ARTHUR LYNCH: Hello there and welcome to the special episode of Sigma Nutrition. I am not your host Danny Lennon, I am your host Arthur Lynch and I will be interviewing for this special episode. For today's podcast we welcome my good friend, Eoghan McNeill to the podcast. Eoghan is a researcher in sports psychology and specifically topics that include pre-performance routines and mental imagery in athletes. So very welcome and very happy to have you on the podcast today Eoghan.

EOGHAN MCNEILL: Thanks a million. I am very glad to be on –big fan of Sigma Nutrition and podcast and generally what Danny has built here. So it's a real privilege to be able to join you.

ARTHUR LYNCH: Yeah. And obviously I've big shoes to fill today, filling in for Danny. So Eoghan, as this is a sports psychology discussion and not a nutrition discussion, many listeners of the podcast won't be familiar with your work, so could you perhaps fill them in who you are and what it is exactly that you do?

EOGHAN MCNEILL: Okay, well, basically I am just – I am a sports psychology researcher in University of Limerick and I am a lecturer in Athlone Institute of Technology. I also work with athletes across a number of different sports and performance domains, and kind of attempt to improve their performance in general. I specialize mostly in what we call self-paced tasks or self-paced sports, which is why maybe what we are going to get onto in terms of power lifting is particularly of interest to me and it may be particularly suitable for the listeners of Sigma Nutrition podcast.

ARTHUR LYNCH: As today's podcast is going to be aimed towards power lifting] and you've described as sort of like a textbook closed skill as opposed to a general self-paced skill or an open skill. Could you maybe briefly outline what each of those are and what would be a good example of a general self-paced skill and an open skill?

EOGHAN MCNEILL: Yeah. So they are kind of arbitrary terms. They are kind of terms that get used in kind of research context if you like, essentially an open skill would be any skill that's kind of perceptually based or kind of reactionary based if you like. So any of your typical field sports, so like soccer, GA, kind of open play and rugby, any sport like that where you are reacting to an external stimulus, is what we consider kind of open skills. Then a strictly closed skill then would be self-paced in nature, would be kind of concentration in a relatively or in a totally unchanging environment if you wanted to kind of stick to the letter of the law and the definition of what a strictly closed thing is.

The thing is, is that in general in sports and across a lot of different form skills, we've got continuum between what is called kind of arbitrary open and closed skills. So what we really have the differentiation that's probably more readily made and it's probably more practically feasible for us to make is we've got self-paced skills where the performers themselves initiate the action and then we've got our non self-paced skill or option skills where they are

actually reacting to some sort of external stimulus. So in the case of power lifting, as I said earlier, it's probably as close to kind of a traditionally closed skill or completely closed skill as we get, because it is an entirely stable environment job. We always use the same bar I mean, all that's really changing is the weights. You've got your three main lifts that are – and the environments around those lifts is going to be relatively unchanging, the only factor there really that's going to be changing is the actual weight itself in general.

ARTHUR LYNCH: Okay. So you wouldn't describe perhaps even the presence of a particular referee or someone in the crowd as something that might disturb that definition.

EOGHAN MCNEILL: No, not really because, maybe some researchers would, but for me that's particularly outside of the performer's control, that kind of environmental change while it's just not as – the actual environment in which the skill is being performed can be replicated from planning to competition, that kind of external or kind of extraneous environmental change, isn't really something that we consider when we are clarifying the training closed and open skills or self-paced and open skills.

ARTHUR LYNCH: Okay.

EOGHAN MCNEILL: It's an interesting point. It's something that I haven't considered, yeah.

ARTHUR LYNCH: Right. For example, if you were to contrast it with say gulf putting, which on the surface might seem like a closed skill and you have for example the conditions can be different, the weather, the wind direction. I am sure there's other factors.

EOGHAN MCNEILL: Yeah. So golf putting tends to be cited as kind of a closed skill but in reality they are actually on variable center that are changing in terms of every golf putt is very much different. You got different breaks, the greens different length of putt which is important,

different speed of greens, and other factors, I would say environmental factors, like how actually pure the green is, so whether or not the service is smooth or not. You got all these different factors that A, it's going to affect the putt itself, so it's going to affect the actual physics of the golf ball rolling on green and it's also going to affect the performer in terms of what they actually have to do, so how hard they have to hit the ball, where they have to end the ball. Those variables are constantly changing in putting. But you don't get those changes in something like power lifting.

ARTHUR LYNCH: Okay, excellent. So I think we've got a good fairly comprehensive definition of those terms there. So, Eoghan one of your research interests is in pre-performance routines.

