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Understanding the performance-related psychological characteristics and skills of doctors: A sport psychology perspective

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ABSTRACT

Introduction: Doctors need to consistently maintain their clinical performance across a range of different situations by managing the stress response provoked by these situations. Six performance-related adaptive and maladaptive psychological characteristics and psychological skills can distinguish between how athletes manage their stress response and consistently maintain an optimal level of performance across a variety of situations. The aim of the study was to understand how the performance-related psychological characteristics and skills identified in athletes are applied by doctors.

Methods: An exploratory qualitative study was conducted with semi-structured interviews. A purposive sample of 10 doctors were interviewed and the data were analysed by template analysis.

Results: Doctors have similar performance-related psychological characteristics and skills as identified in athletes for managing their stress response to consistently maintain optimal clinical performance. The importance of maladaptive characteristics was also identified, especially in junior doctors.

Conclusions: The findings of this pilot study can be used for informing the design of performance-related educational interventions for doctors to manage their stress response for consistently maintaining optimal clinical performance. An important consideration will need to be a focus on specific groups in their career journey and the development of a multi-dimensional, reflective, and problem-solving approach.

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KEYWORDS

Clinical performance; psychological skills; sport psychology; qualitative study

Introduction

Doctors are expected to provide high-quality care and ensure that there are no threats to patient safety. This requires doctors to consistently maintain their clinical performance during the wide variety of situations that they encounter in their clinical practice. Research has identified that there are several inter-related factors that influence the clinical performance of doctors, including patient, organisational, team, and individual (Cox et al. 2006). The interplay of these factors during the situations that they encounter can also contribute to an increase in an individual doctor's level of stress, which can have an adverse impact on their clinical performance and their mental health and well-being, especially in junior doctors (Teoh et al. 2023). A major individual factor that influences a doctor's level of stress and clinical performance in a situation is their stress response, which describes the psychological (affective and cognitive) and behavioural response to stress (Tattersall et al. 1999). An adaptive response can ensure that the doctor can effectively maintain their performance in situation but a maladaptive response can significantly impair their clinical performance.


There has been increasing interest in applying insights from sport psychology to inform educational interventions for training junior doctors in managing their stress response so that they can consistently maintain their

Practice points

- Doctors are expected to consistently maintain an optimal level of clinical performance across a range of different clinical situations by managing the stress response provoked by these situations.
- Six performance-related adaptive and maladaptive psychological characteristics and skills can distinguish between how athletes consistently maintain an optimal level of performance across a variety of situations over their career journey by managing the stress response provoked by these situations.
- We identified that doctors have similar performance-related psychological characteristics and skills as identified in athletes, which they can apply for managing the stress response provoked by a variety of situations to consistently maintain optimal clinical performance.
- Maladaptive characteristics were noted especially in junior doctors.
- The findings can be used to inform the design of focused, multi-dimensional, reflective and problem-solving educational interventions for doctors.

clinical performance when faced with a variety of situations (Church et al. 2020; Sandars et al. 2022). In a sport context, a wide range of athletes, from golfers to rugby players, are also expected to consistently maintain their performance by managing their stress response when faced with the different situations that they encounter during training and events. An important concern for all athletes is the

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variability, with lack of consistency, of their performance across different situations and a widely applied sport psychology theoretical model for understanding this aspect has been the 'individual zone of optimal functioning' (IZOF) (Ruiz et al., 2017). The IZOF model highlights a reciprocal relationship between an individual's optimal stress response and an optimal performance, with lower levels of stress being essential for maintaining performance within a situation but higher levels being detrimental (Hanin 2000). The use of the term optimal implies that each individual has their own unique psychological and behavioural state that is most appropriate for any particular situation. Research has identified that athletes can consistently manage and maintain their stress and performance within their IZOF by using a variety of performance-related psychological skills and these can be enhanced by educational interventions (Harmison 2006; Woodcock et al. 2012). We consider that the IZOF model can provide a useful theoretical lens to inform research and development into how doctors can also consistently maintain an optimal level of clinical performance across a range of different clinical situations by managing the stress response provoked by these situations.

