Resilience Enhanced aFteR ACTiOn ReviewS (REFRACTORS) for Teams: A Pilot, Non-Randomised Investigation of Feasibility Within Military Settings

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Note on title: The term 'after action review' is one of several terms used to label collective reflection processes (e.g., team debriefs). We prioritise the use of 'after action review' in the title because it enabled us to create an acronym that reflects the essence of our approach, namely REFRACTORS (e.g., a refracting telescope is a type of optical telescope that uses a lens as its objective to form an image).

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Abstract

Most existing guidelines for team resilience development offer an incomplete perspective from which to translate theory into practice because they rely on a 'one size fits all' approach that assumes specific capacities and strategies work well for all teams and which are often decontextualised from the defining feature of resilience. We propose an alternative yet complementary approach that combines theory and practice on team resilience, event systems, emergence, and team meta-cognition. The essence of our resilience enhanced after action reviews protocol is reflected in the acronym 'STOP then Resource' in which teams contextualise their reflection process to salient *Stressors* and their *Temporal* elements; an *Overview* of the unfolding dynamics of the events including *Perceived* or actual impact; and lessons learned regarding *Resources* required to optimise resilient outcomes. We report a pilot, non-randomised process evaluation of resilience enhanced after action reviews for teams within a military setting with 17 male team leaders (7 Lance Corporals, 10 Corporals) who were participating in an Army training exercise. Our findings suggest that the resilience-enhanced reflection protocol is feasible and acceptable to participants yet requires enhancements for future applications to maximise uptake and usefulness (e.g., target junior leaders and newly formed teams, integration within existing organisational practices). Future work is required to examine the efficacy and effectiveness of this new approach to conducting after action reviews, alongside protocol usability, salient contextual factors, and applicability for teams in different organisational settings to shed light on avenues for adapting the approach to maximise uptake and engagement.

Keywords: leadership development; team debrief; team reflection; team resilience

Resilience Enhanced After Action Reviews (REFRACTORS) for Teams: A Pilot, Non-Randomised Investigation of Feasibility Within Military Settings

Despite the relative infancy of the area, much has been written about the concept of team resilience over the past two decades (Chapman et al., 2020). This scholarly interest in team resilience is unsurprising because teams are required to learn and perform in contexts replete with stressors and adversities that pose meaningful threats to their functioning (Razinskas & Hoegl, 2020). Scholars have devoted considerable conceptual (e.g., Hartwig et al., 2020) and empirical (e.g., Morgan et al., 2015) effort towards generating knowledge on factors that have the potential to facilitate resilience, leading to the proposal of training frameworks and recommendations for practice (e.g., Sarkar & Page, 2020). Within organisations, doctrinal practices (e.g., simulation exercises) and documents (e.g., military commander's guide) also exist with the aim of developing team resilience. Despite the intuitiveness and practical appeal of these guidelines, we contend that they offer an incomplete perspective from which to approach the optimisation of resilience because they rely on a 'one size fits all' approach that assumes specific capacities and strategies work well for all teams and are often decontextualised from the defining feature of resilience, namely the stressor or adversity experiences. Team identity, for example, might provide a 'baseline' degree of readiness or capacity to demonstrate resilience via a sense of belonginess and connectedness (Sarkar & Page, 2020), yet alone is likely insufficient in circumstances when one or more members experience threats to their sense of 'we' and 'us' (e.g., co-existing yet competing aspects of self-identity – personal and social – are both situationally activated) because the effects might derail the system. We propose an alternative yet complementary approach to fostering team resilience that embraces its dynamic nature and which synergises concept and operationalisation. To forecast the essence of our approach, we prioritise the question 'resilience to what' explicitly because it is an essential yet often overlooked consideration for theory and practice on human resilience (Kossek & Perrigino, 2016; Raetze et al., 2021). For example, past work has typically considered resilience as a response to assumed acute and traumatic events (Southwick et al., 2014). We address this

assumption by acknowledging the importance of developing complementary resilience resources compatible with the unique demands associated with contextually varying event characteristics (e.g., severity, timing, location).

Conceptual and Empirical Foundations

Team Resilience: A Brief Primer

High-quality concept definitions are the cornerstone of robust scientific work, theoretical development, and evidenced-based recommendations for practice (Podsakoff et al., 2016). Existing definitions of team resilience vary regarding the type of property this construct represents (see Table S1; https://bit.ly/3B4Gus0). Conceptually, the property of team-level constructs is typically categorised as either inputs (i.e., characteristics of the context, team or individuals), processes (i.e., mechanisms that explain how inputs form outputs), or outputs (i.e., outcomes of team member interactions, Ilgen et al., 2005). Team resilience has been commonly defined as an input- (e.g., capacity, ability, belief) or process-based (e.g., psychosocial process) team property (e.g., Kossek & Perrigino, 2016; Raetze et al., 2021). However, the dynamic nature of resilience across time and context limits the utility of universal abilities or capacities as well as processes to reflect the essence of team resilience definitions. For example, a team may demonstrate the capacity to bounce back in response to one event such as a loss of a team member but may be ineffective at recovering from another event such as adverse environmental conditions. Essentially, what a team requires (capacities) and how it converts resources into action (processes) to deal with stressors and adversities effectively depends on the context in which they are embedded (Southwick et al., 2014). For this reason, it is almost impossible to articulate with precision the necessary and sufficient conditions that characterise the essence of team resilience when conceptualised as a capacity, that is, the "properties…that all exemplars of the concept must possess [necessary]…[and] things that only exemplars of the concept possess [sufficient]" (Podsakoff et al., 2016, p. 181).

