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Development of the ARENA training programme for resilient performance in defense and security settings

Marc V. Jones [a], Nathan Smith[b], Lucy Walker[a], Martin Turner[a], Andrew McCann[a], Elizabeth Braithwaite[a], Danielle Burns[a], Paul Emmerson[c], Leonie Webster[d], and Martin Jones[d]

[a]Department of Psychology, Manchester Metropolitan University, Manchester, UK; [b]Centre for Trust, Peace and Social Relations, Coventry University, Coventry, UK; [c]Cervus Defence and Security Ltd, Salisbury, UK; [d]Human Sciences Group, CBR Division, Defence Science and Technology Laboratory, Salisbury, UK

ABSTRACT

Defense and Security Personnel (DSP) often have to operate in the presence of stressful demands. Prior research has identified factors and processes associated with DSP being able to perform resiliently in demanding situations and settings. The aim of the present study was to develop a resilient performance training programme for UK defense and security operators. An intervention mapping (IM) method was used to guide the development of the programme. Typically, IM follows six sequential phases. In the present work, these phases were shaped by insights from prior research (e.g. systematic review and end user interviews), the input of a dedicated working group ($N = 13$) and from practitioner focus groups. During the IM process, the importance of programme flexibility was emphasized by practitioners. As such, the enAbling REsilieNt performAnce (ARENA) training programme was designed to be agile and include both face-to-face training and online learning modules. Theoretical behavior change principles, closely aligned to findings of earlier work on resilient defense and security performance, were used to underpin programme content and delivery. Future research should seek to gather data on the impact of the ARENA programme, in the targeted biological, psychological and social factors that previously been associated with resilient performances.

What is the public significance of this article?—The development of a training programme using an intervention mapping approach has resulted in the production of 20 hours' worth of material to help develop resilient performance in Defense and Security Personnel (DSP). This material can be used for training that allows for the effective support of resilient performance and has implications for capability at the individual, unit and organizational level in DSP.

Background

Defense and Security Personnel (DSP) often have to operate in the presence of stressful demands in Volatile, Uncertain, Complex and Ambiguous (VUCA) environments. The demands placed upon personnel in these environments can result in degradation of performance. Mitigating the likelihood of degraded performance is, thus, critical to maintaining a tactical advantage on operations and minimizing the potential broader strategic and political implications that

performance breakdowns might lead to. One approach to maintaining performance for DSP is the provision of Psychological Skills Training (PST) programmes to refine, maintain, and in some instances develop, the coping and performance skills required to operate in VUCA environments. These types of programmes have been used in a number of performance domains, perhaps most commonly in sport (Greenspan & Feltz, 1989; Smith et al., 2022). Sport-based PST programmes typically consist of skills such as self-talk, goal-setting, relaxation and imagery (Vealey, 2007). The efficacy of these skills and wider programmes for enhancing the function of athletes has been demonstrated across a range of sports (e.g., Barker et al., 2020; Greenspan & Feltz, 1989). Drawing on this sport performance literature, military organizations have long encouraged the training of a similar set of psychological or mental skills (Mattie et al., 2020). The present paper describes the development of a resilient performance training programme for high-readiness UK defense and security operators, that is centered around PST, but also draws on broader issues such as, cooperation, sleep

management and self-reflection. In this context, high readiness refers to individuals and groups who are regularly involved in front-line defense and security operations and includes the military, intelligence, and police sectors.

There are few papers that have outlined the development and application of PST programmes to aid performance within DSP (e.g., Fertout et al., 2011; Meredith et al., 2011). In a recent literature review, Jones et al. (2022) uncovered a small number of studies that focused specifically on the development and testing of psychological interventions to enhance military performance (as opposed to promoting mental health). These included studies focused on specific skills such as mindfulness (Jha et al., 2020; Meland et al., 2015), and attentional focus (Campbell et al., 2017). Two studies were identified which used PST encompassing a range of coping and performance strategies for enhancing function. Participants from US Marine Corps completing a 12-week training course were randomly assigned to one of three groups embedded into the course: (1) a training-as-usual group, (2) general mental skills training covering goal setting, arousal control, imagery, positive self-talk, and focus/concentration, and (3) mindfulness-based mind fitness training (Jensen et al., 2020). There were mixed effects on performance with both the mental skills and mindfulness groups performing better than the training-as-usual group during an endurance task (hike). However, the performance of the training-as-usual group was higher during one of the cognitively demanding communications tests, than either mental training group. A similar mental skills intervention was conducted by Fitzwater et al. (2018) in male British Army Parachute Regiment recruits (P-Company) taking part in a training course. Five platoons were exposed to a PST program comprising goal setting, relaxation and arousal regulation, self-talk and imagery, while five platoons in the control condition did not receive any exposure to PST. Individual performance was significantly higher for the intervention group when controlling for fitness and leadership climate.

