

Exploring Psychological Skills Use in Interventional Cardiologists

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Abstract

Psychological skills are explored in a variety of high-performance contexts. In medical fields such as emergency medicine and surgery, psychological skills have been linked to better performance. However, certain medical subdisciplines, for example cardiology, have received less attention than others. For example, cardiology is a growing, interventional medical specialty that requires strenuous training and the precise execution of clinical and psychological skills under pressure. Yet, the development of psychological skills in interventional cardiologists remains underexamined, which was the purpose of the present study. Five interventional cardiologists from across Canada participated in virtual interviews averaging 39 minutes. A semi-structured interview rooted in a theoretical model developed by Spoon and colleagues (2020) was used. Interviews were transcribed verbatim, and a hybrid thematic analysis was applied. Generally, participants agreed with previously hypothesized psychological skills in cardiology. The results revealed five main themes which included “Interpersonal Skills”, “Self-Regulation Skills”, “Applied Skills”, “Self-Care Skills” and “Cognitive Skills”. This paper explores these themes in detail, addressing how they are important for performance in interventional cardiology. Overall, the findings highlight the importance of expanding knowledge on psychological skills in interventional cardiology to better support the unique psychological demands faced in highly stressful medical situations.

Introduction

Cardiology is a growing, interventional medical specialty that requires long training and proficiency in a variety of skills (Khavandi et al., 2010). Clinical skills in cardiology include surgical and diagnostic expertise as well as the ability to implement treatment plans and assist in patients' recovery, among other competencies. Psychological skills in cardiology refer to important qualities (e.g., confidence, resilience) that enable a physician to perform under pressure. Both clinical and psychological skills are important for medical performance. Cardiologists are frequently involved in life-or-death scenarios and a high stress environment where they need to react quickly (Alexandrou et al., 2024). For these reasons, cardiologists significantly benefit from using psychological skills to improve their medical performance in urgent and critical situations. It should be noted, however, that most of the cardiology literature focuses on the development of clinical skills. The development of psychological skills in cardiology remains underexamined. Therefore, the purpose of my study is to investigate which psychological skills interventional cardiologists most frequently use in their everyday practice.

Literature Review

Psychological skills are defined as “an individual’s ability to use learned methods to regulate or enhance their psychological characteristics (e.g., self-talk, imagery)” (Dohme et al., 2019 p.3). The application of psychological skills has been explored in a variety of contexts of high performance. Generally, when people have to function in highly dynamic, quickly changing environments, where the outcome of a situation matters (e.g., winning a competition), psychological skills are important to optimize performance. Psychological skills derived from lessons in positive psychology focusing on performance enhancement (Mann et al., 2017). Positive psychology emphasizes the importance of positive thoughts and emotions, along with mental toughness, grit, and resilience. Several psychological skills emerged that align closely with the principles of positive psychology, such as self-talk (associated with positive thinking), imagery and relaxation techniques (linked to positive emotions), all of which can be used to improve performance (Mann et al., 2017).

There are a variety of frameworks to explain which psychological skills are most applicable in different contexts. In athletics, Birrer and colleagues (2010) argue that the central psychological skills for athletes include arousal regulation, self-skills, pain management skills, attentional strategies, and recovery skills. These skills are thought to be beneficial for the management of the psychological demands (e.g., pressures) that are associated with high intensity sports. Others argue that effective psychological skills for athletics also combine useful skills application of imagery, relaxation, and self-talk (Sandars et al., 2021). In an effort to standardize mental performance services for Canadian Olympians, Durand-Bush and colleagues (2021) proposed the *Gold Medal Profile* that highlights the 11 important competencies for athletic success. The main competencies are separated into three categories, fundamental skills (i.e., motivation, resilience, confidence),

self-regulation skills (i.e., self-awareness, stress management, emotion/arousal regulation, attentional control) and interpersonal competencies (i.e., athlete-coach relationship, leadership, teamwork, communication) (Durand-Bush et al., 2021). Ultimately, the frameworks for psychological skills in athletics emphasize the importance of using both competencies and strategies to improve athletic performance in high stress settings.

In emergency health care, Trepanier and colleagues (2024) hypothesized that psychological competencies consist of commitment, confidence, self-efficiency, and adaptability. Another example of a model for psychological skills is Schneider and colleagues (2024) who reviewed literature from sports, neuroscience, and health care literature. They argued the importance of mental imagery scripts which incorporate visual, cognitive, and kinesthetic aspects for optimal results in emergency medicine. In addition to this, Lauria and colleagues (2017) propose a framework for emergency care providers to help optimize performance in emergency situations. The model includes four key psychological skills: breathing techniques (box breathing), self-talk (short phrases that can be instructional or motivational), visualization (mental rehearsal to prepare for a specific task) and lastly, focus (utilizing a trigger word to encourage an individual to bring their full attention back to their job). Gaining insight on frameworks of psychological skills in emergency medicine aids in understanding the benefits of implementing psychological skills to improve medical performance.

The application of psychological skills has been examined in several decades of research. There are numerous reviews and meta-analyses that support the effectiveness of using psychological skills to enhance performance in a variety of contexts. For example, Lange-Smith and colleagues (2023) reviewed 30 different reviews to analyze the effectiveness of psychological skills on performance enhancement in sport. Eighteen of the reviews concluded that performance

enhancement in athletics can occur from a variety of psychological skills training interventions. Furthermore, the results from the study found that 90 percent of the selected reviews determined that psychological skills training can enhance athletic performance.

Several meta-analyses that were used in the Lange-Smith and colleagues (2023) review of reviews have examined the impact of single psychological skills on performance. For example, Hatzigeorgiadis and colleagues (2011) completed a meta-analysis on 32 studies to analyze the effectiveness of instructional and motivational self-talk methods. The results show that the benefits of self-talk depend on the type of task, and the self-talk method. Instructional self-talk (attentional/focus statements) was more effective for fine performance tasks (hand-eye coordination, precision, accuracy, and dexterity). Motivational self-talk (amping up, positive mindset) and instructional self-talk methods were both effective for gross motor tasks (strength, power, and endurance) (Hatzigeorgiadis et al., 2011).

Another important single psychological skill is imagery. Simonsmeier and colleagues (2021) conducted a meta-analysis on 55 studies to analyze the effects of imagery on sport performance. The authors discovered that imagery is effective in enhancing sport specific outcomes and when combined with physical practice it leads to improved sport performance. Moreover, the effectiveness of imagery is increased when practiced regularly with frequent implementation.