Guided by recommendations for high-quality concept definitions (Podsakoff et al., 2016), we rely on the definition of team resilience as "an emergent outcome that resembles trajectories of

sustaining or bouncing back relatively quickly to collective homeostasis when confronted with meaningful threats to functioning" (Gucciardi et al., 2018, p. 735). Unlike capacity or process definitions, an outcome perspective characterised by emergent team resilience generalises across contexts because the essence of the concept hinges on temporal trajectories of functioning during and following stressor or adversity exposure, rather than what indicators are used to characterise those trajectories (e.g., performance effectiveness or efficiency). Despite the considerable variability between the types of trajectories that people may experience following exposure to stressors that pose heightened risk to threat and disruption (Bonanno & Mancini, 2012), there are two trajectories commonly discussed and observed within the context of human resilience (Galatzer-Levy et al., 2018). First, individuals or teams may experience a sudden deterioration in functioning initially that is followed by a relatively quick return to homeostasis ('bounce back'). Second, individuals or teams may sustain healthy or optimal functioning despite the jolt to the system ('withstand'). A visual depiction of these two types of emergent trajectories is provided in the supplementary material (see Figure S1; https://bit.ly/3B4Gus0). Defining team resilience as an emergent outcome provides us with an essential foundation upon which to elucidate factors that optimise resilient trajectories of functioning, that is, a team-level emergent state of readiness or capacity (Stoverink et al., 2020) that characterises the potential of teams to demonstrate emergent resilience.

Meaningful threats to homeostasis or optimal functioning of a system are a non-negotiable feature of resilience as a scientific concept (aka 'resilience to what'). From an organisational standpoint, triggers of emergent resilience are often occupationally and contextually nuanced, where such variations among the common types of stressors reflect elements of breadth, type, and magnitude of those configurations (Kossek & Perrigino, 2016). At the team level, stressors have been categorised into those intrinsic to the job, relationships at work, roles in the organisation, structure and climate of the team, and the work-home interface (Razinskas & Hoegl, 2020). Within the sport domain, stressors are typically summarised across four broad categories, namely

leadership and performance issues, cultural and team issues, logistical and environmental issues, and performance and personal issues (Arnold & Fletcher, 2012). Stressors in military settings include adverse physical conditions, time pressures, threat, rapidly evolving scenarios, and informational overload/interference (Cannon-Bowers & Salas, 1998). The broad array of team stressor classifications, both across and within organisational domains, underlines the contextually specific and dynamic nature of resilience emergence. Given these observations, any intervention designed to foster team resilience requires contextualisation to the specific threats most likely to be encountered within the environment and which embraces the dynamic nature of these trigger points.

Complex Systems and Team Resilience Emergence

Emergence reflects a dynamic process of cross-level influences within systems (Kozlowski et al., 2013) and may occur via (i) bottom-up processes whereby the interaction of lower level system elements (e.g., individuals within teams) produces higher level phenomena (e.g., team performance) or (ii) top-down processes whereby higher-level constructs constrain and shape lower-level system elements. Conceptualised as an emergent outcome, team resilience emerges primarily via bottom-up effects that may vary across teams (e.g., interactions between varying patterns of member characteristics). Accordingly, strategies designed to optimise team resilience are likely to work best when they embrace a complex systems view, rather than a static, 'one-size fits all' approach (Arrow et al., 2000). Complex systems are characterised by groups of interacting, autonomous agents (e.g., team members) who are open to the influence of environmental dynamics and hold universal features that inform intervention strategy (Gomersall, 2018). First, linear representations of the effects of system inputs (e.g., interventions) on system outcomes (e.g., performance) insufficiently capture the full spectrum of possibilities. Non-linearity occurs as a product of the interdependent and unique nature of system members (e.g., star performers, Volmer & Sonnentag, 2011), and the influence of feedback loops within the system (e.g., team performance at time-point 1 influences team attributes at time-point 2, Ilgen et al., 2005). This feature dictates that even small inputs (e.g., adjusting an individual's role) can create large differences in team

functioning resembling tipping points, whereas other significant changes to a system (e.g., change in task performance) might have marginal effects demonstrating system robustness. Second, path dependence outlines that past states of the system influence the current state of the system. This feature is a product of the 'memory' of a system and dictates that interventions are influenced by when it happens and what happened to that system before the 'system jolt' (Cronin et al., 2011). For example, adding an experienced performer to a newly formed team may have a stronger positive effect upon team performance than if applied to an established, highly cohesive team who are adapting to the loss of a valued team member. Together, these features demonstrate the value of considering both the team (e.g., past experience, member strengths and weaknesses) and the environment (e.g., nature of stressor) when tailoring interventions to foster team resilience. In sum, aligning these theoretical principles within practical strategies requires advancement from universal 'one size fits all' approaches.

Some scholars have proposed contextually-specific strategies and enablers for team resilience development based on qualitative explorations (e.g., ethnographic studies within elite sport, Morgan et al., 2019), whereas others have outlined generic strategies based upon conceptual work (e.g., Alliger et al., 2015; Sarkar & Page, 2020). For example, recommendations to enhance team resilience include transformational leadership, shared leadership, social identity, team learning, team enjoyment, and positive emotions (Sarkar & Page, 2020). Although these approaches demonstrate potential endpoints of interventions, their effectiveness is likely limited by the aforementioned complexity of teams. Stemming from process (Morgan et al., 2013) or capacity (Alliger et al., 2015) based conceptualisations of team resilience, these approaches are silent on the essential nature of stressors and team characteristics. Given the range of team processes that have been proposed to foster team resilience (Hartwig et al., 2020), it is unclear how teams best select or prioritise from the array of strategies available. For these reasons, we require systematic yet flexible strategies by which to enable teams to engage agentically with the complexities of their

environment. As we articulate in this paper, we believe team reflections afford teams a method by which to determine tailored approaches (see also, Siegel & Schraagen, 2017).

