

# Just Workplace Stress and Its Impact on Decision-Making in Forensics

**Introduction** [00:00:01] RTI International's Justice Practice area presents Justice Science.

**Voiceover** [00:00:09] Welcome to Just Science, a podcast for justice professionals and anyone interested in learning more about forensic science, innovative technology, current research and actionable strategies to improve the criminal justice system. In this episode, Just Science sat down with Dr. Mohammed Almazrouei, a forensic practitioner with the Abu Dhabi Police, to discuss his dissertation work, which examines how workplace stressors may affect decision making in the field of forensic science. In their daily jobs, forensic science practitioners are tasked with making countless decisions that can make a large impact on people's lives. As a result of this experience, Dr. Almazrouei conducted a pivotal research study to examine how stress affects the way that forensic practitioners make these important decisions. Listen along as Dr. Almazrouei highlights some of the most salient workplace stressors in forensic science, how those stressors affect decision-making, and how he's laid the foundation for future research on this topic. This episode is funded by the National Institute of Justice's Forensic Technology Center of Excellence. Some content in this podcast may be considered sensitive and may evoke emotional responses or may not be appropriate for younger audiences. Here's your host, Donia Slack.

**Donia Slack** [00:01:11] Hello and welcome to Just Science. I'm your host, Donia Slack, with the Forensic Technology Center of Excellence, a program of the National Institute of Justice. Today's episode aims to offer some recommendations of what forensic labs could do to manage workplace stressors that forensic practitioners may face. The conversation will first focus on some theoretical background and research findings on the possible sources and impact of stress on decision-making in forensic science. Here to discuss this case study is Dr. Mohammed Almazrouei. Welcome, Mohammed.

**Mohammed Almazrouei** [00:01:42] Thank you so much, Donia, and thank you really for hosting me in this episode. I would like to start with a disclaimer. Opinions expressed in this podcast are solely my own and do not represent the opinions or beliefs of Abu Dhabi Police. In addition, any findings mentioned in this episode are not necessarily reflective of specific organizations.

**Donia Slack** [00:02:04] Same goes for the disclaimer with the National Institute of Justice. So Mohammed, I was able to get a copy of your dissertation work that was focused on forensic stressors and was a very great and comprehensive study that really adds to the body of literature that I know is sorely lacking. So I would love to know what sparked the idea for you to do this research.

**Mohammed Almazrouei** [00:02:28] I would say the thing that sparked my ideas could be divided into two main aspects. One is from practice. I am a forensic practitioner, so I feel that during my work, researching this part is really important. Looking at workplace stress and how it can contribute to the practitioners well-being and their performance at work. Now there is a lot of developments and technologies in forensic science, but here the focus of my research is on the people, on the human, on the practitioner, because in the end it's the practitioner who are the ones who will operate those technologies and they are the ones who will make important case decisions. Some of these decisions are even complex and difficult that technologists may not be able to unpack. So it's really important to maintain the optimum working environments of the people, of the practitioners themselves. Otherwise, we may end up losing them, losing those talents, and in the end it

might be a cost to the forensic science organization. This is the practice side of it that sparked my idea to look into this. And the second part, I started by looking at the broad picture of the human factors that may influence decisions in forensic science. And I read the papers by one of my supervisors, Dr. Itiel E. Dror, and I was really, really fascinated by his work. So I started digging deeper into this and I was very lucky to be part of his team to work with him and Professor Ruth Morgan at University College London when I was doing my Ph.D. And during these discussions, it was very evident that there was a huge significant lack in the literature in terms of understanding workplace stress, but more specifically how it pertains to the decision-making of forensic science.

**Donia Slack** [00:04:32] Yeah, I was very interested by your research study and your concepts for being able to really test this. And it's interesting, I also have an interest in this as well as I have also been involved in the research realm for this particular topic. And it was kind of this similar journey where you understand when you're around other forensic scientists that there are different types of stressors that they might experience. And you also know at the end of the day that the analysis and the decisions that they're making, they really do have a life or death impact, right? Like there are consequences to being able to ensure that their decisions are not being taken lightly. And so I have also kept up with the research work of Dr. Dror. He's obviously very well respected in this field and a lot of interest even by the National Institute of Justice in funding research in this area. And hopefully that continues. So I'm really excited to look at, and for the audience unpack, what this really important study that you performed. So what were the main research questions that you aimed to address in this study?