In medicine, evidence indicates that psychological skills can improve performance in emergency and surgical physicians. Exploring psychological skills for surgeons, Lin and colleagues (2020) reviewed seven studies on the effectiveness of psychological skills interventions (e.g., mental practice, relaxation exercises, mindfulness) for surgical performance. To measure effectiveness, the studies either used simulated surgeries, had experienced blinded surgeons to

evaluate surgical performance, or a global rating scale to assess technical skills during a surgery. Psychological skills training resulted in improvement in their medical performance during surgical procedures as well as in simulated surgeries. Moreover, Anton and colleagues (2021) found similar results when reviewing the outcomes of psychological skills interventions (e.g., emotional regulation, mindfulness practices, cognitive training) to improve surgical performance. The evidence from the reviewed psychological skills interventions for surgeons demonstrated effectiveness in reducing stress and emotional exhaustion as well as increasing cognitive ability, resulting in better surgical performance in simulated tasks. Implementing psychological skills training interventions regularly may lead to an increase in a surgeon's confidence, teamwork, and overall surgical skills (Anton et al., 2021). Notably, there is strong support for the effectiveness of psychological skills to enhance surgical performance.

When examining emergency medicine, psychological skills are crucial for physicians to perform under pressure and provide optimal patient care. Lauria and colleagues (2017) analyzed performance-enhancing psychological skills that target being conscious of feelings, thoughts, and sensations and are ultimately effective in enhancing performance in emergency physicians. These skills have shown high efficacy when used before and during high arousal, high anxiety situations such as trauma resuscitations. In those situations, psychological skills are effective in reducing acute stressors, increasing problem solving and decision making, as well as optimizing mental awareness for peak medical performance. Schneider and colleagues (2024) addressed that psychological skills were effective when emergency physicians were navigating complex, critical situations where emotions run high, and a larger cognitive component was required. Psychological skills are effective for retaining knowledge and skills and reducing error in these intense procedures.

Interventional cardiologists often execute complex procedures in high arousal environments. Spoon and colleagues (2020) recognize the need for psychological skills for interventional cardiologists. The authors identified six key psychological skills, which include mental toughness, arousal regulation, attention focus, imagery, self-talk, and cohesion (Spoon et al., 2020). While Spoon and colleagues (2020) share promising theoretical thoughts, the effectiveness of the mentioned skills for enhancing an interventional cardiologist's medical performance is speculative. In particular, it is unclear whether the identified six psychological skills are a) the most prevalent in the applied practice of interventional cardiologists, and b) the most beneficial for performance in interventional cardiology. Hence, the purpose of the present study is to explore which psychological skills interventional cardiologists use most frequently in their day-to-day work.

Methods

Participants

Six interventional cardiologists (3 male and 3 female) from across Canada were recruited for this study. Interventional cardiologists are a specialized branch of cardiology that performs minimally invasive procedures to treat a variety of severe heart diseases (Dangus et al., 2022). Inclusion criteria consisted of interventional cardiologists who have obtained the appropriate accreditation and have been practicing in cardiology. Non-interventional cardiologists (i.e., cardiologists who do not perform surgical procedures) were excluded from the study. Recruitment began by reaching out to the President of the Canadian Association of Interventional Cardiology, via email. Following this, referrals to other cardiologists were made through snowball sampling method to gather more participants. Participants were also contacted through personal connection. The participants involved in the study provided written and verbal informed consent to partake in the study.

Interview Guide

Rooted in the theoretical model developed by Spoon and colleagues (2020), with additional insight from Thelwell and colleagues (2008) and Ellet (2024), an interview guide for this study with six sections was formulated. The first section was an introduction to gain background information on the participant. The second section focused on the participant's definition of psychological skills. The third section consisted of deductive questions based on Spoon and colleagues (2020) six key psychological skills for interventional cardiologists. Section four allowed the participant to suggest any other psychological skills they may use in their practice. The fifth section reflected on implementation, and training background to uncover previous training they have related to psychological skills as well as to see the participants thoughts on

having psychological skills training programs integrated into medical education. The sixth and last section wrapped up the interview, final remarks were given and there was time for any outstanding questions from the interviewer. To ensure effectiveness of the interview guide, pilot testing was conducted with a mental performance consultant who has experience in qualitative interview research, which allowed for adjustments and feedback.

Data Collection

Ethical approval was obtained from the research ethics board (REB) at St. Francis Xavier University. Invitations to the participants for the interviews were sent out by email along with consent forms before the interviews were conducted (participants were able to withdraw from the study at any point). Once consent was received, the interview process commenced. Interviews occurred through an online portal (i.e., Microsoft Teams). The study utilized semi-structured interviews with inductive and deductive elements that used open-ended questions that allowed for flexibility and elaboration, which facilitated discussions. Each interview was recorded and transcribed verbatim. The interviews average length was 39 minutes with a standard deviation of 14 minutes and 13 seconds. At the end of each interview there was time for any questions, and if the participant wanted to add anything after the interview time was over, they were able to reach out to the interviewer via email.

Data Analysis

Following the interviews, a hybrid thematic-analysis approach was taken. The analysis was theory driven based on Spoon and colleagues (2020) theoretical model as well as data-driven based on the participants answers (DeJonckheere et al., 2024). Following the model of Braun and Clarke (2006), the primary researcher began the analysis by reviewing the interviews, to

familiarize themselves with the data. The next step is where common quotes and significant ideas that resonate with the research question were identified (e.g., coding stage). To ensure anonymity of the participants, codes were applied to the relevant quotes. After that, the primary researcher searched for themes and categorized them into groups based on these potential themes. The themes were then reviewed once more to clearly define each individual theme that was present. Lastly, the primary researcher named the themes and provided a discussion on the findings. During the analysis process, trustworthiness needed to be established. This was accomplished through using reflexive journaling to identify challenging moments and consider when bias may arise (Meyer & Willis, 2019). To limit bias in the research, a critical friend (two mental performance consultants), who were not involved in the data collection phase were utilized to clarify and organize themes (Thelwell et al., 2008). Lastly, member checking was also used after each interview to verify that the findings aligned with the participants' experiences.

Results

The themes that emerged from the analysis are presented in a thematic map (see Figure 1) that shows the most prevalent psychological skills that the six participants deemed they used in their practice. The lines connect psychological skills to the categories of interpersonal skills, self-regulation skills, applied skills, self-care skills and cognitive skills. Each major theme is underlined with subthemes listed beneath them. The dimensions included in Spoon et al., (2020) model are highlighted in red.



Figure 1 – Thematic map showing themes found in analysis

Interpersonal Skills

Interpersonal skills refer to the abilities required to interact with and relate to other people (Barakat et al., 2007). Participants in this study described interpersonal skills as crucial for interventional cardiologists, given the constant collaboration with various colleagues including radiation technologists, nurses, fellow interventional cardiologists, physicians and hospital management. Five key subthemes emerged for interpersonal skills which are leadership, communication, cohesion, empathy and respect.