Two recent papers have reported on the development of programmes for specialist military populations using Intervention Mapping (IM; Bartholomew Eldredge et al., 2016) to capture the needs of end user stakeholders and then design and develop content that could feasibly be implemented and would likely be accepted by those receiving the training. Recently, Pattyn et al. (2022) described the design of a holistic and multidisciplinary human performance program, which included performance psychology, within the Belgian Special Forces Group, the Tier 1 Special Operations unit of the Belgian Defense. The psychological element involved individual psychological screening, individual feedback, and team feedback and interventions around key areas (e.g., understanding differences in individual functioning, collaborative decision-making). The aim of the programme was holistic and addressed mental and physical health and wellbeing, in both professional and personal aspects. Mattie et al. (2020) described the development and implementation of a customized PST programme for the Canadian Special Operations Command. Preliminary feedback on the course from 137 personnel indicated that the majority of participants found the training to be useful and relevant to their performance. The aim of this programme was to help soldiers effectively manage the demands placed on them, thereby fostering resilience, enhancing performance, and promoting employment longevity in the Special Forces community. This work from Mattie et al. (2020) is key to the present paper which outlines the development of a programme to enhance resilient performance in UK DSP.

A focus on resilient performance

A key area where PST programmes may be helpful for DSP is in maintaining and enhancing resilient performance. In defense and security domains, resilience has typically been studied in the context of traumatic stress by examining its buffering role in experiences of mental (ill) health (Jones et al., 2019; MacManus et al., 2014; Pietrzak et al., 2010). In the past, considerable primary research has been conducted, and several training programmes focused on resilience for mental health have been developed and tested in military and policing domains (e.g., Griffith & West, 2013; Ramey et al., 2017). Psychological resilience is not solely about mental health. It also relates to performance, especially in psychologically demanding VUCA settings. In a recent systematic literature review, resilient performance has been defined as "*the maintained or improved execution of competence under situational duress*" (Jones et al., 2022, p. 2). This definition is aligned to contemporary perspectives on resilience and captures the dynamic aspects of how a person functions under stressful demands (Gucciardi et al., 2021; Kalisch et al., 2017). Operationally, resilient performance can be thought of as an emergent outcome, best viewed by examining variability (i.e., maintenance or improvement) in the execution of competencies that are critical for defense and security operators being able to do their work (Jones et al., 2022; Smith et al., 2022). Resilient performance also has a temporal aspect with strategies needed

to manage performance, in response to different stressors that may be immediate (e.g., a weapon jamming) or more pervasive (e.g., being a long time away from home). Resilient performance itself can also be considered to have a temporal aspect in that it can relate to in the moment performance but also the long-term repeatability of performance and longevity of a successful career in defense and security contexts.

Findings from prior research point toward a number of biopsychosocial factors, such as decision-making (Campbell et al., 2017), leadership (Fitzwater et al., 2018), and biomarkers such as Neuropeptide Y (Morgan et al., 2002) that are linked to the resilient performance of DSP. Jones and colleagues (Jones et al., 2022; Smith et al., 2022) recently organized these factors into a resilient performance framework that includes three broad interrelated domains. First, the framework specifies potential competencies, or so-called "markers", of resilient performance that are relevant to the work of DSP. These markers include fine motor skills (e.g., marksmanship), physical fitness, persistence and effort, attention and concentration, judgment and decision-making, and communication and teamworking. Consistent with how Gucciardi et al. (2021) operationalized resilient functioning, variations in the aforementioned markers when personnel are operating under pressure can be used to provide an indication as to whether the individual is performing resiliently.

Second, situational processes represent a range of dynamic biopsychosocial factors, shaped by person-environment interactions, that are expected to influence variations in performance markers in a given situation or setting. A variety of process factors, including physiological, psychological, and social variables have been identified as potentially impacting upon the execution of performance markers. Physiological processes include biomarkers such as cortisol, Dehydroepiandrosterone (DHEA), Neuropeptide-Y (NPY) and Heart Rate Variability (HRV). Psychological and social processes include perceptions of control, state self-efficacy, trust, challenge appraisals, and regulatory skills, such as self-talk, imagery, and emotional control (e.g., Fitzwater et al., 2018; Morgan et al., 2007). Situational processes are shaped by both situational factors, such as prevailing task and environmental demands, and global-contextual enablers and disablers of performance.

Third, enablers and disablers are defined as relatively stable, distal, global-contextual variables that have an enduring impact upon a person's function. A range of enabling factors have been linked to being able to perform resiliently. These factors include, amongst others, mental toughness,

psychological hardiness and grit (Arthur et al., 2015; Bartone, 2007; Beal, 2010). Potential disablers of resilient performance include variables such as certain personality traits (e.g., being egotistical or arrogant) and factors such as intelligence (Smith et al., 2022). Although an intricate understanding of the relationship between all relevant enablers/disablers, situational processes and markers of resilient performance is yet to be elucidated, individual components of the resilient performance framework offer potential targets for enhancing the resilient function of DSP.