Team Reflections: A Brief Primer

Team reflections are a meta-cognitive strategy by which teams interrogate training, simulated, and real-world performances for knowledge of effectiveness and efficiency, and lessons learned for future performances (Otte et al., 2017). This strategy is well established within certain organisational settings (e.g., military, medical) and enacted through techniques such as after-action reviews or team debriefs (Tannenbaum & Cerasoli, 2013). Team reflections are underpinned by theories of feedback, observational learning and behavioural modelling, and goal setting (Keiser & Arthur, 2021). Feedback theory emphasises the transfer of messages from a source (e.g., leader, environment) to a recipient for motivational or instructive purposes (Ilgen et al., 1979). Observational learning and behavioural modelling theories, in contrast, reflect the importance of learning from others in directing people's attention to key behavioural considerations and motivating them to inject this knowledge into one's future performances (Bandura, 1986). Finally, goal setting theory underpins the enactment, motivation, and direction of effort to guide future team behaviours based upon information gathered via feedback and learning (Locke & Latham, 1990). Empirically, meta-analytic evidence supports the effectiveness of team reflection strategies for fostering learning and adaptation of processes and performance (Keiser & Arthur, 2021; Lines et al., 2021; Tannenbaum & Cerasoli, 2013). Collectively, therefore, theory and evidence underscore the importance of team reflections for team functioning, particularly within the context of dynamic and complex work environments.

Team reflections are widely acknowledged as an essential strategy by which to foster team resilience, with some scholars citing team reflections as "the most efficient and powerful way" to do so (Alliger et al., 2015, p. 182). For individuals, debriefing with managers has been proposed to foster resilience by supporting realistic attributions within project team members following project termination (Moenkemeyer et al., 2012). Experimental tests of individually enacted systematic

stressor reflections also support the adaptive nature of meta-learning for optimising mental health indices of resilient functioning (Crane et al., 2019; Falon et al., 2021). At the team level, scholars have conceptually argued for the focal role of learning from event experiences within transition phases (Alliger et al., 2015; Gucciardi et al., 2018; Stoverink et al., 2020) as a means to develop resilience readiness via the enhancement of protective resources such as shared confidence in overcoming future challenges, action inventories (Stoverink et al., 2020), or awareness of specific coping strategies (Gucciardi et al., 2018) to overcome future challenges. Capacity perspectives of team resilience, largely informed by conservation of resources theory (Hobfoll, 1989), offer an extended view of this aspect of the nomological network. For example, positive emotional team culture acts as a resources passageway to facilitate the development of further team resources and subsequently resilience readiness (Adler et al., 2021; Hartmann et al., 2021). Key to team reflection, this resource passageway fosters team cognitive mechanisms of situation awareness, collective exploration, and information sharing that enable teams to buffer against and learn from adverse experiences (Hartmann et al., 2021). Important for team reflections, the degree to which members of a team feel encouraged to share ideas, information, or concerns that may challenge the status quo and offer developmental improvements is positively associated with a team's capacity or readiness to demonstrate resilience (Brykman & King, 2021). The positive effects of team reflection upon resilience readiness may also be reciprocal in nature. That is, reflecting upon mastery experiences of overcoming adversity serves to strengthen important resilience resources (e.g., psychological safety) akin to a positive feedback loop or resource gain spiral (Alliger et al., 2015; Brykman & King, 2021). Taken together, these conceptual perspectives and empirical findings provide initial knowledge on the nature and mechanisms of reflection-resilience pathways within teams.

There exist numerous guidelines and tips for executing team reflections in general or within the context of specific organisational settings (see Table S2; https://bit.ly/3B4Gus0). These recommendations characterise broad conditions (Tannenbaum & Cerasoli, 2013) or sequential steps (Lyons et al., 2015; Schmutz et al., 2018) with the aim of optimising the quality of the information

gathered to improve learning processes and future team performance. Operationally, these recommendations inform the structure, content, and process of team reflection activities to guide and optimally leverage team members' interpretations of past performance experiences. Given that these approaches contribute a flexible approach that may be applied across performance contexts, the specific content, structure, and process of these team reflections will ultimately vary according to the nature of the team, organisational context, and the objectives of the task at hand. For example, the objectives of a surgical team will likely resemble metrics to optimise patient safety and require behaviours that minimise risk, whereas the objectives of a product development team may require novel, creative, and even 'risky' behaviours to perform optimally. Regarding content, team reflections within sport settings may involve the interpretations of substantial performance analysis data, whereas military teams conducting operational missions may rely mainly upon members' recollection of those experiences. Therefore, existing guidelines encompass strategies to facilitate team performance broadly, yet there remains a need for recommendations to articulate how teams can best leverage team reflections for more specific team outcomes (Tannenbaum & Cerasoli, 2013). We propose that one area of need is for the optimisation of team resilience.