EOGHAN MCNEILL: Yeah.

ARTHUR LYNCH: What exactly is a pre-performance routine and why might that be beneficial for a power lifting performance specifically?

EOGHAN MCNEILL: So pre-performance routine is kind of in the simplest terms, it's kind of a series of tasks rather than thoughts or behaviors that an athlete is going to kind of systematically engage in prior to his or her performance. I know, talking to you, that you had a slight misinterpretation maybe of what pre-performance routine was , just from your own performance...

ARTHUR LYNCH: Yeah. So until recently my understanding of pre-performance routine was literally the mental rehearsal or the mentally sort of...

EOGHAN MCNEILL: Preparation.

ARTHUR LYNCH: Preparation yeah of the execution of the lift, whereas you said that that's not really the case and that's not exactly what the pre-performance routine encompasses.

EOGHAN MCNEILL: Yeah. So, specifically, where pre-performance routines tend to be extremely effective is in expert performers, okay. That's what we tend to get with expert performers is we tend to get this over-learning of their particular skill to the point where they don't have to actually biomechanically focus on any – sorry, don't have to attribute any kind of cognitive resources to the biomechanical focus of the skill itself. So basically in layman's terms they have learned their skill to the point where they don't have to really think about physically completing the skill. So what you end up with then is you end up with all of this kind of free thinking space, which can be filled with task relevant thoughts and that's all performance routine is really doing. It's kind of just filling – it's just filling this time and filling this cognitive space with task rather than cues or actually aids in this case, a lifter to perform properly, if that makes sense.

ARTHUR LYNCH: Right. So there's a sort of in the five minutes or so before you go up to lift…

EOGHAN MCNEILL: Yeah. So like as somebody has set up the platform.

ARTHUR LYNCH: Right.

EOGHAN MCNEILL: You are probably looking at different psychological processes in the five minutes or 10 minutes or a day previous to the competition, when you are talking about pre-performance routines in context of performance and self-paced skills in particular, we really talk about immediately prior to performance.

ARTHUR LYNCH: Right. So the application of the pre-performance routine is in combating the thoughts of "Oh shit this is a big lift, oh shit I haven't done this before, I could miss this lift," and sort of combating those thoughts and essentially putting something sort of pushing them out of the space in the brain if you like.

EOGHAN MCNEILL: And specifically those thoughts has so many steps of the platform, and what a pre-performance team can also combat is somebody having basically like the

absence of a thought. So, somebody like just being not focused or not "clued in" as we've said. So just lacking concentration even, would be considered. So just like the absence of thought really is kind of also a task irrelevant. So one of the important aspects of a pre-performance routine that people should practically be aware of for themselves both in training and in competition is that, so you should execute automatically and experts would do that anyway. So as I said earlier, they don't have to think both biomechanics of their skills, they are going to actually execute the skill automatically. They are not going to really have much conscious thought during the execution of the skill itself. But if you have automaticity in the time previous to the execution, that's when we can get these kind of task relevant thoughts if you like.

So the actual routine itself, and this is important, should actually be a conscious process, and it should stay a conscious process. The point where routine – so say if a lifter has the same routine, for six months or a year, and if that's becoming a conscious process, that's not filling its purpose anymore. It's not filling its function. It has also become automatic, it's not taking off that, it's not taking off those cognitive resources, and then you can get those tasks relevant thoughts fed in. Whereas the whole purpose of routine is to allow for a focus on task relevant thoughts and views.

ARTHUR LYNCH: Right. So once that pre-performance routine becomes automatic, you would say is now – it's not serving its purpose, so it needs to be changed.

EOGHAN MCNEILL: Correct. And that change can be very slight. Like there's kind of a saying, it's not how long a routine it takes, it's what you do that's important okay, because a lot of the kind of seminal research into the pre-performance routines was looking at basically temporal congruency or how similar the timing was from routine to routine from skill exception to skill execution. And the working hypothesis at the time

would have been that at least should take the same amount of time. We know now that that's not the case, basically that's with more difficult, with more difficult situations the routines would get longer and that's fine. What I would say is that it's not how long it takes and it's also not what you do, that's important, okay. It's what you are thinking okay, that's going to be most important. And filling up that time with these task-relevant thoughts and there are different psychological strategies that we can use in terms of developing those tasks rather than thoughts, to facilitate performers and skill execution if you like.