The main performance-related psychological skills that have been applied to manage the stress response for consistently maintaining optimal performance in doctors are pre-performance routines (PPR) (Sandars et al. 2022). These skills, which include self-talk and imagery, are only used within a short time-frame immediately before and during performance in a specific situation (Cotterill 2010). For example, PPR have been applied to the effective training of specific operative and procedural skills in surgery, such as suturing (Anton et al. 2017), and for when performing a wider range of specific clinical skills in both simulation and the workplace (Church et al. 2020).

Although PPR can be a useful performance-related psychological skill for 'closed -skill' sports, such as golf or swimming, there has been increasing recognition of the importance of a wider range of general performance-related psychological characteristics and skills (PRPCS) in 'open-skill' sports, such as rugby and soccer (Nicholls 2014). An important limitation of the use of PPR in 'open skill' sports is that they are more psychologically challenging for managing the stress response since there are several individual and environmental factors that are dynamically changing over a longer time-frame, including before, during and after performing (Koch and Krenn 2021). Using the sport psychology theoretical framework of 'talent development', research on experienced athletes across a range of different 'open- skill' sports, from rugby and soccer to judo and rowing, has identified several adaptive and maladaptive PRPCS that are consistently applied by athletes before, during and, most importantly, between performances over the course of their career journey (MacNamara and Collins 2013, 2015). This application of PRPCS between performances provides an essential opportunity for reflection to increase self-awareness and adapt their use in future situations to ensure that they remain in their IZOF. The PRPCS identified in previous research were found to distinguish between athletes that had managed their performance-related stress response for maintaining a consistent level of optimal performance across their career journey compared

with those that had not consistently maintained optimal performance (MacNamara and Collins 2013, 2015). The adaptive positive characteristics included the individual's approach to dealing with mistakes, advance preparation for a performance (especially the use of imagery), self-directed control and management of stress and the use of social support. The maladaptive negative characteristics included anxiety-related behaviours and depressive symptoms. There were dual-effect adaptive and maladaptive characteristics included perfectionistic tendencies and its associated fear of failure. These characteristics were considered to be dual-effect since an athlete has to achieve a balance. For example, fear of failure can lead to excessive hypervigilance and this stress response can negatively impact on performance but mild vigilance can be beneficial for increasing awareness of potential problems in a situation. Associated with each of these adaptive characteristics, specific psychological skills were also identified (MacNamara and Collins 2013). For example, athletes may actively seek help from others through social networks between performances and use mental rehearsal and imagery before a performance.

The practical advantage of understanding the PRPCS of an athlete in an 'open skill' sport, and how they apply these skills, is that it can inform the design of personalised training and coaching (MacNamara and Collins 2015). For example, a profile of an individual's PRPCS can be obtained by using a questionnaire, such as the Psychological Characteristics of Developing Excellence Questionnaire (PCDEQ) (Hill et al. 2019), to identify the individual's strengths and areas for development. The profile can also inform an individual's continuing personal awareness and reflection (MacIntyre et al. 2014), with the educational intervention designed to enhance and develop their self-regulatory metacognitive skills so that they can dynamically manage their stress response and performance to consistently maintain their IZOF across a wide range of future situations (McCardle et al. 2019; Moodie et al. 2023). Importantly, these interventions appear to be especially beneficial to younger athletes earlier in their career (Collins and MacNamara 2017).

There has been previous research on educational interventions for enhancing how doctors can manage their stress response to clinical situations by applying their general psychological characteristics and skills but there has been heterogeneity of their effectiveness and limited evidence of the impact on their clinical performance (Kunzler et al. 2020). This may be because the scales used for profiling, and the design of educational interventions based on these scales, have not been developed to consider the specific management of the stress response in relation to performance (McKinley et al. 2019). A sport psychology perspective for understanding how PRPCS are applied by doctors for managing their stress response to maintain a consistent optimal clinical performance appears to have the potential of offering a more ecologically valid approach that can be used to inform the design of future educational interventions.

We are not aware of previous research or educational interventions that have applied sport psychology insights from a 'talent development' theoretical lens on how athletes in 'open skill' sports manage their stress response to

maintain optimal performance across a variety of situations have also been applied to doctors. An essential first step before designing an educational intervention is to identify if the PRPCS which have been identified in athletes are also identifiable and applicable to doctors. The overall intention of our pilot study was to consider if a 'proof of concept' had potential for progression into further research studies and the development of educational interventions (Sandars et al. 2021).