Present programme

The ARENA (enAbling REsilieNt performAnce) training programme documented in the present work aims to educate and equip DSP to understand and be able to self-manage, and where relevant optimize, key global-contextual enablers, disablers, and situational processes linked to performing resiliently under stress. It complements and builds on recent work outlining the development of PST programmes in military populations (Mattie et al., 2020; Pattyn et al., 2022) in a number of ways. First, the work is grounded and informed by a resilient performance framework developed specifically for defense and security (Jones et al., 2022; Smith et al., 2022). This is used to shape the application of an IM methodology, capturing key practitioner and end user stakeholder needs and requirements, to produce an enabling resilient performance programme that is ready to be tested and evaluated in the field. Second, it is focused on a UK population, complementing previous work in Canadian (Mattie et al., 2020) and Belgian military populations (Pattyn et al., 2022). Third, the present programme is focused on the broader high readiness defense and security community comprising military, intelligence, and police sectors. The objectives of the present work were to:

- Produce a series of educational resources to help develop understanding of the enablers and processes of resilient performance and equip individuals with the skills needed to enhance resilient performance in defense and security settings;
- Collect information from end-users to assess the validity of the content and delivery style of the programme; and
- Refine the resources for the programme for enhancing resilient performance in defense and security settings based on the feedback from the high-readiness end-user community.

Methods

Programme design

An IM approach was used to inform this work (Bartholomew Eldredge et al., 2016). Whilst IM originates from the health promotion domain, it has previously been applied to develop human performance programmes for defense populations (Mattie et al., 2020). Within IM, emphasis is placed upon addressing problems in context. The involvement of end-users from the target population is key to all aspects of the IM approach. Involving end-users throughout helps avoid an overly top-down perspective where the content and delivery approach would primarily be driven by the research team but may not meet the needs of intended end-users.

Procedure

The steps of the IM approach used to develop the ARENA programme are outlined below. Detailed reflection on each stage is provided in the Results section.

(1) *Step One: Needs Assessment* – The first step of the intervention mapping approach involved an in-depth needs assessment, making clear the problem to be addressed.
(2) *Step Two: Identification of Programme Outcomes* – The specific outcomes targeted by the programme were outlined. These derived from the needs assessment performed in the step one.
(3) *Step Three: Programme Design* – The design of the programme and how it could improve behavioral outcomes was considered. This included consideration of what content is delivered, to whom, and how it was delivered.
(4) *Step Four: Programme Production* – Here the programme was produced, and feedback received on the content. This stage has been described previously as a "reality check" (Bartholomew Eldredge et al., 2016).
(5) *Step Five: Programme Implementation* – A comprehensive implementation plan was developed in order to ensure that the programme was introduced into the populations it was designed for. Including the identification of potential barriers to the adoption of the programme.
(6) *Step Six: Develop an Evaluation Plan* – In this stage consideration was given to the type of data that should be collected (e.g., qualitative, and quantitative), the methodology employed (e.g., group studies, single-case research designs) to assess the effects of the programme on momentary (e.g., decision-making under pressure) and more macro levels (e.g., longevity in the profession) of performance.

Results

Step one: Needs assessment

In the present work, the needs assessment comprised three main aspects: (1) a rigorous systematic literature review of resilient performance in defense and security settings (see Jones et al., 2022); (2) stakeholder interviews (Smith et al., 2022); and (3) the creation of a joint working/advisory group. The aim of this first step of programme development related to clearly defining the problem. Psychological resilience is a complex phenomenon, which, in defense and security settings, has typically been studied in relation to trauma and mental health (van der Meulen et al., 2020). In contrast to earlier studies on resilience, a priority of the current work was to develop an understanding of how to support resilient performances in defense and security populations. With this focus in mind, understanding what is meant by "resilient performance" and the factors that contribute to such performance was therefore the primary aim of the needs assessment. A summary of the results from each section of the needs assessment is outlined below.

Systematic review

To fully scope out existing work regarding resilient performance, a systematic literature review was conducted (Jones et al., 2022). The review aimed to identify i) what theories and models have been used to study resilient performance in security domains, ii) what measures and metrics have been implemented, and iii) how previous programmes have been designed to enhance resilient performance in defense and security contexts. The systematic review retrieved 32 internationally diverse papers examining various samples, including work from the United States of America (USA), Norway, Australia, and the United Kingdom (UK). Military samples were the most investigated populations, with only two studies exploring outcomes with police and law enforcement personnel.

The search revealed a lack of clear theoretical or conceptual approaches to the study of psychological resilience. Some research referred to psychological skills and PST, but these were not framed within the context of broader explanatory resilience frameworks. Furthermore, resilience was often discussed in terms of being a trait-based attribute that is relatively stable

across time. More recent contemporary work regarding resilience has adopted a person-environment focus, acknowledging the influence of personal attributes on resilient functioning in stressful situations and settings.

When examining the measures used in previous research to benchmark performance, it became clear that a wide range of outcomes had been selected. These were: course selection/completion; applied tasks; shooting; and cognitive performance. Outcomes were largely dependent on the setting, and is reflective of the dynamic and ever-changing environment that DSP operate in.