Leadership

An interventional cardiologist is in charge of the catheterization lab (Cath Lab) which requires them to lead the team and command the room. The participants emphasize that strong leadership skills are essential, as the entire team looks to them for direction and reassurance. This leadership role means the interventional cardiologist must remain calm and composed at all times during the procedures, for example one participant said: “We’re always the leader, so you have to be aware that other people are looking to you as an example of how to respond” (P5). This participant recognizes that since they are the leader, their behaviours set the tone and directly influences the others in the room, including the patient. Participants also emphasize the weight of responsibility that comes with being the leader: “If things go wrong, it's all on you too, even if it really wasn't. I mean, the buck stops with the doctor” (P1). This highlights that despite working with a large team, the interventional cardiologist ultimately liable for the procedure’s outcome. Their primary duty as the lead is to keep the patient safe, and it falls on them to keep the team focused as well.

Communication

Communication in interventional cardiology is described as important not only with the members of the Cath lab, but also with other colleagues and the patient. As one participant said: “Our ability to communicate effectively and without conflict as much as possible so that we can have the best outcome for the patient is an extremely powerful tool” (P3). This demonstrates how clear communication can benefit the patient and success for the procedure. The participants all mentioned how there needs to be effective communication so that everyone is on the same page. Participants also described closed-loop communication to be essential, to ensure all the tasks are being completed and done properly. One participant gave an example: “Did the heparin go in?... Yes, it did. OK. Thank you. You know, um so we, you know, by definition we should have closed loop communication. So, everything I say should be sent back to me” (P1). This approach to communication in the Cath lab ensures mutual understanding for the tasks and helps minimize mistakes in these stressful high-risk procedures. Furthermore, another way communication is effective that was described by the participants was: “A lot of that is with communicating before procedure, but for example saying OK, this is our plan, this is what we're doing” (P5). Being effective in communicating the procedure’s details beforehand will allow the members of the team to feel prepared and safe going into the procedures, contributing to a better outcome.

Cohesion

The majority of participants did not view cohesion as an essential skill for interventional cardiologists. They considered cohesion to be beneficial when they have it, as it can lead to better performance outcomes, but it is not required to get the job done. One participant’s perspective on cohesion: “I look at it as a bonus, you know, everything else is the mashed potatoes and cohesion’s the gravy” (P4). This explores the idea that social cohesion is not necessary in this field, but

striving for task-cohesion is important. Developing social relationship with colleagues can contribute to a more pleasant work environment but is not the main focus when preparing for a procedure. The primary focus is saving a life, and they can do that with or without a cohesive team. As one participant explained:

I can't make a silk purse out of a sow's ear um, you know you can only work with what you got, so you can try to use different interpersonal techniques to recruit those people and get them on side (P1).

This participant described how cohesion isn't always attainable. As the leader it's their responsibility to do whatever they can to create unity but sometimes maintaining task cohesion may require sacrificing social cohesion.

Empathy

Interventional cardiologists recognize empathy is a vital skill, especially given the high-stakes nature of the field where someone's life is in their hands. Participants highlighted building empathy begins with taking the time to get to know your patients. Interventional cardiologists that engage with the patient and their family to discuss the procedure openly will not only enhance their own sense of empathy but also help patients feel more informed and secure about what is happening. However, the participants stated, that during procedures, empathy has to sometimes be "shut off", to avoid clouding clinical judgement. Contradictory, an interventional cardiologist always needs to be attuned to the patient's physical and emotional state, particularly when a patient is in pain or discomfort:

I think the core of it has to be empathy, but it has to be regulated in a way um and utilized in a way where you keep people comfortable and your understanding of the situation, but you don't let it affect how you think or make decisions or cloud your judgment (P4)

Empathy requires the physician to put themselves in their patients' shoes and considering what would be best for them. Empathy also plays an essential role in ethical decision-making as it prevents interventional cardiologists from performing dangerous procedures that will push the patient's heart beyond safe limits. For example, "if something goes wrong in a completely elective procedure um would I have wanted this procedure for my mother?" (P2). The participant explains that fostering empathy becomes easier when they relate their patients as they would to their own loved ones, allowing them to genuinely understand another person's perspective.

Respect

In the Cath lab, respect is essential between both colleagues and towards patients. By making individuals feel valued, this enhances patient care and team collaboration, for example: "People that feel respected and seen um, will just do better and will take better care of patients and will take better care of each other on the team" (P4). This participant noted that when people feel respected, they are more motivated to work productively, leading to better procedural outcomes. This can help improve social cohesion among members of the team. Showing respect in the Cath lab can involve listening to instructions, accepting feedback as well as respecting the patient's wishes. Respect is also critical amongst interventional cardiologists themselves; mutual respect helps maintain a productive work environment: "Appreciating and respecting that person is a skill person and we trust him" (P6). This participant shares how respect is key in managing conflict and building trust among colleagues. When interventional cardiologists recognize and appreciate each other's experience in the medical field, it facilitates improved interactions within the hospital.

Self-Regulation Skills

Self-regulation skills are the dynamic process of determining a desired end state and taking action to move towards it while monitoring progress (Carver & Scheier, 2008). Interventional

cardiologists need to be proficient in self-regulations skills in order to perform their job on a day-to-day basis. Subthemes include emotional regulation, arousal regulation, attention focus, goal setting and self-awareness.

Emotional Regulation

It was found that interventional cardiologists need to consistently monitor and regulate their emotions, especially in the high-stress environment of the Cath lab. Being able to remain emotionally stable directly impacts their ability to lead and manage the procedure as it progresses. One participant points out: “You need to have um a lot of emotional stability... the ability to remain the fixed variable in any problem... if you start to panic, then everyone starts to panic” (P4). This highlights how the interventional cardiologists set the tone for the entire procedure, making it essential to be consistent in your emotions (suppressing highs and lows) to prevent the team from having an influx of emotions as well. Participants also shared different strategies that aid them in regulating their emotions in high-pressure moments. For example, participants described techniques like desensitizing themselves in emotionally charged situations as well as compartmentalization to manage their emotional responses:

I put it in the imaginary file cabinet in the back of my brain and I shut the door, and I do not think about it. I block it out until another time and when I have more uh time to sit and think and think it through (P2).

These strategies allow interventional cardiologists to set aside emotional stressors, helping them to stay focused on the procedure while retaining their emotional well-being. They can return to these feelings later when they have the emotional capacity to thoroughly reflect on them.

Arousal Regulation

It became evident that the reality of being an interventional cardiologists is that every day is stressful. Without effective arousal management, the physiological stress responses can spiral out of control. As this participant stated:

Everything that we do um is stressful. Uh, if you couldn't mitigate your own stress response uh, I think you again wouldn't be able to continue in a career like this. Um, you would be uh, unable to sleep at night, you would be unable to be uh a good family member with, with your family, you would be uh you would be not a nice person to work with, probably (P2).