The aim of the study was to understand how the performance-related psychological characteristics and skills identified in athletes are applied by doctors for maintaining their clinical performance.

Methods

Study design and research method

An exploratory qualitative study was conducted using semi-structured interviews. The study was approved by the Health-related Research Ethics Committee at Edge Hill University (REC reference: ETH2223-0131).

Sampling and setting

Recruitment was by email invitation from a database held by the Medical Protection Society (MPS), which provides indemnity services for doctors. The database has contact details of over 2000 specialists, from across 10 countries and a variety of clinical specialties, that have expressed interest in being research participants. Detailed demographics of the doctors on the database could not be disclosed due to commercial confidentiality. The email invitations were sent out by the MPS.

There were 41 respondents to the email within 4 weeks of its circulation. The respondents were from several countries: United Kingdom (23), Ireland (7), South Africa (5), New Zealand (2) and Australia (1), Caribbean (1), Malaysia (1) and Singapore (1). The age, gender and level of experience as a specialist of the respondents was not recorded. The clinical specialities were surgery (17), non-acute hospital specialities (13), anaesthetics (6) and general practice (5).

A purposive sample of 10 participants was selected from the respondents (Sharma 2017), with random selection into two groups that we classified as 'high stress' (surgery and anaesthetics) and 'low stress' (general practice and non-acute medical specialities). The rationale was based on the contrasting types of clinical situations experienced by the doctors.

All participants were provided with an information sheet that also included how free and confidential counselling support from the MPS's independent provider was available if they were distressed by the interviews.

Data collection and analysis

Following consent, each interview was conducted by an experienced qualitative researcher (LJ) using Microsoft Teams, which was also used to audio-record and initially transcribe the interview. The interview guide is provided in [Supplementary Material 1](#) and the questions were aligned

to the main domains in the Psychological Characteristics of Developing Excellence Questionnaire (PCDEQ_2) (Hill et al. 2019) but also there was a question about any recommendations for an educational intervention. The mean length of interviews was 35 mins (range 23-47 mins). The interviews were conducted over a period of 3 weeks.

The anonymised transcripts were checked for completeness by LJ and then analysed by template analysis (Brooks et al. 2015). This approach to content analysis is flexible and pragmatic, and allowed themes to be aligned to the PCDEQ-2 domains and the educational intervention recommendations. The analysis was independently conducted by two experienced qualitative researchers (JS and LJ). Each transcript analysis began with reading through all the transcript to familiarise themselves with the content and then relevant examples of interest and themes (with the associated illustrative quotations) were selected. Throughout the data collection there was debriefing after the initial interview, after 5 interviews and after 10 interviews to ensure reflexivity and agreement of the selected examples and themes.

Member checking was not conducted due to the expected low yield from participants within the limited time-frame for the study but also its value for enhancing the trustworthiness of data is contentious (Motulsky 2021).

Results

Demographics

Ten participants representing four main clinical specialties (surgery and anaesthetics; general practice and non-acute medical specialities) completed the interviews (See [Table 1](#) Participants' stress response and clinical speciality).

(A) adaptive psychological characteristics and skills

(1) Dealing with mistakes (Aligned with Interview question 1). Participants discussed that they maintained their clinical performance by having an adaptive response when dealing with mistakes and highlighted the importance of reflection to avoid making future mistakes:

When it is my fault, I will be the first one to accept it and try to, you know, learn from it.[Participant 3: General Practice]

But I think thinking about mistakes I've made, it's because I'm trying to avoid making them again. That's a positive thing. [Participant4: Surgery]

I will lie awake at night thinking, thinking about work, but not over and over. I think if you're going to be half-reasonable

Table 1. Participants' stress response and clinical speciality.