**Mohammed Almazrouei** [00:05:38] I would say, broadly speaking, the two main research questions are, first, what are the possible sources of stress that forensic practitioners feel? So this was answered through self-reported studies. And the second main part was what is the possible impact of stress on real decisions in forensic science? These are the two main questions that I looked into. And just to make it clear, why am I saying, emphasizing on the possible so I say possible sources or possible impact. The reason here is because our study was one of the first to look into the relationship between workplace stress and the stressors in general and decision-making, as we mentioned earlier. Many of the other studies looked at other aspects like well-being and others. That all impacts on, which is when we think of the impact of stress, we can look into three types of impact. One is on the strain that the human practitioner may feel. So that could include things like burnout or having a secondary traumatic stress by being exposed to distressing elements from the families, of the victims, or other aspects. So this is a strain impact, which we could call it. Then we have the second type of impact is a job attitude. So here we're looking at how people think. So what do they think about their workplace and jobs? Are they satisfied? Are they motivated to do the actual case work analysis? So this is about the second level. It's an attitude. And then if that attitude becomes a behavior, so that would be the third form of impact I'm looking into here, and behavior can include things like people started now to look for, actively to look for, other jobs or their behavior during the case work and the decisions and performance. So my research actually looked at this latter part, the job behavior and specifically the performance and the decision-making of experts. That's why we're not sure, this area is quite immature at the moment in forensic science domain compared to other domains. Now, the second reason why I'm saying it's possible is stress research generally is a complex matter where it depends on the context where we are studying it. Stressors can vary from, for example, lab-to-lab and even within the same lab, and it differs even among individuals. That's why it's actually more scientifically sound to say that our findings were exploratory in nature rather than having a definitive answer.

**Donia Slack** [00:08:40] So that's really interesting. And I agree. I mean, I've looked at the literature, I keep up with the literature, and there really are very few studies and none that I can think of that really do look at the impact of stress on decision-making, specifically in the forensic sciences. There have been other studies, I know you're using a study for how to induce stress. So this is clearly research that's been done across other domains. And it's interesting that this has not been done yet, specifically on forensic scientists. So if you could just tell us a little bit about the design for the first research question of the types of stressor and then maybe discuss some of the findings from that?

**Mohammed Almazrouei** [00:09:21] Yes, sure. To answer the first question, we worked through my supervisors, with a lab/ collaborator lab, to identify the possible sources and to refine the research questions in there. And we managed, in the end, to have a set questions that are meaningful to the lab and to categorize the questions into what the possible source of stress. And also within that, the feedback. And I will explain soon how feedback could relate to stress. And then within the design of the survey, it was agreed through the available data that the scale would be 1 to 7, where 1 would be no feelings of stress and 7 could mean high feelings of stress. And this is how we went through with the first study.

**Donia Slack** [00:10:18] So this was a Likert scale that you gave to your forensic practitioner's self assessment for them to determine their perception of their stress, correct?

**Mohammed Almazrouei** [00:10:27] Yes. Correct. This was their perception of the stress and how they feel that they experience stressors in the workplace.

**Donia Slack** [00:10:35] Was it generally how they felt about stress, whether it was workload or management stressors, or was it a combination of both?

**Mohammed Almazrouei** [00:10:44] Through that study, there were a combination of questions that included both questions from the actual workplace, like you mentioned, related to management or related to how many case works they are involved in. And also there were questions related to the specific tasks that they can get involved, in terms of reporting conclusions. And there were questions about stressors outside the workplace, like personal stressors. And we tried to see if there were variations among these different types of questions.

**Donia Slack** [00:11:23] Fantastic. So I know you had a pretty good sample set, about 150 examiners. So that is a really nice rate of getting the survey data back. So can you maybe go over what the findings were for that first part of the study?