ARTHUR LYNCH: Okay, very good. So pre-performance routines and how exactly would you go about developing them and what are the components of an effective routine and I suppose one that would spring to mind for me would be for example, things like visual and tactile imagery. And you are the one who knows about it, so what would be the recommendations you have?

EOGHAN MCNEILL: So here's the thing and it's kind of a cop-out plus – a lot of what we work with informed psychology and sports psychology and across psychology in general, is working with individual differences, right. So what we have is we got a range of different psychological strategies but what works for Arthur Lynch, the power lifter may not work for a John Doe, the power lifter. Okay, so we've got different psychological strategies that we could use typically while we would see people use quite effectively would be some sort of mental imagery, some sort of kind of self-talk if you like, and then some sort of cue word or trigger word that can be particularly effective. And again, that's going to depend, that's going to depend on the skill, it's going to depend on what spores or what's kind of performance context the actual performer is involved in. And it's always going to depend on the individual themselves as to what's going to actually, what's going to actually work for them, what's going to actually facilitate, so actually facilitate their performance.

ARTHUR LYNCH: So perhaps you might recommend like anything, like any new skill that you start, is to just practice really.

EOGHAN MCNEILL: Yeah. Correct, yeah. So these, so mental imagery in particular is a skill that can be learned. You can develop imagery ability with practice. So typically we'd say, whatever you can manage, it can be quite cognitively taxing, performing mental imagery. So typically we would say five or 10 minutes a day to start off with, and just kind of progress from there and up to around 20 minutes at a time maximum is what the literature kind of, that's what the literature suggests, yeah.

ARTHUR LYNCH: And would you do that in a quiet room on your own, would you do it at the gym, would you do it...

EOGHAN MCNEILL: I would do it as close to the actual performance setting as possible, so make it kind of as ecologically valid as possible, I would say. So the cruel thing about imagery and its use and its efficacy within a pre-performance routine is we can use imagery outside of pre-performance routines, and that's like different. So you can use imagery to imagine, so if you are going to talk about the different environments like the different environment that somebody might have between training setting and performance setting, we can use imagery to kind of account for that and to prepare for that, okay. But that's slightly different to the imagery that we are going to use as part of the actual pre-preference routine. As part of the routine, you just want to use some very simple kind of visual cues whether it's like just imagining kind of kinesthetically it's both visually and it's kind of actually feeling kinesthetically what's going to be like to grip the bar or to lift the bar off the ground, that initial lift and initial kind of surge of power if you like, that's all that you want to be focusing on as part of the pre-performance routine. You are not necessarily going to actually have the time to stand up there on a platform and like fully imagine every second of your lift, because you just might not have the time.

ARTHUR LYNCH: Yeah.

EOGHAN MCNEILL: So you want just very simple stimuli to focus in on to get that, to mentally image, and what you will find is that with effective mental imagery or with effective visualization if you like. You can elicit the same physiological responses or some similar philosophical responses as those that are actually associated with the performance and stuff, which is pretty good. So mental imagery is certainly one skill that you can use as part of pre-performance routine.

And another skill would be kind of basically just positive self-talk, so very simple trigger words or cue words that somebody can do. I would, for power lifting, so, because of the nature of the sport, you are trying to facilitate somebody putting maximal efforts through the bar, in a given moment, okay, which is why a trigger word can be actually particularly useful, in the context of power lifting. So somebody can train a trigger word, so whatever it is, they can use that trigger word in practice in the lead up to a competition, and that trigger word through their training, that trigger word is their trigger to exert maximal power if you know what I mean.

ARTHUR LYNCH: Yes.

EOGHAN MCNEILL: And by sticking to that trigger word in competition, that can be, that would be quite effective strategy to employ as part of pre-performance routine, just facilitate that maximal effort in competition as in training.

ARTHUR LYNCH: So, for example, anecdotally some trigger words you might hear would be Tice or Brace in order to kind of remind the athletes of what they need to do in order to make sure that they are set for the lift.

EOGHAN MCNEILL: Yeah. So some sort of minor physiological cue like that, it's not harmful at all, like it can be quite beneficial. Any more than that in terms of focusing on the actual, in terms of focusing on the actual

biomechanics or the actual technique involved in the lift, I would be hesitant to say, or hesitant to use let's say. So if I give you an example, just from golf, because it's what I conduct my research in, a very common trigger word like golf has been used, it's something like “commit”, so it has nothing to do with – they are not thinking about club position or anything like that in the swing, it's just very simple like basically hit the ball hard. With golfers really you see some of them absolutely have a little biomechanical cue or trigger as part of pre-performance team, where they are just looking for like a checkmark in the swing or a certain position that's just want to make sure if they get into what they intend to have is just one of those. So using something, so in power lifting context, bringing it back, so using something like brace or tight. That's going to be absolutely fine.