Events System Theory: Optimising Event Experience

If team reflections are to maximise lessons for fostering team resilience, they need to provide knowledge of effectiveness and efficiency within the context of stressful or adverse performance experiences. Scholars have devoted considerable attention to event-based approaches to conceptualising and exploring team-based constructs (Basch & Fisher, 1998; Hoffman & Lord, 2013). Given the centrality of stressors and adversity experiences to resilience emergence, Event System Theory (EST; Morgeson et al., 2015) offers a framework to approach debrief activities aimed at fostering resilience systematically. Within the context of EST, events are characterised as external, bounded in time and space, and involve the interaction of different entities (e.g., team member action and team member, team member action and external environments, combined member actions and external environment). Key to resilience, EST focuses upon non-routine events

and outlines how such events command attention and influence the behaviours, features, and future events of teams. *Event strength* dictates the likelihood of commanding attention and is underpinned by the degree of novelty (i.e., unexpectedness), disruption (i.e., change in external environment), and criticality (i.e., interference with progress toward objectives) of events. This feature-based perspective of events is elaborated in EST by integrating process-based perspectives. *Event time and space* are key features for appreciating the influence of events upon systems. As events are bounded in time, the temporal component of EST outlines the duration (e.g., acute, chronic), timing (i.e., when within system lifecycle), and strength changes (i.e., evolution of strength over time) of events as essential event features. *Event space* offers a multilevel component to understanding events via knowledge of the origin (i.e., who within system hierarchy directly experienced the event) and nature of how an event's effects spread throughout a system (e.g., contagion effects). Event effects may spread across members within a single level of a system hierarchy or disperse between levels, with each of these processes mediated by the proximity of members within and between these system levels. These essential features of EST offer a theoretical platform from which to develop guidelines for team reflections that allow teams to identify and analyse adverse events effectively and therefore target key leverage points to facilitate resilient functioning.

Objectives of the Current Study

Against this backdrop, we conducted the current study with two overarching aims. First, we aimed to translate theory (EST) and empirical evidence into a tangible reflection protocol for use within a military setting. We reviewed current doctrine (e.g., guidebooks, white papers) informing reflection processes within military and emergency response organisations, and engaged key stakeholders to co-design and implement a protocol suitable to facilitate resilience-focussed team reflections. Second, we aimed to explore the feasibility of the protocol and implementation approach via a non-randomised pilot study within the context of a typical military training environment. Meta-analytic evidence supports the positive effect of team reflections upon team outcomes (Keiser & Arthur, 2021; Lines et al., 2021; Tannenbaum & Cerasoli, 2013); thus, we

focused on understanding the feasibility of our novel approach rather than efficacy or effectiveness considerations at this stage. Framing feasibility as a "concept encapsulating ideas about whether it is possible to do something" (Eldridge et al., 2016, p. 8), we were primarily interested in acceptability of our alternative approach to executing after action reviews, that is, "the extent to which people delivering or receiving [an] intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention" (Sekhon et al., 2017, p. 4). In so doing, our work offers a practice-orientated theoretical contribution in two ways (Corley & Gioia, 2011). First, we evaluate the pragmatic usefulness of current perspectives of optimising team resilience via the integration of theory and research on team resilience, team meta-learning, and event systems to propose a new approach to fostering team resilience. We refer to this new practical solution as 'STOP then Resource'. Second, the production of knowledge is best viewed as a recursive dialogue between academics and practitioners (Corley & Gioia, 2011). Our approach facilitates the practical evaluation of theoretical perspectives on team resilience that have received limited practical exposure by engaging practitioners and offering a platform for theoretical refinement in the future.

Methods

Transparency and Openness

We report sufficient detail on our methodological decisions below and on the Open Science Framework project page (https://bit.ly/3B4Gus0). We are unable to make to the raw interview transcripts available publicly or upon request from the corresponding author because it would violate our ethical approval, particularly regarding potentially identifiable participant information. We received approval from the Defence Science and Technology Group human research ethics committee prior to the commencement of this study (LD 03-18).

Philosophical Standpoint

We approached this work from the standpoint that reality is multiple and intimately linked with our egocentric experiences and knowledge is best acquired and assembled in ways that

emphasise social interactions and understanding between key stakeholders (Malterud, 2016). Within this constructionist paradigm, we acknowledge that knowledge is relative to circumstances (e.g., cultural, historical influences; Levers, 2013) and incorporate these influences by leaning on the collective expertise of our group to support the interpretation of participants' experiences within the data analysis process. Regarding prior knowledge of the target concepts, our team is composed of one junior and two senior academics with expertise on resilience, one Defence scientist with expertise on human performance in military settings (including resilience), and one Army officer with expertise on military training and operational structures and systems. Stemming from a subjectivist epistemological perspective, we aimed to achieve meaningful coherence by merging our expertise via iterative collaborative sessions across stages of protocol design, and pilot study development and analysis (Poucher et al., 2020).

Phase 1 – Development of STOP then Resource

The content of our approach is theoretically informed by EST (Morgeson et al., 2015) and complex systems thinking (Gomersall, 2018), whereas the application framework is co-designed with subject matter experts to maximise its pragmatic usefulness. We executed this co-design process alongside intended knowledge-users currently working with military teams and individuals with extensive experience of conducting military reflection activities (e.g., senior officers). In line with past Integrated Knowledge Translation approaches (Gagliardi et al., 2016; Kothari & Wathen, 2013), we engaged these knowledge-users from the conceptualisation stage up to piloting of the protocol. Specifically, all knowledge-users were involved individually via online interviews and email communication to share feedback iteratively of evolving protocol prototypes. Decision making rights were held by our research team with the support of knowledge-users to ensure a balance of practical considerations and theoretical integrity. Full details of the development processes are provided in the supplementary material – see Phase One (https://bit.ly/3B4Gus0). Briefly, the objective of our approach is to generate knowledge from stressor experiences on the interaction among micro, meso, and macro factors within and across levels of a system that enable

teams to withstand threats to homeostasis or optimal functioning, or bounce back quickly if they experience some degree of deterioration. Unique to our framework in relation to existing approaches that present linear or open questions regarding past experience (e.g., Kolbe et al., 2015; Lyons et al., 2015), we place specific stressor events as the central focus to contextualise reflective processes on experiences that matter most for resilience dynamics. The essence of our new practical solution is reflected in the acronym 'STOP then Resource' (see Figure S2; https://bit.ly/3B4Gus0), with the intervention development process resulting in the specific rationale and application points.