The concept of resilience was also measured using psychological and/or physiological techniques. For psychological aspects, a range of validated self-report questionnaires were utilized, such as the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) and the Duckworth Grit Scale (Duckworth et al., 2007). Objective physiological measures were also used in some studies. These were separated into biological markers of stress reactivity such as the measurement of cortisol and NPY, biological markers of immune function such as C-reactive protein (CRP), and other physiological measures such as cardiac measurements (heart rate and vagal tone) were monitored using wearable devices. In some instances, both psychological and physiological measures were selected, providing a multifaceted insight into resilience within these settings.

The literature review also revealed research that focused on improving cognitive performance (such as mindfulness and attention) or mental skills via training programmes. While informative, these studies did not refer to directly targeting resilient performance. Overall, there was a lack of information relating to how a resilient performance training programme for DSP could and should be designed and implemented. Furthermore, it was evident that resilient performance meant different things dependent upon the setting and population. This insight stimulated the development of a clear definition and theoretically informed framework of resilient performance in defense and security settings. The framework (Jones et al., 2022), outlined in the introduction, describes specific enablers and disablers and situational processes that are expected to contribute toward resilient performance. Resilient performance was defined as: "*the maintained or improved execution of competence under situational duress*" (Jones et al., 2022, p. 2). The applicability of this framework and definition were then discussed in end user interviews (presented below).

Stakeholder interviews

To conduct an initial face validation of the resilient performance framework, 17 defense and security end-users were recruited to take part in semi-structured interviews (see Smith et al., 2022). The interviews were also used as an opportunity to garner insight into the types of training stakeholder groups might be receptive to. End-users were asked to contribute their perspective on each area of the developed framework and broader aspects related to assessment and training (enablers, disablers, processes, measures, and training methods) and to reflect upon the definition produced.

Thematic analysis of interview data produced seven overarching themes including: resilient performance markers (Theme One), resilient performance enablers (Theme Two) and disablers (Theme Three), resilient performance resources (Theme Four) and demands (Theme Five), measuring resilient performance (Theme Six), and training resilient performance (Theme Seven). When presented with the definition of resilient performance as "*the maintained or improved execution of competence under situational duress,*" end-users largely agreed that it was relevant to their area of work. A novel finding arising from these discussions, related to the temporal aspect of resilient performance. End-users were keen to emphasize that resilient performance did not just allude to finite periods of applied performance (such as shooting), it was also pertinent in more enduring circumstances such as lengthy deployments away from home. Overall, end-users were generally in agreement with the markers of resilient performance that were presented to them.

Joint working/advisory group

A joint working/advisory group comprising the authors, which included two members from the Defence Science and Technology Laboratory (Dstl), and 13 members from across the UK defense and security community was established to ensure that the training programme developed was relevant to their working environments. The group all had operational experience, which involved combat operations, although some were now in human performance roles, leading training for their organizations. The group met on three occasions to develop the programme.

One aspect that emerged from discussion with the advisory group was "Performance tools when under stress". This related to guidelines around how people can behave/talk under stress that can enhance performance. This applied both to operations, and also assessment and training scenarios, which make up a significant portion of the work of these communities.

Another aspect raised was the social element of resilient performance. Individuals from high-readiness groups in defense and security settings work in teams more often than alone and as such, team dynamics are crucial. Discussions around emotional and social contagion highlighted issues of negative co-rumination within teams. The social aspects also related to maintaining positive relationships at home. The positive contribution of social dynamics was also highlighted by an emphasis on the role that culture can play in affecting resilient performance. Therefore, a module on Resilient Group Living and Performing were considered an important addition to the course.

Step two: Identification of programme outcomes

Several programme outcomes emerged from discussions with the working/advisory group and how these may be reflected in data collection measures. It was noted that one or two sessions may not be sufficient to observe meaningful changes in outcomes, given the characteristics of the target groups. That is, these groups are typically classed as high performers and more intensive work may be needed to demonstrate any meaningful change. It was suggested that information should be presented over a series of sessions and data collected throughout and following delivery to identify trajectories of change in targeted aspects of resilient performance. In addition to discrete performance metrics (e.g., number passing an assessment course), practitioners suggested to examine objective statistics such as measures of longevity (e.g., time spent in the profession) and absences (e.g., incidences of sick leave). This illustrates the close association between resilient performance in given moments and managing performance demands over time, which may have knock-on effects towards health-related aspects, such as leaving the profession and sick leave. While some group members encouraged a longer-term focus, all also agreed that, consistent with the findings of prior activities (Jones et al., 2022; Smith et al., 2022), evaluating how the programme content impacts upon biopsychosocial markers linked to enablers and processes, as well as outcomes of resilient performance, was ideal. Multi-year investigations of the programme were highlighted as potentially fruitful. These studies would help determine the efficacy of the programme in fostering more enduring high performance and combatting the build-up of cumulative stress exposure across a lifespan (e.g., presentations of crisis points, which relates to cumulative stressors).