This participant reinforces the fact that the ability to manage stress levels is not only crucial for performance in the Cath Lab but also for maintaining personal and professional well-being. Numerous strategies emerged that the participants described as useful for regulating their arousal, with the most common ones including breathing techniques, slowing down the room (being technical/logical) or separating yourself from the stressful situation when possible. One participant's example: "I just kind of get very methodical and go back to sort of first principles. Sometimes my personal trick is if there's something bad happening with the patient, uh, I will tell the nurses to start a timer" (P1). This participant describes starting a timer which they find helpful to know how much time has elapsed. In a stressful environment what feels like 20 minutes, only two minutes may have passed, which keeps people from losing control. Becoming very logical with their intentions, participants state it allows the team to refocus and respond more effectively under pressure.

Attention Focus

All participants identified attention focus as the most important skill to have as an interventional cardiologists. Each emphasized that one would not succeed in this field if you do not have this skill. One participant illustrates the variety of things that require their attention in the Cath Lab during a procedure:

I might be fixing an artery in a heart in the middle of a case, but I'm still watching the screen to see that the heart electrical rhythm is staying stable and if it isn't, I have to be able to respond to that and tell people what to do. So, so ours is extremely attention focused but with acute awareness of everyone else's jobs and what they're doing (P2).

This quote describes the countless elements that an interventional cardiologist needs to simultaneously attend to, to ensure an effective procedure. As an interventional cardiologist it is required to be able to switch from task to task with ease, while also filtering out the noise to be able to focus. Different strategies were described by participants including, resetting everyone's attention in the room, and trying to limit any extra distractions. This participant states:

One of the techniques is to delegate it to someone else and just say OK I'm not going to think about any of this stuff, that's your job because I'm gonna be here and please do not ask me about it, I just need you to manage it (P5).

This strategy helps interventional cardiologists to remain focused on the most important tasks by delegating the non-essential responsibilities, allowing them to fully concentrate. This helps them to avoid becoming overwhelmed in the Cath Lab.

Goal Setting

The participants described goal setting to be important in this field as there are many distractors so having a set end goal reminds the interventional cardiologist to stay on the right

track. For example, one participant states: “You need to just keep focusing on the goal, which is getting through safely, through this procedure and hopefully successfully as well” (P5). This quote describes how having a clear, reachable objective helps them navigate complexities of the procedure. Furthermore, while it is important to have an unwavering goal of getting the patient out of a dangerous situation, it is equally important to set goals throughout the procedure to stay motivated:

You have to look at step one and then just do it as if it's the only thing you have to do and then do Step 2 and then step three. And I think you know success is um probably the combination of individual micro steps done perfectly (P4).

This participant’s approach shows how breaking down the procedure into achievable goals throughout the procedure will facilitate momentum and ensuring the procedure continues smoothly.

Self-Awareness

It was uncovered that self-awareness is an essential skill that is needed by interventional cardiologists. They need to be aware of their stress, emotions, sleep and many more. One participant describes self-awareness as: “Being aware of your current state and then having a strategy to either adjust how you're thinking, or um apply how you're thinking in a positive way or in whatever way you want it to be” (P5). This participant’s insight shows that being conscious of one’s mental and emotional states allows them to respond appropriately to those different states and switch their approach accordingly. Moreover, interventional cardiologists can use self-talk or other strategies like moving a procedure if they are not feeling up to their standards:

If um I have an injury or pain or something like that, I don't feel like I wanna do this procedure, I don't feel safe to do the procedure. I don't have the confidence of something

happened to the patient to that procedure, um, therefore I will avoid doing it and I'll delay the procedure until this patient is back until, I'm back to myself to be able to perform at my optimum level (P6).

This highlights the importance for interventional cardiologist to be self-aware, as it ensures they recognize when they not be at their best, so they do not overdo it and put someone's life at risk.

Applied Skills

Applied skills can be described as skills that should be developed and maintained to achieve consistent high-level performance (Durand-Bush et al., 2021). This theme has the largest chunk of Spoon and colleagues (2020) suggested psychological skills, however there were different perspectives on their use and importance that emerged. The subthemes for applied skills include self-talk, mental imagery, mental toughness, mental rehearsal, confidence and resilience.

Self-Talk

The participants agreed that self-talk can be useful in their field, but it is very personalized and not required for success. As one participant explained: "If you're trying to do something that's really difficult um, I think hearing that voice of my mentors, in my case saying, you know, you know, just calm down, just take your time, it's got to be there" (P2). This illustrates how having a positive internal monologue can help interventional cardiologists manage the pressure of their job. All of the participants used self-talk in different ways, to reassure themselves, regroup and check-in. For example, one participant said: "Maybe I made, you know, not the best choice or there's there was a complication because of the choices I made and so I think that's where I find self-talk most important so that I don't freeze" (P3). This highlights how self-talk can help them stay focused, counter negative self-talk and maintain control during critical moments.

Mental Imagery

The interventional cardiologists in this study all had different perspectives on imagery. Half the participants discussed using it as a tool for planning, and preparation. For example, one explained: “I’ll often um usually the night before the morning of go through my mind, kind of how I’m going to proceed and, and what I can imagine myself doing physically, and I find that really helpful” (P3). This highlights how imagery can assist cardiologists in mentally preparing for procedures by visualizing the motions and anticipating challenges. However, some participants did not view imagery as beneficial. Some participants felt that the routine nature of their work made imagery unnecessary. One participant said: “It’s like OK, imagine yourself making this bowl of cereal. It’s like no, I think I got it” (P1). This response reflects an alternate perspective, where repetition and familiarity of the procedures makes imagery irrelevant in an interventional cardiologist’s daily practice.

Mental Toughness

The importance of mental toughness was brought to light by participants as a key everyday skill while enduring the intense demands of interventional cardiology. As one participant said: “You would not survive as an interventional cardiologist if you didn’t have a very high level of mental toughness” (P2). Another participant shared a challenging situation that they needed to work through, which everything did end up going well due to their ability to be mental tough:

We weren’t sure we were going to be able to provide a solution for [patient]. His heart pump function was 10%. So, he had terrible heart failure and really a very high chance of mortality and, so as a stable outpatient, we had actually decided to consider using a special tool that would allow us to kind of um safely get him through the procedure (P3).

This participant's experience highlights the mental toughness required to be successful in this high-stakes medical field. Interventional cardiologists face many curve balls, as such the ability to adapt, grow and thrive in these challenging situations is vital. They describe needing to be mentally tough through team challenges (different levels of Cath Lab experience) and technical challenges (patients' anatomy).