ARTHUR LYNCH: Okay, very good. And maybe just, to dig a little bit deeper with regards to imagery, you will hear the terms external and internal imagery kind of thrown around from time to time. What exactly are they and which do you think would be more beneficial for power lifting performance based on what I would imagine limited evidence is available in literature.

EOGHAN MCNEILL: Yeah. So, what we are talking about really with external and internal imagery is we are talking about perspective, so we are talking about first person, third person perspective. This is what we are generally talking about. To be honest with you, it comes out to preference, so whether somebody wants to image themselves, from a first person or from a third person perspective, whatever they find more effective, is what we are generally encouraged anecdotally, as you say. But there is some evidence around this, particularly around the PETTLEP model of mental imagery.

We would say that for performance execution, you want to use a first person perspective, so if you are imagining yourself going through some sort of like

actual performance execution, you want to see from your own eyes, so it means basically that you can kinesthetically more effectively feel what that's going to be like in that given situation, so you are trying to – because basically what you are trying to do is you are trying to prepare yourself for that kind of physiological response, kind of anxiety response if you like. And that can tend to be more effectively achieved through a first person perspective, and then if a third person perspective can be particularly effective. If we are trying to change something about the technique, so for example if you are a tennis player and you wanted to change something in your serve, imagine yourself from a third person perspective and getting external visual feedback like that, so through video or some other kind of feedback means. That's certainly more effective for that kind of skill change in terms of technical changes, so some sort of skill execution.

ARTHUR LYNCH: Very good. So one example I can think of there maybe that brings to mind would be the transition from a high bar squat to a low bar squat. That kind of what brings to mind. So for example, the movement is still the same but there's just subtle changes in the technical execution of it, which is kind of what you are describing there.

EOGHAN MCNEILL: Yeah.

ARTHUR LYNCH: Would that be correct?

EOGHAN MCNEILL: Yeah, absolutely. You hit the nail on the head there. Yeah, so literally as you say, it's just sort of changes to total execution. That is going to be a third person perspective in terms of the imagery is going to facilitate that in theory. Now, maybe an individual might prefer using first person perspective and that's fine as well, but just anecdotally across the board, we would say, first person for performance, and third person for changes to technique. The other thing about using imagery in that context, so on change to technique context, and particularly for lifters is that

you can – you are getting this mental practice okay, and if you are doing it properly and you are imagery build is good and you've done some practice around the actual imaging itself, it's a very low impact way of getting some supplementary practice that isn't physical practice. Look we know, physical practice is more effective than mental practice in enhancing performance, but we also know that there's a significant effect for mental practice, for enhancing forms across a range of skills.

ARTHUR LYNCH: So staying specific to power lifting competition and maybe a way for training in this particular discussion, one of the things I wanted to ask you about was combating the inevitable negative thoughts that will enter a lifter's mind at a meet, so I will just give you a bit of context here for example. So between attempts at a meet, so you might get your second squat attempt right. And then you call for your next ways which happens to be a new personal best for you, right?

EOGHAN MCNEILL: Yeah.

ARTHUR LYNCH: You now have about 10 minutes before you will actually come around to lifting that weight. So that's a lot of time for your mind to wander and start thinking, oh, this is a new personal best attempt for me, I could miss this, if I miss this what will this do to my total, will this derail my performance for the rest of the day. What kind of strategies would you employ with that sort of person who's vulnerable to slipping into sort of a negative mindset?

EOGHAN MCNEILL: Yeah. Well, I guess extremely calm that kind of particularly in self-paced skills the potential for those kind of talks to creep in is – it's an inherent risk with – in terms of the sport. So what we tend to encourage is that like trying to stop with all these uses, so the example I always give is like don't think about the pink elephant and you are going through kind of ironic process here, going to the end and focusing on the pink elephant, right. So I think the most effective

thing to do or the effective kind of say most effective psychological strategy to use in that situation is what we call a thought replacement. What thought replacement involves is the individual having enough kind of meta-cognitive awareness to say okay, I've had a negative thought, you accept the negative thought as it's just kind of part of the, it's just part of the situation. And then you reframe that negative thought, okay. So you are accepting the negative thought so you've had the negative thought, you can't stop that thought but how are you going to actually reframe the thought. So in that case, it's a – so if somebody is worried that "oh I've never lifted this weight before, I'm going for a PB"

So yes, you've never lifted the weight before, but you've put yourself in position now to actually lift a weight, you've never lifted before. How exciting is that? That is exactly what you've spent the last three months or four months or however long your preparation was for that meet, has all been – all that preparation has been for to put you in this situation, to put you in the position to personal best. And by reframing the thought from negative i.e. I've never lifted this before, to positive i.e. I've never had the opportunity to lift this before, I now have this opportunity to go out and perform to the best of my ability and break my personal best. That can be quite uplifting and quite a freeing thought process for someone who needs to go through.

