are kind of found and groomed online and so they want to try to understand a lot of the dynamics that are making that happen. And they're also looking a lot into social media bubbles and how that can have a funneling effect and kind of pushes them towards more extreme views and extreme communities. And it should be really interesting to see what studies they come up with next.

Lydia Chain: Malia Politzer is a freelance reporter based in Spain, as is Ruth Edwards who produced her segment. Our theme music is by the Undark team and additional music in today's game episode comes from Kevin MacLeod at Incompetech. I'm your host, Lydia Chain.

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