Mental Rehearsal

The findings highlight that an interventional cardiologist's ability to mentally prepare and rehearse for procedures will reduce the likelihood of mistakes and unexpected complications. This participant emphasizes the importance of mental rehearsal in anticipating rapid changes in patient status:

If I'm going to do a procedure, I am mentally prepared that this procedure can go from a zero to 100 from a safety to unsafe from a, from a live to crashing situation and have to be prepared rather than surprised" (P6).

This example illustrates how mental rehearsal enables interventional cardiologists to prepare for worst-case scenarios, allowing them to develop predetermined solutions to respond quick under pressure. This skill may be the difference between a successful and unsuccessful outcome. Participants also pointed to strategies such as imagery, self-talk as components that will help with mental rehearsal. One participant describes: "I do a quick kind of physical check on myself. Like make sure that you know I'm alert, I'm not dehydrated or over hydrated. Um, I make sure that I feel stable and strong" (P5). This reflects not only mentally preparing for the technical aspects of the procedure but also ensuring that they, as humans are in the right physical and psychological state to perform the procedure. Interventional cardiologists never know what will happen or the

duration of procedures in the Cath Lab for, so they need a high level of mental rehearsal to be ready for anything.

Confidence

Participants expressed that confidence is required to be a successful interventional cardiologist. For instance, one participant shared: “I think interventional cardiology you need to have a certain level of confidence that you can do something even ahead of time to know that you have strong skills” (P3). This quote reflects how important it is for an interventional cardiologist to be confident in their training and abilities, especially when lives are at stake. A lack of confidence can not only compromise patient safety but also disrupt their team’s confidence as they are the leader. Further, interventional cardiologists cannot waiver in their confidence:

Often times I see with people that are new to interventional cardiology will, will have a small victory. Oh, the wire went in the artery and suddenly their confidence will go here [hand raised high] and then the next step doesn't work as well and then their confidence drops here [hand lowered] and then they just do this [up and down] the whole case and it wreaks havoc (P4).

Not only did participants describe the need for an interventional cardiologist to be confident but also to remain steady in their confidence. If they do something well or wrong, they cannot become overconfident or lose confidence during a procedure. Balanced confidence it was allows them to perform effectively and remain composed throughout a procedure.

Resilience

The participants consistently described the high-risk environment of interventional cardiology throughout the interviews. Unlike many other professions, a bad day in this field is devastating. As one participant expressed: “When we have a bad day at work, somebody died.

You know, it's not just like, oh, I had a conflict with my coworker or, you know, that I missed the deadline on that project" (P1). This quote portrays the toll this job can have and the level of resiliency an interventional cardiologist needs in their profession. They must develop the capacity to recover from these difficult situations or they would not make it through the day. This participant also provides an example of this:

So, it could be an emergency heart attack that comes in at 2:00 in the afternoon and doesn't do well, patient dies on the table and then you have to just erase that. Go talk to the family and then go on to the next patient (P2).

This shows the intense demands of their role, where resilience in these challenging moments is essential. Without the ability to recover quickly, more lives could be at risk.

Self-Care Skills

Self-care can hold various meanings for different individuals. For interventional cardiologists, prioritizing self-care could help maintain balance in their personal and professional lives, ultimately contributing to the longevity of their careers. Self-care is recognized in several ways and is mainly understood as having the potential to improve health and wellbeing (Ferguson et al., 2024). For interventional cardiologists it primarily involves self-care strategies, fatigue management and self-compassion.

Self-Care Strategies

The participants expressed that taking care of themselves is extremely important. The pressure of the job can create a culture of toughness, where pushing through and acting fine all the time is expected, although the participants acknowledged that this stereotype needs to change. One participant stated:

Self-care and some of those things. Uh, I'm not, I mean, I think maybe you don't need those things immediately to perform your job in the moment, but you need them over time longitudinally to be able to continue to perform your, perform your job (P1)

This suggests that while self-care may not appear like a crucial skill in the moment, it is essential for a long, rewarding career. Several strategies were described, including talking to someone, listening to music, taking vacations or exercising. Another strategy a participant shared: “On a personal level I attempt to, um you know, practice some of the um strategies in the uh mindfulness, space, or meditation space, like the breathing exercises” (P2). This participant shares how integrating mindful practices into their daily life will help manage the immense stress of their profession and contribute to their well-being and care.

Fatigue Management

One psychological skill the participants identified important to explore further is fatigue management. The high expectations in interventional cardiology involves pushing through significant sleep deprivation. The participants describe how these expectations are not there in a lot of other trauma like fields. One participant stated:

I feel like it is because often we're, you know, called in the middle of the night and we have to be in within 20 minutes and functioning even if we haven't had any sleep or we're up all night and we have to do these very highly technical skills in that setting. Um, and I think knowing that you know that our mental abilities and physical um because of that are impacted really makes you have to control um that part of your brain (P3).

This highlights the urgent need for strategies and solutions to help interventional cardiologists stay mentally sharp while operate complex procedures even when physically exhausted. Not only when woken up, but a long day in a Cath Lab with no break for nine plus hours is extremely tiring.

Another outlook on fatigue management describes the disruptive nature of being on call. One participant said: “If you get a phone call and it’s a false alarm, good luck getting back to sleep” (P1). This perspective shares the difficulties faced in the profession. If there is an emergency, they can go do something with their adrenaline and push through sleep deprivation. However, if you wake up in the middle of the night alert and ready it’s hard to fall back asleep and be well rested.

Self-Compassion

In a field where optimal performance is not only expected but required, the participants describe self-compassion as important. Highlighting self-compassion includes patience, positivity, humbleness and kindness to yourself and other members of the team. One participant stated: “To be able to maintain positivity in, and uh, and to be kind during even during stressful events, I think those people do better in the long term uh personally and I think professionally” (P2). Demonstrating self-compassion in challenging moments allows interventional cardiologists to rest and maintain emotional stability and humbleness. As another participant shared: “I just completely changed my focus because I knew I couldn't go in, it wasn't safe for me to go into the next procedure with that kind of negative cloud over my head” (P5). This highlights how treating oneself with kindness in hard moments is necessary for both patient safety and personal well-being.

Cognitive Skills

The final meaningful theme that emerged was cognitive skills, which are understood as the mental processes of acquiring knowledge and understanding through thought, experience and the senses (Van der Fels et al., 2015). Key aspects of cognitive skills include problem-solving, decision-making, critical thinking, game face and ethics.