**Mohammed Almazrouei** [00:11:36] Looking at the main findings of this first question, so the possible sources of workplace stress. We could say that the main findings seemed to go to this direction first it seemed that the forensic practitioners seemed to perceive that their stress comes more from what you call common stressors. So common stressors are the ones that could be common across occupations, not necessarily in forensic science context, so even outside non-forensic domains can be applicable to them. And these were mainly through stressors from working high caseload and from working too many cases. And second, from supervisory and management stress; and that level of stress, was more than other types of stressors, including forensic specific stressors. So what do I mean by forensic specific stressors? It is those that are unique to the forensic science context. And one example here, working high profile cases, that was not, I was a bit surprised actually,

that was not the main stressor. And even compared to personal reasons were lower than the comments versus the personal reasons could be things like having financial issues. So this was a main finding that common stressors are really important. And why I think this is important because if these studies show that common stressors could be things like having even promotion backlog, like people stop being promoted or other thing. That means we can look at management approaches that are coming from other domains and we can benefit from them here. This could be a justification for that. Another thing that this means that maybe the management might be looking at meaningful management mitigation. I don't like actually the word mitigation, I prefer the word optimization strategy.

**Donia Slack** [00:13:45] I like that!

**Mohammed Almazrouei** [00:13:46] The reason for using the word optimization, is that stressors can be high and can be low, and we want it to be at an optimal level of moderate rather than being too high to be mitigated or too low to be increased for an optimal performance.

**Donia Slack** [00:14:06] Well, I was interested by your your take on that, because I know from the literature review that you've done in your work. So this was a paper by Driskell et al. (2014) that too low of stress actually can lead to an under load boredom, lower performance. And that has actually tracked with a lot of the research that I've looked at where when individuals are burned out. Sometimes people make this assumption that they leave their jobs, but it's actually the opposite. They stay in the job, right. And so that actually could be detrimental to the actual job itself. When you have disengaged lower performers who are burned out or maybe feeling too much stress, too little stress, and they end up staying in the job in ways that maybe they shouldn't. However, it's interesting, too, that in your literature review that moderate levels, actually that is the optimized level of stress. And that was a paper that was actually done by Yerkes and Dodson, and it's a paper from 1908. So more than 100 years ago, research has been looked into of what is that optimum level of stress. So it is interesting.

**Mohammed Almazrouei** [00:15:12] I couldn't agree more. And we forget sometimes that some stress can be good and can be motivating actually to people. The Yerkes-Dodson Law is, as you mentioned, is quite an old law that we still use today. And it's good that we are now looking at the low part of the stress, not just the high part of the stress. So we mentioned one of the main findings on the possible source of that common stressors are important. Now, there was another interesting finding. So we had questions about feedback and how they could be related to stress and could affect one another. So feedback could be just from a theoretical perspective, it could be either explicit feedback in the workplace where let's say the supervisor would talk to other people and they say "thank you", for example, or "well done". This is an explicit feedback where it's coded and expressed. A lot of the feedback are not expressed and they are implicit and the receiver might not understand, but they might perceive it in a way. So this could be things like smiling. And I found that there were some of the questions that were more of the implicit feedback that the experts or the practitioners may experience. We found that some of the practitioners felt that they knew what the stakeholders would communicate with them, like stakeholders like the lawyers or the police officers from their conclusion. And that's an expectation that the practitioners feel, at least even if it doesn't exist, that doesn't matter what matters here, that they feel it and they perceive it. There could be some systemic pressures within the working environment. Some of them are not expressed and are unpleasant. But in the end what matters is what the conclusions of the reported conclusions, and that is what goes in the end to the stakeholders and might have impact or

consequences to the case. Ultimately, because one expert will have many cases and even one expert decision is important, and it's ultimately hope that none of the experts will have or will feel implicit pressure to report any conclusions.

**Donia Slack** [00:17:34] Again, going back to your word of optimization, that's an easy thing perhaps to optimize, right? Laboratory managers and supervisors and other engaged stakeholders, whether it be the investigators, prosecutors or others in the legal system, to even just give feedback, you know, that implicit or explicit feedback could actually add to the wellbeing or the workplace perceptions of stress. Would you mind giving us a little bit of background on some of the sources and background theory on occupational stress?