Participant	Stress response: clinical speciality
1	'Low stress': Paediatric Cardiology
2	'High stress': Paediatric surgery
3	'Low stress': General Practice
4	'High stress': Surgery
5	'High stress': Surgery
6	'High stress': Surgery
7	'High stress': Plastic Surgery
8	'High stress': Anaesthetics
9	'Low stress': General Practice
10	'Low stress': Dermatology

surgeon, you do have to think about the mistakes you make but I wouldn't say let it interfere with performance, so I think we all reflect. But let's say I wouldn't say that has a direct effect on anything I do, apart from trying to make me do better. [Participant 5: Surgery]

However, junior doctors appeared to have a maladaptive response to dealing with mistakes, but this was also developmental over time using an adaptive response:

My sleep was often disturbed by worrisome thoughts about work - I used to do that in my first job, it was really, it disturbed my sleep to great extent. So I stopped working nights. [Participant 3: General Practice]

I think again maybe 10-20 years ago, I'd have dwelled on it a lot more, a lot more but I'm a bit longer in the tooth. I think things are more in perspective. [Participant 5: Surgery]

(2) Imagery and active preparation (Aligned with Interview question 2). Participants discussed using active preparation for their future clinical performance and highlighted its importance for maintaining optimal clinical performance:

I go a bit early, I don't like rushing into work, so I go half an hour at least early then I'll see the list for that day, then read about each patients, what they're coming in with and then I take notes. I always make notes so that I'm ready by the time I see the patients, half of the things I already know. So I'm relaxed and I get the rest of the things from them and that's how I work. [Participant 3: General Practice]

I don't just rock up and do an operation this time. I've thought through it. [Participant 4: Surgery]

Yeah, I've got a complex case coming up. I'll try and think through the whole case beforehand so that I've got it all planned and it can go smoothly. Yeah, that would be normal practice, I'd say. [Participant 8: Anaesthetics]

Before I arrive my place of work I mentally rehearse what I would be doing. I am somebody who likes to get to work early so that I can get myself ready. You know, in the past I have had to rush in at the last minute because I had young children and working, which I find very stressful. [Participant 10: Dermatology]

Imagery also appeared to be used by some surgeons and non-surgeons for active preparation to maintain optimal clinical practice:

Actually visualizing certain parts of it [operation] and how I'm going to deal with that. Particularly if it's an operation which is a little off the standard. [Participant 4: Surgery]

So I had imagined myself through the routine of performing it [fitting a contraceptive coil], including not just the actual how to do it, but also what I would say to the patient. [Participant 9: General Practice]

Before I arrive my place of work I mentally rehearse what I would be doing. I am somebody who likes to get to work early so that I can get myself ready. You know, in the past I have had to rush in at the last minute because I had young children and working, which I find very stressful. [Participant 10: Dermatology]

(3) Self-directed control and management (Aligned with Interview question 3). Participants discussed that they were self-controlled and highlighted its importance for maintaining optimal clinical performance:

People would say that I am self disciplined and yeah, I don't really have a hard time breaking bad habits. [Participant 1: Paediatric cardiology]

Certainly my life at work is well organised and I think it is important that it's well organized, that you're disciplined about work. Yeah, I think all of that is essential. [Participant 8: Anaesthetics]

Participants also actively managed their stress response by using treats:

Yeah. I give myself treats even when I don't achieve my work related goals - yeah, but because you have to eventually rewind and get ready for the following day so. [Participant 2: Paediatric surgery]

You come home, hard day at work, not on call anymore. I'll have a beer. Thank you very much. It's not a treat, it's just I'm relaxing. It's part of my personal relaxation and that's part, that's not treat that's relaxation and trying to recover and rest. [Participant 4: Surgery]

(4) Active coping (Aligned with Interview question 6). Participants discussed that they engaged in actively managing their stress response and highlighted its importance:

I think this is important as well because I think at times you can feel a bit helpless and a bit paralysed. And I know how that feels it, it's so much better if you can actively do something, if you can actively think, well, I'm processing this. I'm actually moving things forward well. [Participant 1: Paediatric cardiology]

Even if I'm very tired. I'll have a coffee or tea and somehow manage it. [Participant 3: General Practice]

Yeah, there's so much so much that you have to adapt to or not let it bother you. [Participant 6: Surgery]

(5) Seeking and using social support (Aligned with Interview question 5). Participants discussed and highlighted the importance of actively seeking and using social support, especially for maintaining their optimal clinical performance:

There will be one or two people that you trust, who have your best interests and who understand what you're talking about. [Participant 2: Paediatric surgery]

I like asking if I'm in difficulty, I'll get one of the colleagues to, my colleagues to come and help me. You know, problem shared is a problem halved. I've no qualms about asking someone else for help in a difficult situation. [Participant 6: Surgery]

We have a consultants WhatsApp group and people will put their queries up on that. And so anyone can answer in, and because everybody does it, nobody thinks it's weird or weak. And it's absolutely invaluable. [Participant 8: Anaesthetics]

I have one or two people who I would ask because I know they'll tell me "Get your act together". You know, that type of thing and so forth. I'd vary who it was, depending on what I thought the issue was. [Participant 9: General Practice]

However, junior doctors may have a maladaptive response and not seek help and social support and this appears to be developmental, with a change to using an adaptive response with seniority:

I think it's hugely important, and again, I wish I had been better at this 30 years ago and when I was starting on my medical career, if you like, and I'm really happy to ask people for advice and help. [Participant 1: Paediatric cardiology]

(B) Dual adaptive and maladaptive psychological characteristics and skills

Perfectionist tendencies (Aligned with Interview question 4).

Participants discussed the importance of having a perfectionist tendency but also recognised the potential that it can negatively impact on their stress response and maintaining optimal clinical performance:

I know that I have, and many doctors probably have that slightly perfectionist kind of trait which needs to be, needs to be moderated a little bit, probably at times. [Participant 1: Paediatric cardiology]

Once they feel nervous, you've seen surgeons that have a couple of adverse events and then they become nervous in theatre and their performance goes. [Participant 6: Surgery]

So it's very important not to getting annoyed easily at work. You know, the more annoyed you get, the worse you perform, definitely. You can't be perfect, so good enough has to be good enough. [Participant 8: Anaesthetics]

I know I'm not as tolerant of that as I might be, but part of me would say, well, why should I be? The standard is the standard. I need to meet the standard. [P9: General Practice]

However, junior doctors may have a maladaptive response and this may be developmental, with a change to an adaptive response with seniority:

Unbelievably, it took me a lifetime to get through my own perfectionist these things. [Participant 7: Plastic surgery]

(C) Maladaptive psychological characteristics and skills Experiencing anxiety and depression (Aligned with Interview question 7).

One participant discussed experiencing anxiety and depression in the past, and highlighted its negative impact on their mental well-being:

Don't think I feel particularly down at present and don't lie awake thinking things over, but that has it felt like that in the past for sure. [Participant 1: Paediatric cardiology]

(D) Recommendations for educational interventions (Aligned with Interview question 8)

Senior doctors considered that an educational intervention was important, especially for specific groups of doctors:

So it's about picking out, for example, which characteristics are positive towards dealing challenging situations which are negative and then help can be provided. For example if someone is afraid of asking for advice or someone is struggling to deal with some of their failures, it's about trying to help them get through those areas and help build up those characteristics to help them be a bit more successful. [Participant 5: Surgery]

You might target this intervention broadly across all relatively new trainees, for instance, or new consultants or new appointees. And then you might target it specifically to older, working people who are specifically struggling or have had a very significant adverse event or, you know, getting, finding it hard to get their equilibrium back. Even an awareness of what of their own characteristics or concerns about dealing with uncertainty or perfectionism, so things that encourage doctors around self-awareness I think are really important. And we're not, as a general trend in that it's a really weak area in most undergraduate postgraduate training. [Participant 9: General Practice]

Discussion

The aim of the study was to understand how the performance-related psychological characteristics and skills (PRPCS)

identified in athletes are applied by doctors for maintaining their clinical performance. Overall, we identified that the adaptive and maladaptive PRPCS applied by the doctors in the study for maintaining their clinical performance by managing the stress response provoked by a variety of clinical situations were similar to those identified in previous research with experienced athletes (Ruiz et al. 2017; Sandars et al. 2022). We identified no apparent difference in the application of PRPCS between the 'high stress' group (surgery and anaesthetics) and 'low stress' group (general practice and non-acute medical specialities). The importance of maladaptive PRPCS was identified for dealing with mistakes, seeking help and social support, and perfectionist tendencies, especially in the data relating to being a junior doctors. Importantly, we identified that these maladaptive PRPCS in junior doctors appear to be developmental, with a change to using an adaptive response with increasing seniority. This suggests that educational interventions may be of particular benefit for junior doctors.