Problem-Solving

The participants explained that in the Cath Lab numerous unexpected challenges can arise. If an interventional lacks strong problem-solving skills, they may struggle to address and navigate through obstacles. One participant shared: “You have to be like, OK... you can get out of this. How do I, you know, what am I going to do next? What, what skills do I have? How, how can I work through this problem” (P3). This quote illustrates how they need a proactive mindset attack problems head on. The participants emphasize that sometimes the patient’s anatomy is not how they expected or there may be other complications. In these moments, frustration must be set aside and focus on how they can achieve the desired outcome. Moreover, problem-solving in the Cath Lab extends beyond the procedure. Interventional cardiologists need to manage the team’s problems as well. This participant explained:

I mean the problem is you're still main, you're trying to open the artery. You're looking at a monitor. You're trying to do that, um, but at the same time, then the, the nurses are bombarding you right with, um, do you want him to have more heparin? (P1).

This highlights that problem-solving for an interventional cardiologist is not easy, they need to not only solve their problems but also solve problems for their team members, all while under immense amounts of pressure.

Decision-Making

In relation to problem-solving, the participants stressed how decision-making is a crucial skill in the Cath Lab. As the designated leader, the responsibility for making all the decisions ultimately falls on the interventional cardiologist. One participant expressed the weight of this responsibility, stating: “I’m always having to make the decisions in the, in that room and um that can be extremely demanding” (P5). This demonstrates the significant cognitive load involved in

being in charge for every decision made during a procedure. Their ability to make quick decisions directly affects the patient's safety and the success of the procedure. Another participant addressed this urgency:

With patients coming crashing unwell situations, you have to make quick, decisive decision. Um, patient uh, is a, it's a matter of few seconds patient is arresting [cardiac arrest] or dying, you have to make quick decision and uh and fast decision I would say (P6).

This reflects how effective decision-making in these high-pressure situations can be the difference between life and death. If the interventional cardiologist is not able to decide what is best for the patient, the resulting consequences all fall on them.

Critical Thinking

The participants discuss how critically thinking and thoroughly analyzing information is essential for maintaining logic and making sure they have everything needed to move forward safely. This participant shared their experience:

When the momentum's there and the nurses are like, oh, we got to get the next one on the table and hurry up and we're behind and there's an emergency and we're turning the room over and have you consented the patient and uh you got to sort of, say, hang on, like I'm evaluating this patient, I'm evaluating this case. There's more to it than what everybody's thinking. You know, I've got a different opinion on what's going on. (P1)

This quote shows that interventional cardiologists need to stand their ground when they are critically thinking through a patient's case. It is easy to be swept away with dire situations and rush a diagnosis, but if something does not feel right or they suspect another issue, they must take the time to consider all possibilities. Failing to do so could lead to costly mistakes. Critical thinking not only involves analyzing during a procedure but also reflecting on it afterward. This

participant stated: “Think critically back about your performance and how you could do better and what not” (P2). This highlights that in order for an interventional cardiologist to improve and learn is to think back critically on their experience. By evaluating what went well and what could be done differently, they can refine both their clinical and psychological skills, allowing them to approach future procedures with a focus on ensuring the best outcome for the patient.

Game Face

The participants describe how being an interventional cardiologist can take a toll on them, as they are also navigating their own personal lives and struggles as well. A downside is that their negative emotions and challenges must remain hidden as they cannot allow their personal difficulties to impact the productiveness of the procedure. As one participant explained:

Just putting on a game face in a way. You could be feeling rotten, you could have you know, lost a family member, broken up with your partner or whatever it may be, but in the morning when you start your day, you have to put on a face of confidence and positivity (P5).

This shows that even if an interventional cardiologist is having a bad day, or is facing unexpected challenges in their personal lives, they still need to go into work, put their game face on and remain fully present in their professional responsibilities. Another participant shared a strategy they use to cope:

We use a lot of humor and, and um try to disarm people and lots of things to try and help people feel comfortable so they, they can thrive and, and perform at their peak because um we need that (P3).

This strategy emphasizes the importance of putting on a face of positivity to support everyone in the Cath lab, not only for their own well-being but to also help their team members who may be

struggling to put their game face on too. By using humour to uplift the mood, the team can create a more relaxed environment, allowing them to lock in and perform effectively in high-stress situations.

Ethics

In an environment where an interventional cardiologist is working directly with a patient's heart, it is essential that they operate with strong moral values and guiding principles. One participant shared an important quote: "We always have to remember that uh, we are treating a person a whole person and not just an artery or a heart" (P2). This outlook serves as a powerful reminder of the humility and duties of an interventional cardiologist while they are operating. Ethical reasoning also circles back to the fact that if anything goes wrong, they have to live with the consequences of their actions. Which is why the participants suggest approaching each case with honesty and good character. They often think of how they would defend their actions in front of a judge, this ensures that every decision they make is reasonable and in the best interest of the patient. Further emphasizing this mindset, another participant shared:

I think you have to have just a constant sense of intellectual humility, where I find often times people will get into trouble when they feel overconfident. Um, and they're unable to see the limits of what they can do uh and they don't recognize that. Uh, and when they do, when they kind of lose that lack, like that perspective, they can end up hurting people and I think that's very dangerous (P4)

This statement illustrates the importance of recognizing personal limitations. For interventional cardiologist, maintaining ethical awareness and intellectual humility is critical to avoid causing harm and to establish the highest standard of care for their patients.

Discussion

The primary finding of this study was that all of the participants utilize a multitude of psychological skills in their practice. These psychological skills are essential for them to perform their job effectively on a daily basis. The shared psychological skills from the study incorporated all of Spoon et al., (2020) psychological skills. However, divergent findings emerged regarding the importance of the skills, due to the participants different perspectives. Additionally, there are several other psychological skills that are used by interventional cardiologists. For example, self-care skills and cognitive skills were not included in Spoon et al. (2020) model. This study is the first to qualitatively explore psychological skills use in interventional cardiologists. Overall, the participants in this study emphasized the critical role of psychological skills for optimal performance within their medical field.

Several psychological skills emerged that the participants use to have a successful career in interventional cardiology. The findings identified 18 psychological skills, in addition to Spoon and colleagues (2020) six psychological skills that they outlined. This study expanded significantly on Spoon et al.'s (2020) model, demonstrating the depth and complexity of the psychological demands in this field. In comparison to other models (e.g., Durand-Bush, Lauria, Trepanier, Birrer, Sandars), the model developed in the present study revealed a significantly broader range of psychological skills. This highlights the richness of the findings, but also raises the question of whether the broader scope of analysis may have revealed some skills that may be less important to performance in interventional cardiology. In other words, it is possible that this study accurately captured the true psychological demands of being an interventional cardiologist but may have cast too wide a net. Alternatively, previous literature may have failed to fully capture the complexity of psychological skills required by demanding professions in their models.