**Mohammed Almazrouei** [00:18:09] I would say that one way to look at workplace stress and it's very useful to have this understanding, theoretical background of stress before digging into the empirical data. First, you have stressors that are surrounding the practitioner distance from the workplace environment, like having the relationship at work as an example, so it's outside the practitioner themselves. Then you have factors of stressors that originate within the individual practitioner and these could be their own background anxiety, for example, or how much they tolerate uncertainty and ambiguity. Tolerance to ambiguity is a known phenomenon in the medical domain. It could be applicable to the forensic science domain. For example, when you look at the selection of traces of ambiguous crime scenes that could induce some tolerance to ambiguity stressor. So we have the working environment stressors and the individual stressors. Now the work environment one could be further classified due to either common stressors and the ones that are specific to forensic science. So these could be include things like being exposed to bloody crime scenes or in the forensic sciences generally tendency that to not tolerate having mistakes because mistakes can have consequences due to the casework. Now, when we look at solutions or how to manage stress, there is a third level that should be looked at. That stress can be good and can be bad. And what we aim here is to minimize the bad and to increase the good. And one theory that is very relevant here, is what's called the Challenge-Hindrance Stress framework. In this framework, we have the challenge stressors. So these are the stresses that can be motivating to do the work, and that could include reasonable deadlines. So deadlines actually are good stressors, if they are reasonable. They can be motivating and maybe we should encourage that. And then you have the other one, the other type which is hindrance stressors, and these are the ones that are not good in a way. This could include role conflict or even office politics. So ultimately what we are looking for is to increase the challenge stressors and to reduce the hindrance stressors.

**Donia Slack** [00:20:56] So at this point, you could tell us a little bit about the second part of your study. What is really the impact of stress on forensic decisions. So what did you do and what were some of your main findings?

**Mohammed Almazrouei** [00:21:08] This was actually the more challenging part of my research. So in one of the self-reported studies, we found out that practitioners were divided, some of them thought, okay, we think that stress impact our judgments. Others say, no, we don't think and others were not sure. So this was another justification to look at this question in an experimental approach by inducing stress and having a forensic judgment so that we have a more objective answer. So what were the design of this study? First, we had to select a forensic technician. And what we decided, since this was an exploratory study, we decided to choose fingerprint technicians because fingerprints are widely used in the forensic science domain. They carry a lot of weight in the legal judgments as well. And another reason for selecting this type of technician is any findings

that we may find with fingerprint may be applicable to other disciplines that relies on pattern recognition. Now, the more challenging part is how do we stress participants? We needed to actually, here, to induce stress to human participants effectively so they feel they are stressed. But we were not allowed to stress them too much because otherwise it's unethical to research. So what happened is when we started to do that part, COVID-19 happened and it forced us to think in another way. So a lot of the research moved online during that period. We were not allowed to access participants in-person, so we had to think of a way to stress participants in an online environment. So I had to really look into other domains. I looked at the medical domain, the psychology domain, and all of these stress inducing methods that other people did. And I tried to see what I can adapt. There was at the time no research that did stress participants online and without the presence of researchers. So researchers are usually used as stressing agents. And we didn't want to do that because our research is a bit more complex that we cannot be present with every practitioner.

**Donia Slack** [00:23:50] You don't want to add in that variable of having your observer effect, and is that the stressor or is the stress the stressor? Very challenging!

**Mohammed Almazrouei** [00:23:57] Exactly! There are many variables that were involved and we wanted to simplify the experiment as much as possible. So in the end we used two types of stressors and combine them together. One is what we call social evaluative threat. So this is a stressor that means when one person is being negatively judged by other people, like you have a negative feedback so they feel bad about it. And the other kind of stressor is what we call uncontrollability. So when the practitioner cannot control the situation, like having a deadline or time pressure in order to achieve a task. And one meta analysis found out that if you combine these together, you can achieve the highest level of stress to human participants. So we use that theoretical background in order to do our manipulation. And what we did was simple, following a previously established method using mathematical questions and multiple choice questions, but with deadlines and with feedback given to them. So the participant could answer a question, let's say a mathematical question, they might receive a wrong feedback in red, and we classify that as a social evaluative threat because they are being negatively judged by the computer in this example. And we found a way to compare the individual score with an average score so that they feel even more negatively judged. And we had different elements to induce uncontrollability. So they could not, for example, choose the type of question, it was random and they could not choose. And there were time limits to answer the questions in the stress condition. All of these were uncontrollability stressors. So we measured the effectiveness of this online stressor through two self-reported scales. One is called the State Anxiety Scale of the STAI Scale. So basically how much anxious the participants feel around a certain moment. And also they had to report retrospectively how stressed they felt during the manipulation. And thankfully, this was found to be effective. It was published in a behavior research methods journal. In the end, how this could be related to forensic science in terms of stressor. Now, from a theoretical perspective, we have uncontrollable social evaluative stressors in the forensic science workplace. I can give you examples, is some of the labs go through ISO accreditation where they get the 17025 or 17020 accreditation, and sometimes the auditors can come unannounced or external auditors, they can come and check the work. This is a form of social evaluative threat because you are being negatively judged by the auditors. And if it's anomalous or undetermined, it's a time of uncontrollability. So obviously it's online. It's not as realistic as in person, but at least we started to understand the impact of uncontrollable social evaluative threat.