Several of the adaptive and maladaptive psychological characteristics and skills identified in the doctors of the study have also been previously noted in doctors, including the adaptive use of mental rehearsal by surgeons (Sevdalis et al. 2013), and the maladaptive aspects of perfectionist traits (Eley et al. 2013) and impaired mental health and wellbeing (Beckman et al. 2012). However, we are not aware of any previous studies that have had a focus on the wider range of PRPCS applied by doctors.

The overall intention of our pilot study was to consider if a 'proof of concept' had potential for progression into further research studies and the development of educational interventions. In addition to finding that there were similar adaptive and maladaptive PRPCS between athletes and doctors, it is of interest that participants considered that an educational intervention to develop their PRPCS would be useful. Participants in the study considered that educational interventions would be especially useful for specific groups, including medical students and junior doctors.

Recent research in sport psychology has highlighted the multi-dimensional nature of maintaining a consistent optimal level of performance, with a dynamic relationship between several individual PRPCS within the wider socio-cultural environment, which includes the organisational culture and the availability of resources, such as opportunities for social support (Li et al. 2014). An additional important consideration from research in sport psychology is that educational interventions should have a focus on developing skills in active management, such as problem-solving, compared with more passive approaches, such as relaxation or meditation (Nicholls et al. 2016). Our study also identified the importance of reflection and problem-solving for managing stress responses for maintaining consistent optimal clinical performance. The use of a similar approach that uses an initial profile of an individual's PRPCS to stimulate reflection to develop a self-regulated learner has also been highlighted as essential from previous research in sport psychology (Hanin and Hanin 2002; Ruiz et al. 2016). Overall, these insights have informed our recommendations for the design of future educational interventions as focused, multi-dimensional, reflective and problem-solving. We also recommend iterative design and evaluation of an

educational intervention to ensure that it is relevant to the needs of the target audience (Hanin and Hanin 2002).

Our study has several limitations, including the small number of participants that may not be representative of all doctors, and also the data about junior doctors were based on recall by the specialist and we did not attempt to measure how the PRPCS of the participants were associated with maintaining optimal clinical performance. However, several of the participants also described how the application of their adaptive and maladaptive PRPCS in response to a stress response provoking clinical situation influenced their subsequent clinical performance. Despite these limitations, our findings appear to have 'information power' (McKenney and Reeves 2018), with sufficient information to increase our understanding about the PRPCS of individual doctors to inform future research and the design of educational interventions for doctors. Importantly, we found that the PRPCS that have been noted in athletes are identifiable and applicable to the medical context. The 'information power' was enhanced by having a purposive sample, using semi-structured interviews, having a rigorous approach to data collection and analysis, and with overall consistent findings across the participants from several clinical specialities (Malterud et al. 2016).

Further research is recommended to confirm our findings with a larger sample size that also has greater diversity in clinical specialities, perhaps using the PCDEQ-2 questionnaire, and also to compare specific groups of interest, such as different clinical specialities and between medical students and specialists. An important area will be to explore the association between PRPCS and clinical performance, with studies that consider managing the stress response to maintain consistent optimal clinical performance along the career journey.

Conclusion

Our study, which to our knowledge is the first in doctors, found that there are several inter-related PRPCS that are similar to those found in athletes and are applied by doctors across a range of different clinical situations for managing the stress response provoked by these situations. It also appeared that optimal management of the stress response by the use of PRPCS enhanced how the doctors were able to maintain an optimal level of clinical performance. These insights can be used to inform the design of an educational intervention and to stimulate further research. The choice of the potential audience for an educational intervention will be an important consideration, such as a focus on medical students, junior doctors or doctors requiring further support.

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Author contributions

The conception and design of the study was by JS and EH. LJ collected the data, which was analysed by JS and LJ. The article was

drafted by JS and critically revised by JS and EH. The final version to be published was approved by JS, LJ and EH.

Disclosure statement

No potential conflict of interest was reported by the authors.

Data set availability

The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

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