Step three: Programme design

There was broad agreement across the practical aspects of programme design. These included: 1) That the course should have flexibility and have discrete "blocks/segments", by which parts can be slotted into existing courses or be given as standalone workshops. 2) There was preference for face-to-face delivery where possible and that online resources should be provided to supplement face-to-face delivery – but online resources should not replace this approach. The recommendation was to use a blended approach, as different formats work for different groups, so the framework would help when applied across environments. 3) There was support for practical exercises within the education content to understand what attendees think/believe and to reinforce key points of the programme. 4) Case studies and examples were also seen as important to reinforce the points being made and help illustrate the skills being taught. 5) There was some discussion around "train the trainer" or co-delivery (specialist trainer and a specialist end-user) approaches or whether the courses should be delivered by experts in resilience training. While there was support for these approaches, it was also recognized that this may not always be possible. Ideally, the course would be co-delivered with a member of the end-user community, however, flexibility was key, and the suggestion was that the course should be developed in a way that enables a "train the trainer" approach to be adopted if required.

Beyond the practical elements and content of the programme, adopting a theoretical approach to behavior change is key to increasing the likelihood of achieving desired outcomes. As such, it was considered important that the training be constructed in a way that addresses basic motivational processes. To this end, Self-Determination Theory (SDT; Ryan & Deci, 2017) provides the underpinning theoretical framework to the programme. SDT has previously been applied to understanding human motivation in fields as diverse as health behavior change (Ntoumanis et al., 2021), pro-environmental behavior (Darner, 2012), coaching in sport (Bartholomew et al., 2009), human spaceflight (Goemaere et al., 2016), and military functioning (Filosa et al., 2021), among many others. In SDT, behaviors come to be self-determined when they are valued in a social context that fulfills an individual's three basic psychological needs (Ryan & Deci, 2000). The three basic psychological needs are autonomy, competence, and relatedness. Autonomy refers to the experience of volition and self-directedness. Competence refers to the need for perceived confidence and to feel effective in bringing about desired outcomes. Relatedness refers to the fundamental need to experience a sense of belonging and trust within a group.

Self-determined behavior is behavior that reflects either intrinsic regulation (behaviors performed for the pleasure the behavior provides) or integrated regulation (internally controlled, in accordance with own values, goals, and needs and part of a person's identity; Goemaere et al., 2016). Behavior underpinned by self-determined motivation regulations is typically more consistent, long lasting and manifests in increased persistence when tasks become difficult (Darner, 2012). In fostering resilient behaviors, integrated regulation of those behaviors is usually the goal, so that people feel they act of their own volition, even when the behavior is not particularly pleasurable (e.g., having to miss a social event because they are on call). Some behaviors, though, may occur through intrinsic regulation if the individual truly enjoys and gains pleasure from the experience (Darner, 2012; Goemaere et al., 2016).

The resilience training programme developed in this work was designed in such a way that content and delivery should support the fulfillment of psychological needs and engender more integrated and intrinsic motivation. The programme develops autonomy in multiple ways. In its design, the programme is not prescriptive. Individuals are able to engage with the material in a way that is compatible with their own work situations and needs and priorities. Throughout the different elements of the programme, autonomy-enhancing features are integrated into the delivery. There are opportunities for perspective and initiative taking (e.g., explaining what resilient performance means in their specific context). A rationale is provided for why certain approaches are relevant, with supporting statements from other members of the practitioner community to generate intrinsic interest, and those engaging are encouraged to make choices and decisions as to how they will use the information provided (e.g., some individuals may use imagery for skill acquisition, others may use imagery for emotional control). This is particularly important given that resilient performance has a temporal aspect with strategies needed to manage performance, in response to different stressors that may be immediate or more pervasive. Because of the varied nature of the roles performed by DSP it is challenging to build a strategy-stressor synergy but it is one that can be done at an individual or small group level through consultation with the DSP involved.

The programme also supports competence by offering a scaffolded learning approach whereby the learning is broken into sections with a tool or concept covered in each section comprising basic education, practical exercises and modeling, and self-discovery. Furthermore, the course contains feedback from experts, and aims to develop aspects of self-efficacy through using techniques such as imagery and self-talk. Such techniques can build confidence in executing certain skills when needed. Lastly, the programme also addresses relatedness, that feeling of being part of a group, by developing and drawing on relevant cases studies and examples, with quotes from the aforementioned interviews being integrated throughout the materials. In the programme, there is a clear emphasis on how individual behaviors impact upon wider team functioning, with the aim to build trust and cohesion, which again has implications for relatedness.