Step 1: Stressor Identification

Rationale. The coupled nature of stressor and adverse events and the relative salience of resilience resources or processes dictates that resilience development requires explicit consideration and precise description (Raetze et al., 2021) of such events (i.e., resilience to what). At the individual level, a core function of the stress-response system is to encode and filter environmental information to regulate and direct openness to event dynamics (Del Giudice et al., 2011). For collectives such as teams, however, this function increases in complexity due to the integration of interdependent and unique team member perspectives. Given the complexity of shared experience, and the magnitude of information available within dynamic performance environments, the primary objective of the 'STOP then Resource' tool is to direct event identification efforts within teams. Attaining this objective positions teams well to optimise the efficiency and effectiveness of subsequent efforts to develop resilience resources. The characteristics underpinning event strength within EST offers a heuristic to inform event identification and observe past recommendations to detail events within both the team learning (e.g., learning triggers; Sessa et al., 2019) and team reflexivity (e.g., specific over general events; Tannenbaum & Cerasoli, 2013) literatures.

Application. Guided by the *event strength* proposition of EST (Morgeson et al., 2015), this feature requires teams to reflect upon the relative novelty, criticality, and disruptiveness of events experienced to inform the identification of target events for future analysis (akin to 'trigger identification'). Importantly, events need not satisfy all three of these criteria, such that perceptions

of high agreement with one metric can be sufficient to classify an event as worthy for interrogation in the team reflection process. One benefit of this approach is that it allows teams to identify 'near miss events' that may not have disturbed team functioning, yet demonstrated a substantial disruptiveness or shock that had the potential to destabilise functioning. Equally, teams also can identify situations that underpin knowledge of what is working well for the team; events where teams were challenged by some potential disruption to functioning yet sustained team performance. For example, a team of nascent members may identify the malfunction of equipment within the field as a salient stressor given the unplanned, unexpected nature (i.e., novelty) of this event for these members despite no major interference with performance.

Step 2: Timing and Location of Stressors

Rationale. The temporal ('the when') and spatial ('the where') nature of focal events represent an important boundary condition for organisational constructs (Morgeson et al., 2015), including team resilience (Gucciardi et al., 2018). The temporal nature of events can be expressed via consideration of four key features of events, namely (i) timing (i.e., point of event onset within task/team lifecycle), (ii) duration (i.e., length of event; Morgeson et al., 2015), (iii) frequency (i.e., number of event repetitions), and (iv) sequence of events (i.e., ordering of discrete events; Aguinis & Bakker, 2020). Variations within each of these temporal features may moderate event strength and the relative importance of resilience resources or processes. For example, chronic events typically present greater threats to system functioning (Cohen et al., 2019) and require access to and application of unique resources (e.g., robust team morale), compared with the resources required for optimal team functioning following acute events (e.g., detailed shared mental models).

Application. The spatial characteristics of event location (Morgeson et al., 2015) offers an equally important boundary condition that dictates the relevance of resilience resources or processes for team functioning. We draw upon event location to detail the origin of interaction between the team and environment. This feature is necessary for informing (a) situation awareness regarding environmental threats and (ii) priority areas for intervention within the team structure (e.g., specific

individual, sub-team, leader). For example, knowledge of enemy ambush at a specific geographical location may foster efficient team responses in future by informing environmental and team cues of similar events. Alternatively, if one member of the team is observed as the trigger for repeated breakdowns in performance of team-critical tasks across varying situations (e.g., terrain, time-pressure), leaders might be directed to upskill or replace this team member.

Step 3: Overview of Events

Rationale. Generating high-quality knowledge to inform resilience development efforts requires that we differentiate characteristics of the stressor event itself from the behaviours or processes executed by individual team members and the team within the context of these trigger events. This distinction is also important from a scientific standpoint because conflating concepts with their outcomes is a common mistake with concept definitions (Podsakoff et al., 2016). Key here is to focus upon behaviours or processes that are accurate and perceived as controllable by the team and therefore minimise dysfunctional influences upon the team's analysis of events (e.g., self-serving bias, fundamental attribution bias; Cramton, 2002).

Application. This section requires leaders to unpack the behaviours or processes that were conducted by the team, before, during and after the event. The minimise, manage, and mend framework (Alliger et al., 2015) offers a useful lens by which to categorise these processes and serves as a tool to focus the scope of the team reflection process. Minimise refers to those processes enacted prior to event onset and include planning, anticipatory, and monitoring processes. Manage are those processes conducted throughout event exposure (i.e., onset to close of event) including event assessment, reactive planning, and adaptive responses. Mend encapsulates processes conducted following event exposure within the same team performance episode and include regaining situation awareness, team debriefs, enacting adjustments to processes and procedures for future performances, and expressing appreciation. Understanding how team processes unfolded around event exposure according to these three categories provides an important basis for future evaluative efforts because it directs the selection of such efforts to maximise team outcomes.

Briefly, analysing a lasting experience of extreme environmental heat across a co-located team may lead members to identity equipment preparation resourcing and checks (e.g., water receptacle, sun protection) as salient pre-event processes. Similarly, the rationing of water resources between team members would reflect a salient managing process, whereas mending processes would include identifying the need for and execution of an evacuation procedure for a team member suffering heat exhaustion following this stressor.

Step 4: Perceived or Actual Impact to Team

Rationale. Stage four of the protocol serves to evaluate the effectiveness of the behaviours and processes identified within the previous stage according to the effect of the event on team functioning. In so doing, the identification of priority processes requiring future adaptation to maximise team resilience (i.e., tipping points) is a secondary product of this stage.