The psychological skills outlined in Spoon et al. (2020) theoretical model were all present in this studies framework, indicating alignment between their model and the current study's findings. Participants generally agreed on the importance of the psychological skills identified by Spoon and colleagues (2020), although varying perspectives on their application also emerged. For example, imagery is described as effective for planning and strategy (Spoon et al., 2020) and in potentially life-threatening, stressful situations, imagery can help enhance your ability to act (Lauria et al., 2017). Some participants supported these findings, suggesting that imagery helps them to mentally prepare for procedures and evaluate their readiness. On the other hand, other participants noted that interventional cardiologists perform numerous repetitive procedures on hearts, which eventually becomes so routine and ingrained into their memory that imagery does not feel useful. The contrast in perspectives suggest that the perceived usefulness of psychological skills may differ based on personal preference, level of experience or exposure to training. Simonsmeier and Colleagues (2021) express that the effects of imagery are dosage specific. Indicating that imagery is most effective when there are more sessions provided. Therefore, it is possible that participants who did not think imagery was effective may not have received sufficient training for imagery to be applied meaningfully in their practice.

Another divergent finding that emerged was the participants perspectives on the importance of cohesion. The interventional cardiologists in the study did not view cohesion as a vital skill. Spoon and Colleagues (2020) highlighted that cohesion can be fostered by setting expectations, clarifying roles and debriefing after procedures, which could in turn reduce unhelpful attitudes. While participants acknowledged that this could help, they argued achieving social cohesion is not always achievable or needed. Instead, they indicated the importance of task cohesion over social cohesion. Moreover, high social cohesion has been found to contribute to

decrements in performance, increasing the risk of error and impacting decision-making processes (Nosker et al., 2021). Nevertheless, task cohesion has been found to enhance positive performance outcomes and facilitate commitment to the team and accomplishment of goals (Grossman, 2014). Therefore, research supports the idea that while social cohesion may contribute to a more enjoyable work environment, it may not notably enhance procedural outcomes. This suggests that task cohesion has a far greater impact on accomplishing optimal performance in the Cath Lab.

In addition to the six outlined psychological skills in Spoon et al.'s (2020) model, many other psychological skills that are used by interventional cardiologists emerged. Particularly, self-care skills and cognitive skills, were not included in the framework, but were described as essential for an interventional cardiologist's practice. For instance, self-care strategies like relaxation techniques and mindfulness have been shown to enhance surgical performance (Lin et al., 2020). Furthermore, medical students who participated in mind-body workshops that focused on mindfulness and self-care behaviours showed significant improvements in decreasing stress, and being less overwhelmed (Greeson et al., 2015). These findings suggest that future research needs to explore how to increase integration of self-care skills among interventional cardiologists to prevent burnout, reduce stress and to sustain a long-term career.

In conjunction with self-care skills, cognitive skills also emerged as critical skills for interventional cardiologists, despite not being highlighted in Spoon and colleagues (2020) model. Anton and colleagues (2021) emphasize the importance of cognitive skills in enhancing surgical performance, demonstrating their role in increasing cognitive ability. Similarly, the ability to correctly execute a surgical skill is closely linked to receiving cognitive skills training (Kohls-Gatzoulis et al., 2004). Additionally, research on emergency care personnel has shown that strong clinical decision-making skills will not only help them make the correct decisions but also improve

their resilience and ability to adapt to difficult, unpredictable situations (Bijani et al., 2021). These findings suggest that refining cognitive skills in interventional cardiologists, may lead to improved performance and better procedural outcomes.

To summarize, further investigation into psychological skills use in interventional cardiology is warranted. This study is the first to qualitatively examine how interventional cardiologists apply these skills in their practice, providing valuable insights into their complex psychological demands that may have been missed in previous frameworks. Literature in other fields, such as emergency care providers show that psychological skills training has positive outcomes, that can reduce stress, increase problem solving and optimize mental awareness for peak medical performance (Laura et al., 2017). This reinforces the value of psychological skills training and supports its integration into medical education. These findings can guide future research aimed at uncovering what are the core psychological skills utilized and the most important to be trained while becoming an interventional cardiologist.

Limitations

Future studies should aim to address limitations of current research, such as expanding the participant size to enhance data saturation. Each participant continued to provide valuable insight, and a larger sample could help further refine these results. Additionally, inquiring about the length of time participants have been practicing interventional cardiology would provide a deeper understanding of their responses. As highly experienced interventional cardiologist may have had limited exposure on psychological skills whereas newer interventional cardiologists may have a different perspective. The participants also mentioned having taken leadership courses, so further exploration on these programs and their content would be beneficial for expanding knowledge in this area. Moreover, researcher bias is a limitation in this study; if another researcher performed the analysis or conducted the interviews, different themes or quotes may have been identified, potentially influencing the results.

Conclusion

The present study explored the use of psychological skills by interventional cardiologists. The only model investigating psychological skills in interventional cardiology presently is Spoon and Colleagues (2020) model that highlighted six key psychological skills. Expanding on this framework, five main themes emerged in this study. Themes included interpersonal skills (leadership, communication, cohesion, empathy, and respect), self-regulation-skills (emotional regulation, arousal regulation, attentional focus, goal-setting, and self-awareness), applied skills (self-talk, imagery, mental toughness, confidence, mental rehearsal and resilience), self-care skills (self-care strategies, fatigue management, and self-compassion), and lastly cognitive skills (problem-solving, decision-making, critical thinking, game face and ethics). These themes and subthemes were all found to benefit an interventional cardiologist's medical performance. Further investigation into how to improve psychological skills and how they are used is needed as well. Future research should focus on narrowing the model to indicate which psychological skills are the most critical. Overall, future studies looking into how to implement psychological skills training into medical education would be beneficial.

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Appendices

Appendix A

REB Approval Letter

ROMEO File #: 27490

Project Title: Exploring Psychological Skills in Interventional Cardiologists.

Dear Kylie Barton,

The Research Ethics Board (REB) has cleared the above cited proposed research project for ethics compliance with the Tri-Council Guidelines (TCPS) and St. Francis Xavier University's ethics policies. In accordance with the Tri-Council Guidelines, your project has been cleared for one year. At the end of each year, the REB will ask if your project has been completed and, if not, what changes have occurred or will occur in the next year. This will be required each year following approval until the project is reported to be completed, up to a maximum of five years.

Renewal Due-2025/12/16

You are reminded of your obligation to advise the REB of any adverse event(s) that occur during this one-year period. An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s).

You are also reminded that all changes that might affect human participants must be cleared by the REB. For example, you must report changes in study procedures or implementations of new aspects in the study procedures. These changes must be sent to the undersigned prior to implementation.

Level of Risk: Low

Level of review: Expedited review (Honours thesis)

On behalf of the Research Ethics Board, I wish you continued success in your research.