While SDT provides the theoretical approach to behavior change underpinning the programme, it also links to key processes that are relevant to resilient performance. Previous research informing this programme (Jones et al., 2022; Smith et al., 2022) has demonstrated that control (autonomy), confidence (competence) and connection (relatedness) are key process mechanisms for resilient performance. This means that basic needs are likely to act as a critical psychological resource that facilitate optimal performance, both directly and via how they shape other psychophysiological processes, when dealing with stressful demands (Vansteenkiste et al., 2020). Therefore, designing task content, and methods of delivery to be need satisfying is likely to have benefits for encouraging positive behavior change and impact upon mechanisms directly implicated in resilient performance.

Step four: Programme production

In this step, training materials were developed. This entailed the team working together to develop the structure of the course content, written course material in the form of PowerPoint slides and professionally produced content in the form of digital resources hosted on an online platform. In addition, interviews with experienced DSP were interwoven throughout the programme to create interactive elements of course delivery.

Once all material was drafted, it was shared with the working/advisory group for comments during a one-day face-to-face event. The overview of the programme was shared followed by pilot delivery of materials for the "Introduction to Resilient Performance" session, and modular online content. Feedback was provided on the content, style, and proposed structure of the programme. which led to minor changes (e.g., in places it was felt that there was too much content). Overall, the structure of the programme and the material presented were received positively. Suggestions were primarily made around reducing the amount of content but keeping the same/similar topics.

Lastly, in order for the programme to be implemented and taken up by DSP, a programme name needed to be agreed upon. This was achieved through discussion within the programme production group, leading to the development of an acronym for this work. The title produced was: ARENA (enAbling REsilieNt performAnce), which reflects the intended population and aim of this work. It also references Theodore Roosevelt's famous speech "The Man in the Arena" (Roosevelt, 1910), a well cited speech within the defense and security community.

An overview of the course structure, and content of the face-to-face workshops is shown in Table 1, alongside delivery methods in Table 2. In addition to key psychological skills (e.g., imagery, self-talk) broader issues related to resilient performance are covered (e.g., sleep, emotional intelligence). The face-to-face workshops are supplemented by nine online, self-directed, modules comprising:

- Introduction to resilient performance – Content covers the underpinnings of resilient performance in D&S settings;
- Foundations of resilient performance – Content covers a range of biopsychosocial factors linked to performing resiliently under stress;
- Mental skills for performance – Content explores a range of practical mental skills that are linked to being able to perform resiliently;
- In the moment performance – Content covers biopsychosocial processes linked to maintaining performance;
- Teamwork for resilient performance – Content covers issues of teamwork and resilient team performance;
- Group dynamics for team performance – Content covers the wider social ecosystem related to maintaining team performance;
- Optimising performance transitions – Content covers issues related to performance during transition periods;
- Rest-recovery for performance – Content covers the role of mental detachment and sleep in resilient performance; and
- Performance over time – Content covers factors associated with sustaining resilient performance across a career lifespan.

Table 1. Summary of the ARENA programme.

ARENA EnAbling REsilieNt performAnce
The programme will be flexible with the potential for face-to-face delivery and online resources. This means users can provide either: • A face-to-face session on "Introduction to Resilience;" • A face-to-face session on "Introduction to Resilience" and access to online resources; • A face-to-face session on "Introduction to Resilience" and access to detailed workshops on specific topics (e.g., resilient preparation). These topic workshops can all be done together or some of the more relevant ones can be selected. The face-to-face work will be supplemented by access to online resources.

Face-to-Face Sessions

Title	Topics Covered	Length
Introduction to Resilience	Biopsychosocial underpinnings of resilience; Resilience and performance in individuals and teams; Overview of practical strategies for developing resilience (e.g., breath control, sleep, transition)	3 hours
Foundation of Resilience	Introspection/Awareness/Meta-Cognition Rest/Recovery/Sleep/Post-performance routines, Transitioning home, Breath control, Mindfulness, Self-regulation	3 hours
Resilient Preparation	Pre-performance routines, Peaking, Transitioning between tasks, Breath control,	3 hours
Resilient Performance	Skill acquisition, Imagery, Breath control, Pre-performance routines, Self-talk, Communication and Teamwork, Focus/flow states/In the moment. Decision-making, Rumination vs reflection,	3 hours
Resilient Group Living and Performing	Group Living (Emotion & Cognitive Contagion), Transitioning home, Communication/Teamwork/Interpersonal Relationships, Space, Extreme environments, Influencing others, Being a follower, Emotional intelligence, Identity, Transitioning to different roles.	3 hours

Table 2. Structure and delivery of the ARENA programme.

Programme element		Base programme	Full programme	Bespoke programme	Online only
Introduction to resilient performance	Face-to-face	X	X	X	
Foundations of resilience	Face-to-face		X	N	
Resilient Preparation	Face-to-face		X	N	
Resilient Performance	Face-to-face		X	N	
Resilient Group Living and Performing	Face-to-face		X	N	
Online modules	Remote self-directed	X	X	X	X
Time demand (hours)		10	25	10 + N	7

X indicates element of a programme that is included; N denotes a nominal selection of additional material.

The online modules include informational text and a series of reflective tasks, readings and videos from individuals with experience operating in high-readiness units drawn from military, intelligence and police sectors. Each module takes approximately 30 minutes to complete.