Application. Event effect is observed via three markers, namely (i) the presence of flow-on effects within the team (e.g., individual to individual, or sub-team to sub-team transference), (ii) the necessity and potentially changeable duration of event exposure (e.g., whether event exposure could have been reduced through alternative team processes), and (iii) event strength change whereby opportunities exist to reduce or avoid enhanced challenge experienced (e.g., counter-productive reactive processes). Reflection upon each of these markers allows teams to determine the in/effectiveness of the relative minimise, manage, and mend processes identified. For example, evaluating the previous processes surrounding an experience of lasting heat may indicate the extended nature of event effects as a product of the suboptimal equipment resourcing prior. In contrast, the reduction of event strength as a product of re-apportioning water supplies and member evacuation would resemble effective strategies to maintain.

Step 5: Resource Analysis

Rationale. Addressing team processes in response to event dynamics is coupled with the evaluation of a team's resources that foster resilient functioning[1]. The final stage of this protocol encourages teams to reflect upon the overarching resources of the team that support resilience processes. This element requires reflection to move from team processes and seeks to direct teams toward the development of emergent states that foster the resilient functioning (i.e., move from causes to conditions, Hackman, 2012). Examples of emergent states reported in conceptual expositions of team resilience include shared mental models, group norms, and team trust as complementary team qualities, or resilience resources (Gucciardi et al., 2018; Hartwig et al., 2020). Relatedly, effective leadership is focal to the enactment of resilience processes and emergent resilience (Gucciardi et al., 2018; Morgan et al., 2013). Thus, this stage requires leaders to reflect on their personal resources that underpin leadership effectiveness in response to events identified alongside the team's efforts to identify their strengths and areas for improvement.

Application. There exist numerous frameworks and approaches to characterising team system resources, such as SWOT analyses (Jenčo & Lysa, 2018) alongside team-specific approaches (e.g., Reader et al., 2009). The Realise 2 strength-based approach (Linley et al., 2010) is one that we find useful for structuring conversations and evaluations of system resources according to: (i) resources that were present, effective, and should be fostered for ongoing use (realised strengths); (ii) resources that were present but were impeded (unrealised strengths); and (iii) resources that were absent and need cultivating moving forward (weaknesses). This framework can be applied within and across different layers of the system where applicable (e.g., individual, team). Scholars have utilised the Realise 2 strength-based approach effectively for coaching mental

[1] The work-life interface can play a role in resilience dynamics for each ecological context in what can be considered broadly as 'spill over' effects (e.g., life stressors affect how we operate at work and vice versa; see ten Brummelhuis & Bakker, (2012). Steps 4-5 in our reflection protocol is the only place where we see the relevance of the work-life interface. For example, teams may identify at Step 1 poor decision-making of one individual on the team as the trigger for the resilience process within the context of a specific training activity. Interrogation of this scenario might reveal spill over effects from the home environment to work (e.g., romantic relationship difficulties) as the underlying consideration for the performance of the individual team member within the context of the workplace training activity (Step 4). Thus, a key learning for the team in this context might be to consider how they or the organisation might support the individual with the relationship difficulties they are experiencing at home (Step 5).

toughness in sport (e.g., Gordon & Gucciardi, 2011), leadership development in education (e.g., Cooper & Woods, 2017), and strengths application broadly (e.g., Roche & Hefferon, 2013). For example, in response to extended environmental heat, the presence of strong team identification would resemble an effective team resource that underpinned water re-apportioning, yet the absence of collective leadership would represent an absent but desirable resource that would foster effective equipment preparation. Finally, at the individual level, several team members with the ability to carry weight would represent an untapped resource within the team but they did not utilise to mitigate the effects of environmental conditions.

Phase 2 – Pilot, Non-Randomised Investigation of Feasibility

Organisational Background and Sample

We conducted this study within an Australian military context. In total, 17 male team leaders (7 Lance Corporals, 10 Corporals) termed 'section commanders' participated. These personnel were selected as a representative sample of combat Army junior leaders (e.g., modal point in Army lifecycle) who were recommended to us by the Army stakeholder. Teams were participating in a training exercise involving repeated episodes of performance that required multiple reflection periods and positioned leaders well to comment on the protocol's usability and feasibility of use within a military training environment. Briefly, we framed the study as an exploration of team resilience within the context of an 18-hour overnight training activity comprised of seven unique performance stands. Groups of 3 to 5 teams conducted the training activity each night in a staggered fashion over a total of four separate nights. This activity was conducted as a competition between each team with scores received across each of the seven stands and then aggregated for final positions. Teams were highly motivated to perform with the winning team selected to represent the Battalion at a national competition. Each performance stand represented a typical and high-fidelity military activity requiring tactical and technical team performance (e.g., casualty evacuation or ambush assault activities). In addition to the chronic challenge of continued performance demands, the dynamic nature of activities purposefully

included events that threatened or challenged team performance (e.g., unexpected enemy contact, changes in time pressure).

Measures

Demographic data. We collected demographic data on individual members (age, gender, military rank, and time served within Army) and leadership experience for section commanders (number of military sections previously led within activities).

Protocol usability. Section commanders self-reported their perceptions of protocol usability using adapted items from a combination of the System Usability Scale (SUS, Brooke, 1986) and the Usefulness, Satisfaction, and Ease of use questionnaire (USE, Lund, 2001). Using a 5-point rating scale (1 = *not at all* to 5 = *extremely*), participants assessed 10 items to capture their perceptions of usefulness (i.e., ability to achieve outcomes using the protocol), satisfaction (i.e., subjective reactions to protocol use), learnability (i.e., ease of learning), usability (i.e., ease of use following learning) with the team reflection protocol (see Table S5; https://bit.ly/3B4Gus0).