**Donia Slack** [00:27:33] I know you say it's just online and it's not as realistic, but I can tell you, even from reading your dissertation, how you put the big red word and it said "Wrong" or it said "Time Out", and then the neutral, when it was right, it was just a gray "Okay". You know, when I read that I thought to myself, oh, my goodness, I would feel stressed at having to answer these questions and then have it just that big red word saying wrong, time out. And then when I was doing well, it wasn't very positive. It was just like, okay, so I think it felt really realistic and I can actually say, I mean, obviously studies would have to be performed on this, but just the trend of your data pool, I did notice that you did have a dropout rate of the experimental group, and it was somewhere around 17% of your experimental group actually dropped out in the middle of the test. So to me, that tells me that they were not happy with the level of stress that they were feeling. So I think you should give yourself more credit that you were absolutely able to induce stress. Okay. So after piloting those online stress methods, talk about what those results were.

**Mohammed Almazrouei** [00:28:42] Oh, yeah, This is like the main point here, because ultimately we want to see what is the potential or the possible impact of this stressor that we created onto fingerprint assessments. So what we did is we looked at the impact on both not experts/novices using Prolific Academic, which is a crowdsourcing platform, and also for fingerprint practitioners. We found out that the relationship can be complex here between stress and their decision-making. One reason is because we looked at inconclusive here. That's why we we classify this as a complex. But the main finding that this stressor, it actually improve some judgments made by fingerprint examiners, especially for the same source evidence. So the evidence that is a match, they reported higher matches correctly compared to the control group, the non-stress group. But we found also that I could classify also improvement in judgment that when the fingerprints were very difficult, the stress participants were taking less risk. I think that's great. But why would I say that they took this risk because they were reporting more inconclusive. So they were saying, I don't know more. That means they're not taking a risk by saying a match or an identification or exclusion, and they would be prone to error in that sense. Technically, this is classified as taking less risks, but in my opinion, it's moving to the right direction. Also, we found out that the experts performed better than the non-experts, but the unexpected is that they're not-experts performed reasonably well with minimal training in terms of their decision-making. And the last finding was that the online stressor of social evaluative threat and uncontrollability did actually influence the overall confidence level and the response time of the non-experts, but not as much with the experts. And I thought, okay, so the experts were more consistent in their responses, both in the stress and the non-stress condition.

**Donia Slack** [00:31:08] So the experts were able to draw their conclusions in a consistent amount of time, whereas the novices did they take longer or did they go quicker?

**Mohammed Almazrouei** [00:31:18] The experts were taking almost five times more time to make their judgments compared to the non-experts. I would think that being an expert, you would respond quicker because you're familiar with the task. But here we could explain it differently, that they were really cautious and they wanted to get it right, while maybe the the novices were not sure about how to address or answer the task or even they wanted to finish it a bit quicker because they were being paid through Prolific Academic.

**Donia Slack** [00:31:56] Well, that is really, really interesting. You know, just the findings overall from this study, primarily that stress improved the performance of both novices and the experts. That was really interesting. You know, a lot of times there is anecdotal

information or people make assumptions of what stress can do to somebody, but actually showing it with this experiment and you had a very good sample size even for this stress set I know it was more than 100 examiners. I would say a very nice sample set that you were able to show statistical significance because it was such a nice set and that stress improved. So it was great to caudify that with some actual data to back that up.

**Mohammed Almazrouei** [00:32:36] I couldn't agree more. Now we could see, we have some data showing that we have at least moderate stress it actually improves some of the fingerprint judgments. Each fingerprint expert made more than one judgment, actually each fingerprint examiner made six decisions, and it added up to be many, many decisions.

**Donia Slack** [00:32:58] So you have a pool of more than 600 decisions to be able to draw your statistical analyses from, so that right there is extremely impressive. And then also the observable effect of the risk taking of both the novice and the experts. And it is really interesting to see that the stress reduced the amount of risk that one wanted to take. It's nice to hear that, you want your experts when they're feeling that to be able to take a step back and maybe not take the big risk.