Step five: Programme implementation

Earlier research (Jones et al., 2022; Smith et al., 2022) and interactions with the joint advisory and working group, as well as feedback from a stakeholder consultation event with 45 attendees, helped shape the programme implementation plan. As indicated earlier, Bartholomew Eldredge et al. (2016) suggested that barriers to implementation include limited acceptability of material and no concerted effort to deploy interventions that encourage participants to adopt, implement and maintain the material covered in the programme. Cognisant of these potential barriers, efforts were made to produce content that is directly applicable to the end user stakeholders, relying on relevant research and framing material with practitioner perspectives and case studies. Material has been regularly end user checked for acceptability throughout development (Motulsky, 2021). Various flexible options for implementation were suggested to encourage end user engagement. At a minimum it is recommended that engagement with the ARENA material includes participation in the face-to-face "Introduction to Resilient Performance" session supplemented with online material. Other options include receiving the full programme or a more bespoke offering that could be driven by end user needs. At various points of development, a fully online package has been discussed. Earlier research suggested that an online only programme was not especially desired by end-users (Smith et al., 2022), but remains an option for certain hard to reach populations.

Step six: Evaluation plan

It was suggested that evaluation of the programme in the short to medium-term should focus on whether participants perceive an increase in self-knowledge and potential change in aspects related to performing resiliently. To this end, various measures of biopsychosocial enablers and processes related to resilient performance, alongside performance measures themselves, could be used. Based on earlier work, this could include pre- and post-programme assessments of discrete performances (e.g., shooting scores), self-reports including general emotion regulation tendencies, personality, basic psychological needs (competence, autonomy and relatedness), cognitive flexibility, and task demands vs. personal resources, and physiological measures such as HRV. It is recommended that evaluation measures be obtained following each session and use of online material allowing for process evaluation and further development of the programme. Table 3 outlines a proposed evaluation method and timings in line with the running of the ARENA programme. In the longer-term, stakeholders suggested that further data could be considered in relation to programme delivery such as longevity in the profession, along with qualitative data on personal perspectives on the consolidation and development of resilience-enhancing skills over time. Continued evaluation and refinement of the programme could lead to a wider implementation beyond the specific end user populations of interest to this work.

Based on the above evaluation plan, a control group comparison study has been proposed (blinded for review). In the proposed study we aim to test the effectiveness and acceptability of the ARENA programme to end-users and collect data on whether taking part in the course stimulates changes in the enablers and processes of resilient performance. Data collection of the key outcomes will be completed prior to intervention delivery and post intervention delivery, in order to allow for access of the online content. Data collected across the

Table 3. Evaluation of the ARENA programme.

Evaluation type	Method	Timing							
		Pre course	Post 1	Post 2	Post 3	Post 4	Post 5	Post online	Post course
Standard	Quantitative	Enablers Processes Performance	Session evaluation	Session evaluation	Session evaluation	Session evaluation	Session evaluation	Material evaluation	Enablers Processes Performance
Intensive	Quantitative Qualitative	Enablers Processes Performance	Session evaluation Enablers Processes Performance	Session evaluation Enablers Processes Performance	Session evaluation Enablers Processes Performance	Session evaluation Enablers Processes Performance	Session evaluation Enablers Processes Performance	Material evaluation	Enablers Processes Performance
Online	Quantitative Qualitative	Enablers Processes Performance						Material evaluation	Enablers Processes Performance

study will comprise self-report, (basic psychological needs, a greater stress-is-enhancing mind-set (that stress enhances health, performance and wellbeing), a challenge psychological state, cognitive flexibility, and higher levels of emotional regulation), alongside the collection of some physiological (heart rate variability) and qualitative (open ended questions) data.

Discussion

The ARENA programme for resilient performance in defense and security settings was developed using an intervention mapping approach (Bartholomew Eldredge et al., 2016) and informed by previous work conducted in the Canadian (Mattie et al., 2020) and Belgian military (Pattyn et al., 2022). Educational materials for five separate workshops and online resources were produced based on research evidence and a series of video recordings with end-users focused on resilient performance. The proposed programme is flexible with the potential for face-to-face delivery of varying levels and/or utilization of online resources.

The development of the training programme built on existing programmes in this area, and the stages of the approach reflected those adopted by Mattie et al. (2020) within a comparable population. The Mental Skills Training programme developed for a population of elite training soldiers in Canadian Special Operations Forces Command (CANSOFCOM) by Mattie et al. (2020), shows similarities to the current programme in both content and structure. In terms of content, both have a focus on mental skills (e.g., imagery, self-talk and breath-led training). In structure, both programmes advocated a co-delivery model, with material being delivered both by a trainer and an end user. Both programmes also proposed the use of videos of experienced end-users talking about the psychological skills. There are also similarities between the content of the ARENA programme and the psychological element of the programme outlined by Pattyn et al. (2022) such as understanding differences in individual functioning, collaborative decision-making.