Procedure

Initially, we provided all team leaders with key background to the nature of the study and an overview of the protocol via a 60-minute classroom-based workshop. We also delivered this workshop to their team members (i.e., Private-ranked soldiers) in waves of four to five teams (20-40 individuals) prior to their scheduled training activity; this process was repeated four times across subsequent days approximately 12-hours prior to the activity for each wave of teams. Leaders executed the reflection procedure with their respective teams at two scheduled activity break-points at the 6- and 12-hour timepoint within the activity (outdoors), and then again at the activity conclusion around the 18 hr timepoint (indoors). Approximately 24 hours following the completion of the training activity, we explored team leaders' (4-5 individuals) experiences of the protocol via focus group discussions. In total, we conducted four focus groups (20 participants; 17 leaders + 3 assistant leaders). Focus group discussions ranged from 27.07 to 46.93 minutes (36.05 ± 7.13 min) and were conducted using a semi-structured interview protocol that was constructed to gain rich

insight into elements of the System Usability Scale (i.e., effectiveness, efficiency, satisfaction, Brooke, 1986). We iteratively amended the probes used during the focus group discussion based on previous group interviews, given the staggered structure of the activity across several days.

Data Analysis

Mixed methods approach. We adopted a convergent parallel mixed methods design for this study (Creswell & Plano Clark, 2011), where we concurrently collected qualitative and quantitative data sets. We prioritised the qualitative findings for study interpretations because it permitted an in-depth exploration of participants' perspectives of our protocol. Quantitative data via the SUS were used to assist in the interpretation of qualitative themes once all data were analysed (i.e., interaction of data sets occurred at the analysis stage).

We analysed focus group data using a three-phase content analysis approach consisting of (i) building a coding frame, (ii) piloting the coding frame, and (iii) executing the main analysis (Schreier, 2014). For the coding frame, we used a combination of concept and data driven categories. A priori 'concept driven' elements resembled the research aim and were informed by core features of process evaluation guidelines (i.e., perceptions of protocol, contextual considerations, implementation process, Moore et al., 2015). We generated sub-categories in a data-driven manner via the process of reading two of the four focus groups for relevant material, checking whether a relevant sub-category exists for that material, moving on if a relevant sub-category already exists, or creating a new sub-category to capture this new material (i.e., subsumption, Schreier, 2014). As depicted in Table 1, we defined each of the main and sub-categories with related indicators as they were created to inform the subsequent coding process and ensure unidimensional main categories (i.e., only covering one topic), and mutual exclusiveness of sub-categories within each main category (i.e., clear boundary conditions between each).

The coding frame was piloted by conducting an initial analysis on the remaining two focus group transcripts. This pilot involved revising and expanding sub-categories via trial coding of these transcripts, that is, we applied our coding frame to the material following the same approach that

would be used in the main analysis except categories remained changeable throughout this stage. Author 1 repeated the trial coding of the same material 48 hours following the initial run to evaluate the consistency. Validity of the coding framework was important as it reflected the extent to which the sub- and main-categories adequately described the data in line with our research questions (Schreier, 2014). Authors 2 and 5 assessed the validity of the coding frame by evaluating the relevance of the main categories in relation to the research questions, and the distribution of coding across sub-categories (Schreier, 2014). For the main analysis, we applied the final coding frame to all focus group material. No adaptations to the coding frame were made within this stage of the analysis. Author 1 coded data into a coding sheet throughout the analysis. To track validity the author provided a rationale for the interpretation and coding of ambiguous transcript sections. This process provided clarity behind Author 1's coding decisions that were again reviewed by Authors 2 and 5 and together optimised the extent to which data resembled associated categories. Similar individual codes within sub-categories were summarised into meaningful units, termed nodes to illustrate the nature of content within each sub-category.

Methodological Rigour

In line with our relativist ontological position, we believe our methodological rigour can be assessed via salient characteristics that align with the context and purposes of our study (i.e., co-development of a theory driven practical tool, Smith & McGannon, 2018). We suggest several indicators and examples that can guide readers in their assessment of our work including the (i) worthiness of the topic (e.g., the industry-demand driven translation of theory into practice to optimise a meta-cognitive technique that is well supported by evidence; (ii) credibility of the approach, which included iterative collaborative engagements with senior staff several months prior to and after data collection, command approval for the project, and our team's composition of academic and Defence scientists, and Defence personnel; and (iii) reflexivity in our analytical interpretation and presentation of the findings, particularly regarding the diverse team composition and ongoing discussions with senior staff to consider multiple and varied viewpoints.

Results

Following the content analysis of focus group data, we created a final coding framework including main categories, sub-categories, and summary nodes (see Table S6). Our analysis resulted in a total of 159 sections of material coded across 39 individual nodes. We created three sub-categories to reflect participants' perceptions of protocol category (opportunities, strengths, weaknesses), with two sub-categories generated for both the contextual considerations (barriers and facilitators), and perceptions of protocol implementation categories (improvements and positives).