Appendix B

Invitation to Participate St. Francis Xavier University

Title of the Study: Exploring Psychological Skills in Interventional Cardiologists
ROMEIO #: 27490

Researchers:

Kylie Barton, Honours Student, Department of Human Kinetics, St. Francis Xavier University
Email: x2021eig@stfx.ca

Dr. Sebastian Harenberg, Associate Professor, Department of Human Kinetics, St. Francis Xavier University
Email: sharenbe@stfx.ca

Maggie Nieto, PHD Student, Department of Human Kinetics, St. Francis Xavier University
Email: mnieto@stfx.ca

Purpose of the Study

You are invited to participate in our study titled exploring psychological skills in interventional cardiologists. The purpose of this study is to explore which psychological skills interventional cardiologists use most frequently in their day-to-day work. This study is being conducted as a part of the requirements for an honour's undergraduate degree in the Department of Human Kinetics at St Francis Xavier University, Antigonish, NS. Your participation is voluntary. Consenting to participate does not waive any rights to legal recourse.

What will be Required of Participants, Including Time Commitment

You will be asked to partake in one interview. The interview will occur online through Microsoft Teams and take approximately 60 minutes to complete. You will be asked to be audio recorded so the interview can be transcribed verbatim. We thank you for your consideration and participation.

Confidentiality and Anonymity

Data will be anonymized, and you will only be identified by a code number. To maintain confidentiality, only the researcher and supervisor will have access to the data. Any quotations used in the final write up will be associated with codes to ensure no personal information is included.

Data Storage

- Data will be stored electronically on a password-protected computer. Only the researcher and supervisor will have access to the data. No paper copies of the data will be made.

Right to Withdraw

- Participation is voluntary and you can withdraw from the study at any time with no negative consequences. If you wish to drop out of the study, all the data that has been

collected up to that point will be deleted from the record. Please inform the researchers through email at sharenbe@stfx.ca if you want to withdraw from the study. If you wish to decline a question in the interview, please feel free to ask to skip that question or that you do not want to answer.

Potential Benefits and Risks

Potential Benefits:

We hope to uncover what psychological skills are most frequently used by interventional cardiologists. By figuring this out, our results can help incoming physicians specializing in interventional cardiology to learn psychological skills that will improve their work performance and better prepare them for this high stress field.

Potential Risks:

The interview may bring up stressful moments throughout the participants career that may be hard to talk about. The participant will also need to find time in their schedule to fit in the interview.

Contact Information

If you have any questions or concerns regarding this study, please direct them to Dr. Sebastian Harenberg using the contact information at the top of this letter. If you have any questions or concerns regarding possible ethical issues please contact Christine Lomore, the ethics board chair through email: clomore@stfx.ca.

Appendix C

Consent Form St. Francis Xavier University

Title of the Study: Exploring Psychological Skills in Interventional Cardiologists

Researchers:

Kylie Barton, Honours Student, Department of Human Kinetics, St. Francis Xavier University

Dr. Sebastian Harenberg, Associate Professor, Department of Human Kinetics, St. Francis Xavier University

Maggie Nieto, PHD Student, Department of Human Kinetics, St. Francis Xavier University

ROMEO #: 27490

I have received a copy of the Invitation to Participate for the research project titled Exploring Psychological Skills in Interventional Cardiologists. I have had an opportunity to read the information provided or it has been explained to me and have had all questions that I may have had answered.

I agree to participate in this research project, understanding that I am doing so voluntarily. I understand that I will be video, and audio recorded during the interview. I understand that information collected will be handled confidentially by researchers. I understand I have the right to withdraw from the study at any point using the means outlined in the Invitation to Participate. I indicate free consent to research participation by signing this research consent form.

Release of Data

1. I give permission for the release of data to the public ensuring the confidentiality guidelines above, including data being disseminated through presentations at academic conferences as well as published in academic journals and written reports.
2. I understand I will not be identified as the source for any quotations and my name will not appear in any report

Signature: _____

Date: _____

Researcher Contact Information:

Dr. Sebastian Harenberg, Ph.D. Associate Professor

Email: sharenbe@stfx.ca

Phone: (902) 867-2157

Mailing Address:

P.O. Box 5000

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B2G 2W5

Appendix D

Interview Guide

Introduction Demographic questions

- What made you passionate about medicine?
- What is your education background and how did you end up in interventional cardiology?

Personal Usage on Psychological Skills

As you know, this study revolves around psychological skills in interventional cardiology. Before we explore which skills are important to your practice, could you provide me with a brief definition of what you would define as “psychological skills” in the realm of interventional cardiology?

Deductive Questioning

Spoon and colleagues offered their perspective on psychological skills use in interventional cardiology in an article that was published in the Journal of the American College of Cardiology in 2020. In this article, Spoon outlined 6 psychological skills (Mental toughness, Arousal regulation, Attentional focus, Imagery, Self-Talk, and Cohesion) that they believed to be the core skills for interventional cardiology. I would like to discuss each with you now.

1. Mental toughness: “Defined as the mental attribute that enables one to thrive in demanding situations.” (Spoon et al., 2020, p.2)
 - a. Do you agree that this skill is important? If so, why?
 - b. Can you provide an example where you had to be mentally tough?
2. Arousal regulation: “Ability to actively address their emotional state and take steps to mitigate their stress response in real time, just before or in moments of high stress” (Lauria et al., 2017, p.885)
 - a. Do you agree that this skill is important? If so, why?
 - b. Can you provide an example where you had to actively regulate your arousal/anxiety?
3. Attention focus: “Ability to concentrate attention on a target stimulus for a period of time to optimize performance” (Spoon et al., 2020, p.2)
 - a. Do you agree that this skill is important? If so, why?
 - b. Can you provide an example where you had to focus intensely despite many distractors?
4. Mental imagery: “Semi sensory experiences produced by picturing oneself performing the task prior to the event” (Spoon et al., 2020, p.2)
 - a. Do you agree that this skill is important? If so, why?
 - b. Can you provide an example where you used imagery/visualization in your practice?
5. Internal monologue (self-talk) “Covert speech or verbal thinking, to help maintain positive thoughts during stressful events” (Spoon et al., 2020, p.2)

- a. Do you agree that this skill is important? If so, why?
- b. Can you provide an example where you used self-talk in your practice?
6. Cohesion: “The strength of interpersonal connection among team members working toward a common goal or shared task” (Spoon et al., 2020, p.2)
 - a. Do you agree that this skill is important? If so, why?
 - b. Can you provide an example where the cohesion with others was influential in your practice?

Other skills

Spoon and colleagues’ paper was an opinion piece and might miss some psychological skills that are relevant for interventional cardiologists. From your perspective, are there other psychological skills that help you to perform in your job?

Can you provide an example in which situations you applied this/these skill(s)?

Psychological Skills Training

- Have you ever received psychological skills training? If yes, how did you learn about psychological skills?
- Should psychological skills training be implemented in medical education? If so, why? If not, why not?