And he's quite healthy, like everybody gets those thoughts, everybody gets nerves, everybody gets that kind of response kind of anxiety response almost. It's just all that is, it's just the psycho-physiological response to something being important to, and once you accept that response and acknowledge that, like that response rate, so that kind of physiological response is why you are competing on, to get those nerves, to have the opportunity to break personal best. So have the opportunity to lift more than you've ever lifted before. That is why you are competing, so

embrace and reframe the negative thoughts. It's very simple strategy. Can take a little bit of practice for people to have enough kind of a meta-cognitive awareness and to understand the thoughts that they are having and B to be able to actually reframe the thoughts effectively. Gosh, once people kind of hit that nail in the head, once people are able to use that strategy, it can be very effective for performance.

ARTHUR LYNCH: Okay, so what you would actually recommend is prior to the niche, to actually imagine those uncomfortable feelings and imagine that – the jitters and the butterflies, prior to the niche and how you would deal with them…

EOGHAN MCNEILL: Exactly, yeah. So like I was saying earlier, we can use mental imagery in a few different ways, one is as part of the actual pre-performance routine and one is just as an effective performance strategy, so it's an effective kind of, almost like motivation strategy. And that would involve absolutely in the weeks or even months prior to competition. Imagining what it's going to be like on the day, so how it's got – and this is kind of most effectively used if you know where the platform is going to be, if you know what gym it's going to be, if it's in your home gym or whatever, where is the crowd going to be sitting. When you imagine like, when you imagine seeing the crowd, how is that going to feel, what's that going to feel, what's it going to feel like when you're on the walk up to the platform, and by imagining those different scenarios, by eliciting those different physiological responses that you are likely to go through, then it's not a surprise on the day you've prepared for us, you know how to reframe your thought, you know how to control your emotions in that given situation as you can perform to the best of your abilities.

ARTHUR LYNCH: Excellent. That almost wraps this up, but before we conclude, if anyone wants to get in touch with yourself and wants to hear a little bit more information on

these topics, where would be the best place to contact you or to find you?

EOGHAN MCNEILL: Yeah, so just by email I suppose is probably the easiest thing to do. So it's just eoghan.mcneill@ul.ie

ARTHUR LYNCH: Excellent. That just about wraps this up but I am just going to finish on – I am just going to ask you now what would be one tip you could give to listeners to make themselves a better version of themselves if you like?

EOGHAN MCNEILL: So what I would say to people is that particularly around performance and so if we are talking about performance, because I am not going to give out a Tony Robbins' style answer. What I would say is that be aware of try and develop your meta cognitive awareness. And so trying to develop an awareness of what you are actually thinking, so what are the thoughts you are actually having, and how are they affecting your emotions or your kind of physiological response on the day of the performance? If you understand the thoughts you are actually having, then you can develop strategies to think more clearly or to increase arousal levels or whatever you need to do. Once you understand those thoughts, you can actually develop strategies around how to perform more effectively. Like one of the issues that I would typically see is people don't know what kind of thoughts are happening, don't really know – like just – it's not something that they particularly pay attention to. So to try and develop that awareness around what you are thinking on the day of the competition is probably going to be – That's going to be very effective, because then as [inaudible 00:32:57] then you prepare for events and then it's just not a big deal on the actual day itself.

ARTHUR LYNCH: Okay, very good, and so maybe to finish then, to reiterate you would say definitely don't try to avoid those negative behaviors.

EOGHAN MCNEILL: Absolutely yeah, definitely.

ARTHUR LYNCH: That's something I see a lot.

EOGHAN MCNEILL: Yeah, absolutely, yeah. So you just acknowledge that you've had like a negative thought or a doubtful thought has crept in, and say that's fine, like it's natural as part of the process. Gosh, I've had that negative thought, how can I reframe that into a positive thought that's actually going to help my performance.

ARTHUR LYNCH: That's just about wraps us up. Thank you again for being on the show Eoghan and leave you there.

EOGHAN MCNEILL: Thanks.