While there are clear similarities in the programmes, there are also notable differences, which perhaps reflect the different populations engaged in the development of each programme and the critical steps taken to develop the current work. The current programme is perhaps broader in scope than Mattie et al. (2020), focusing on wider issues relating to resilience (e.g., sleep, leadership and transitioning to home). The work of Pattyn et al. (2022) is even more holistic encompassing physiotherapy, physical training and performance psychology. While videos are included in both ARENA and Mattie et al., programmes, the present project incorporated videos into specific, discrete, online modules to supplement the face-to-face delivery. Online delivery of content did not appear in the work of Pattyn et al. (2022) beyond being used as a method of questionnaire administration. Finally, there was a preference that the course should have flexibility and have discrete "blocks/segments" that could be slotted into existing courses or be given as standalone workshops. This perhaps reflects the more diverse population from across the defense and security services that inputted into the development of this programme, in contrast to the more focused programme developed for CANSFCOM (Mattie et al., 2020) and the Belgian Special Forces Group (Pattyn et al., 2022).

A major strength of the ARENA programme is that the content was derived from a current, and comprehensive, systematic literature review of resilient performance, complemented by interviews with end-users from defense and security settings. The development of a biopsychosocial resilient performance framework based on end user perspectives and current literature provides a sound theoretical base for the content. It also provides a clear basis for measures of biopsychosocial markers, processes and enablers of resilient performance that could be used to test evaluate the effectiveness of the programme.

Limitations

There are some limitations to the current work that can be addressed in future projects. The working/advisory group was made up of already-engaged end-users, who were senior in their organizations. These individuals had substantial frontline experience, but also were engaged and interested in the development of resilience, and this perhaps offers a slightly skewed perspective of the content. Furthermore, there has been no empirical evaluation of the course to date, and so unlike the work of Mattie et al. (2020), there is no data on how the course will be received, despite the robust process for the development of the material. Also, the current programme was developed with input from a narrow, and perhaps unrepresentative, area of defense and security with an emphasis on individuals with experience of operating in high-readiness groups. Despite the importance of this group, other less operationally demanding roles may not have the same user needs and so the programme may not translate as effectively across all areas of defense and security settings.

Future directions

The next stage of this wider project of work is to test the feasibility and acceptability of the psychological resilience programme to end-users and collect data on whether taking part in the course stimulates changes in the enablers and processes of resilient performance. Based on the evaluation plan outlined a control group comparison study has been proposed (blinded for review). A second, complementary approach which is not yet planned, is to use intensive single-case research (n of 1) designs. Findings from a large group trial may mask individual differences in responding to the intervention. A case study approach would provide insight into the individualized experience of the training programme and capture some of the features that make the programme acceptable (or not) from a user perspective. Similar case study approaches have commonly been used in sport to identify the effects of psychological skills training (Barker et al., 2020). That said, the range of tasks faced by individuals in defense and security settings, the breadth of demands and how these change over time mean that evaluating the feasibility of this training programme is a significant task. One which requires replication of data, and the use of different methodologies, across a range of different contexts and populations. Overall, in terms of programme evaluation our suggestion would be to make this bespoke to the group and specific tasks the group undertakes. But that the evaluation is done in line with the resilient performance framework (Jones et al., 2022) and the evaluation would cover the biopsychosocial aspects of enablers and processes as required. For example, for a group of military personnel leaving for a long mission the importance of group dynamics maybe a focus, while for members of the intelligence community strategies for mainlining concentration and focus during surveillance maybe emphasized. A further consideration is how the ARENA programme would be experienced by individuals going through "low tempo" periods which might offer limited exposure to resilience triggering events, compared with individuals engaged within high-fidelity training experiences with daily stress-inducing training activities. Future research could explore optimum times for delivery and the retention of skills acquired in the course.

From the process of developing ARENA one notable point made by the advisory group was the potential negative aspects of being a resilient performer. For example, this may mean focusing on a successful career at the expense of other social connections. More serious aspects of resilient performance were also highlighted, including individuals affected by burnout, leading to emotional numbing, which in turn can be stress resistant, but could contribute to a negative culture within a team. This is also an area worthy of further research in this population.

Conclusion

This study describes the development of a training programme for resilient performance, using an intervention mapping approach. The ARENA programme comprises five face-to-face workshops along with nine online, self-directed, modules. In total there are 20 hours of material should the entire programme be completed, although the programme has flexibility whereby material can be fitted into existing courses or be given as standalone workshops. The ARENA programme complements and builds on recent work outlining the development of PST programmes in military populations (Mattie et al., 2020; Pattyn et al., 2022). The programme specifically draws on the broader high-readiness defense and security community comprising police, military, and intelligence sectors, being focused on a UK population, and informed by a resilient performance framework developed specifically for defense and security (Jones et al., 2022; Smith et al., 2022).

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Marc V. Jones http://orcid.org/0000-0003-2999-3942

Data availability statement

Due to security restrictions the data are not available via open access.

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