**Mohammed Almazrouei** [00:33:27] To add onto that Donia, I want to say that our study is really one of the first studies that included inconclusives as part of the judgments. Many of the previous decision-making studies in fingerprints did not include inconclusive because they were looking at the accuracy of decisions under certain contexts or conditions that would accurately correct identification or inaccurately correctly identify. But we added the the inconclusive here for various reasons. One of them that actually in practice, fingerprint examiners do opt for inconclusive. And it's an important decision that highlights the risk taking of practitioners.

**Donia Slack** [00:34:12] With that, I would love to be able to get some of your thoughts on how you believe laboratories might be able to optimize workplace stress, because we know there needs to be a healthy balance.

**Mohammed Almazrouei** [00:34:23] I really, really like that you use this word and I encourage everyone to think of stress and the workplace to be optimize or managed, but not mitigated, not reduced because as we mentioned earlier, some stress is good, so we might need to increase it actually. So by looking at the findings of the study that I mentioned, as well as the broader literature, we can get some insights that could be useful to be translated to practical tips in the workplace. I want to start with the basic thing that forensic labs and the managers should rethink of stress and workplace stress and to be part of the work environment, to be an integral human factor of the work practices. This is the most fundamental and the most important part here as we recognize what stresses, its impact, and why is it important? We can create so many initiatives and everything else will be just a matter of project and follow up practice. But this has been most key part in my view. So it's not the stress that we expect practitioners to deal with. There is some research actually, shows that because forensic practitioners signed up to be a practitioner, they know what they are involved in. That's why they're expected to deal with the stressor. I don't think that's the ideal perspective here or we don't need to deal with stress just when there is a crisis. In my view, from what I looked at, the private sector has done a good job here, like looking at research from Google and Target. They were implementing mindfulness practices as an example of a stress optimization strategy a while ago. So looking into this basic thing, we think of stress as an integral part of the work quality. I wanted to bring up a new ISO. It's ISO 45003. It's a way actually to look at occupational

stressors in the workplace and how to manage them. This is a very new ISO looking at the mental health of the employees and it's a way for forensic service providers to be at the upfront of tackling stress and mental health. So it highlights things like ineffective communication, poor leadership, and how to manage workloads, for example. And I think, I really encourage managers to look into this and maybe considering implementing it in the workplace. Now, a second practical tip is what we called earlier common stressors, and I wanted to focus on case backlogs or when we have high case loads. So this is actually a common issue in forensic science. It's not new, but till today there is no consensus on how to resolve pressure for having high case loads. And I want to highlight a really good solution here that was first highlighted by Dr. Max Houck, and I encourage thinking about it. It's about thinking through system thinking approaches. There has to be some holistic thinking about the problem of having high case loads or case backlogs. So what does system thinking mean? It means you don't look at what happens in the lab only, but you look at what happens before the sample reaches the lab and maybe sometimes after. So it's the whole system integrated together. One clear example here that many providers face is what we call artificial backlogs. The output may not be needed by the stakeholders and would be just artificially adding to the case backlog. So here there are various approaches to deal with it. One of it is having constant communication of what exactly is being needed here. It's about having a system thinking rather than what we call mechanical thinking. Mechanical thinking means this period of time, maybe every year we have too many cases. So maybe we have people having more shifts to work or more hours. It's a reactive approach rather than a proactive approach. This third practical step that I want to highlight is about improving relationships in the workplace. This is an important aspect, in my view, that practitioners, they don't normally work in isolation. They communicate and receive feedback from different stakeholders in the workplace, should be their colleagues, the investigators, the lawyers and others. So each type of communication makes all the difference to us. But here I wanted to highlight or to focus on the relationship between the supervisors and the the practitioner, because this was one of the studies I mentioned earlier. Previous research found that management support can have two way impact. It can reduce stress that potentially practitioners may feel. Secondly, it can increase satisfaction. These are two different cognitive aspects, but they are toward the right direction. Now the ultimate aim is to improve the practitioner-supervisor relationship and their communication. One way to achieve this is through what we call emotional intelligence, and this is a great avenue to highlight. A 2022 paper by Donta Harbor. I thought his paper was very interesting (in Forensic Science International: Synergy), highlighting how in the forensic science workplace managers, what can they do in terms of emotional intelligence and why is that important? Now, maybe emotional intelligence could be a nice word that we talk about, but when you look deeper into it, it's more than just a nice word of emotion and intelligence. It's a skill that can be acquired by the practitioner and the manager that needs training to them. Typically in the workplace environment where there's a lot of cases going on, communication messages and interruptions. It takes time and effort and skill for the manager to take time, pause and think that they are talking to individual practitioners and that's part of the solution. And maybe the last two points I want to mention is that we need to look at also the low stress, not just the high stress. So maybe we might need to look at the opportunities where might increase stressors to the practitioners, for example, if they are doing the same tasks again and again, again, like in DNA work, there might be an opportunity to rotate the tasks so that they don't get bored from doing the same job. And the last point is to actually have proactive training practices to improve the mindset and how the practitioners may behave in stressful conditions.

**Donia Slack** [00:42:25] A. I have never heard of ISO 45003 and I quickly did a quick Google search on that and I find it to be definitely worth looking into, especially now that we are seeing that it really is linked to so many things. And that's why I like that it's linked to occupational health and safety management. So it's kind of taking the whole picture of mental health, physical health, physical safety for our employees around any discipline really. And then also training the practitioner, not just the managers, but also training the practitioners. I like that as well, right? Having people think about their own mental health and their own perception of it. So what do you think the future is for research like this?

**Mohammed Almazrouei** [00:43:10] I would say in my view there should be more and more work, first of all, to better understand stressors in the forensic science workplace, because we just touched on very small part of it and there is more and more work to do in this area. But I feel we should also start to look into how we can manage stress in the forensic science workplace and optimize it and optimize the performance. And one issue that we are facing currently, in my view in forensic science, that many of the recommendations into how to approaches to manage stress are based on self-reports or previous research or opinions or anecdotes, but not on objective experimental approaches. And this is different to other domains like the medical domain, for example, where they have done quite a bit into understanding how to manage stress in an objective way through behavioral experiments. So what I mean by behavioral experiments, what I mean here, so we have people, some of them could be treated with a certain intervention, stress interventions and other group comparable groups with a different certain dimension or a control group. This is similar when we do what we call randomized controlled trials for medicine, where some medicine is treatments and some is a placebo. But we can have other types of experiments which are quasi-experiments, what you call quasi-experiments, where you have one intervention 1 and another group intervention 2, and you compare them. So by having this, you can really understand how the stress management intervention work, what works and what doesn't work. And here it's important to differentiate between three levels of management. One, that is what you call primary intervention. This looks at the original source of stress and how we can mitigate it or increase it or modify it like redesigning the job, for example or the task. This is a primary intervention. Then we have a secondary intervention is we look at the individual, the practitioner, and how they perceive and react to the stress and modify or work on to this. Things like cognitive behavioral therapy or mindfulness techniques. This is the second category. And then the last one is tertiary interventions. These kind of interventions look at those who already suffer from long term stress. And so they need, they were diagnosed with things like post-traumatic stress disorder, as an example. And for this category of intervention, you need interventions like counseling, for example, to mitigate the issues.

**Donia Slack** [00:46:07] I could not agree more. I know at the moment when this is being recorded, there is a lot of solicitations, research, grant opportunities that the NIJ has put out, and I do encourage people to look at what are what are ways that we can increase this body of research. And it's also very important to recognize that forensics doesn't work in a vacuum. It's one portion of a very important criminal justice system. And so it does need to have attention brought to some of these stressors. Fantastic. I could not agree more. And so, Mohammed, I would like to thank you for adding to this body of literature. I think that it's critically important.

**Mohammed Almazrouei** [00:46:46] I would also like to thank you, Donia, and the team for giving me this opportunity to talk about this important topic.

**Donia Slack** [00:46:54] Well, if you enjoyed today's episode, be sure to like and follow Just Science on your platform of choice. For more information on today's topic and resources in the forensic field, visit [forensiccoe.org](http://forensiccoe.org). I'm Donia Slack and this has been another episode of Just Science.

**Voiceover** [00:47:11] Next season, Just Science covers topics from the recent ASCLD annual symposium. Opinions or points of views expressed in this podcast represent a consensus of the authors and do not necessarily represent the official position or policies of its funding.