Perceptions of Protocol

Opportunities for protocol development. Participants most frequently discussed strategies that they as leaders would apply within the protocol to develop team resilience. For example, the following participant expressed the importance of using humour and buy-in to the mission within team members to overcoming challenging events:

> [to develop team resilience.] *I'm going to keep coming back to humour and the buy-in [of soldiers] to the mission. Once they have buy-in of the mission and they want to achieve that they're obviously going to help the team (during challenging events).*

Examples of this node were included as opportunities because they were direct outcomes of protocol use and presented potential contextually specific examples to guide reflections within future versions. This opportunity may be realised via the development of a repository of responses to support knowledge sharing between leaders. Participants also reinforced this opportunity by repeated mentions of a desire for clear strategies to develop resilience within future iterations of the protocol:

> *It [the opportunity for development] is what the next (i.e., follow-up) part is. How to fix them [events analysed], and how to implement the process? We might have identified (the problem), but [we need to know] what's another tool to fix the problem? So, you've identified it, what's the fix to the problem essentially?*

This example highlights an ambiguity within leaders regarding awareness of team resilience resources that are compatible for specific event demands. Said differently, our protocol enables leaders to identify and analyse event dynamics but requires adaptation to support the synthesis of

development strategies. Participants also commonly spoke to refining the protocol by tailoring future applications to specific audiences within Army including newly formed leaders and members higher within the organisation. Specifically, several participants discussed the opportunity to include inputs from all/other team members in a written form prior to the execution of a team reflection, as demonstrated in the following quote. This finding presents an opportunity to adapt the process (i.e., the 'how') of completing the protocol rather than changes to protocol content:

> *Everyone in the group could have input about what they thought as well. Then that allows them to tell me what I did wrong, or what they thought I could have done better in terms of anything. Orders wise or tactics wise*.

Strength of protocol. Participants discussed the benefits of identifying positive reflective points and allowing information to be retrieved at later time points. Positive reflection points were mentioned in respect to a propensity to focus on negative team processes within reflections:

> *We tend to dwell on the one or two negative things that happen. I think it (the protocol) helps us see that we can do all these really positive things leading up to an event and it's just one thing that might have completely changed it (mission outcome) and that's all you're focusing on*.

Specifically, this leader explained how detailed analysis around an event helped advance understanding of wider causes of events above and beyond team deficiencies. Building a picture of team performance and informing later reflection were mentioned as strengths that would be afforded by use of the protocol across time. One participant discussed the benefit of the protocol to help inform current performance evaluations with individual soldiers:

> *Because we do report when we get back but it's two, three, four weeks past event and you're like looking back or thinking back- 'What actually happened?' You either remember something really good or you remember something really bad. There's no in between. So when you're assessing an individual's performance, it degrades if you're doing it two, three, four weeks down the track. Versus if you have a tool in your hand that you can use to assess an hour, two, three after an event, you can actually jot down some points which will help you assess individual's performance, which will in turn help them with better performance*.

Participants frequently discussed strengths of the tool that aligned with our conceptual rationale, particularly regarding the benefit of informing unique responses for chronic or unique events and supporting problem identification. For example, in the following exchange one participant

expressed how use of the protocol afforded insight into strategies that would foster resilience specific to event timing:

> Participant: [as a strategy discovered for a brief event] *Yeah, we need to complete this mission objective and it doesn't matter what I think. So, if you can keep them in that immediate mindset that could be very useful*.
>
> Facilitator: *I imagine that's pretty useful in the short term, keeping yourself task orientated*?
> Participant: *Yeah, obviously not for a long period of time. [break]. Well we did two months at [location blinded] and you had to deal with your guys (differently) out there.*

Weakness of protocol. Participants most frequently commented upon the challenge of completing the resources element of the protocol, primarily because of perceived ambiguity regarding how to complete this section. For example, one participant outlined that this feature of the protocol was most relevant at a tactical platoon level rather than as a reflection discussion point after a training activity or operational experience:

> *The resources aspect I find is not very relevant for a lot of things… That's probably more important for us when we're discussing things at the tactical level as opposed to anything related to here (at the team level) in my opinion*.

This perceived weakness of the protocol arose as a product of the acute timeframe available for reflection activities between intense activity stations. Coupled with the abstract nature of identifying team resources, future protocol versions may require refinement to match the contextual demands associated with reflection activities (e.g., time available). The time impost on participants to complete the protocol and perceived return on investment is an area we never sought to quantify empirically. However, this is arguably important for assessing overall acceptability and feasibility within the military, particularly if used to supplement AARs rather than replace them. This consideration of feasibility is an area for future protocol trials using quantitative and qualitative approaches (e.g., comparison of time spent conducting AARs with return on investment).

Participants also discussed the perceived ease of event identification within team reflections and therefore the limited need for detailed guidance within the protocol. For example, the following participant expressed how the detailed nature of conversation within team reflections sufficiently affords event identification:

> *In my experience I think a lot of those things (event features) come up in normal AAR's [after action reviews], to be honest. I think the key things stand out. Obviously (our missions) are very tactical focused and mechanics focused (and that helps).*

This observation highlights the contrasting nature of traditional military after-action reviews that resemble a chronological walkthrough activity to provide a complete review of event occurrences. However, given the often time-pressured nature of reflection activities, this finding illustrates the utility of streamlining event identification via the STOP-R protocol.

Contextual Considerations

Contextual barriers to protocol. Participants referred to several features beyond the protocol itself that might potentially alter its effectiveness. Participants referred most frequently to the strength of current norms within the organisation surrounding reflective processes as a barrier to the protocol. These comments included explicit mention of preference for an element of the traditional approach to conducting reflection. For example, the following quote demonstrates a preference for a performance focussed 'fix, sustain, improve' structure and identifying key events through conducting a timeline of experience:

> *I like the fix, improve, sustain. Then going through a timeline so they can see (what occurred). For us it was starting with the training we did weeks and weeks ago. How that progressed to the actual [training activity] itself and then we broke that down into like each stand.*

Individual differences of varying emotional intelligence across team members was also outlined as a barrier to protocol effectiveness. Specifically, participants frequently outlined how having team members with a lesser ability to accept constructive criticism or feedback from others would challenge team reflections in general and subsequently the effectiveness of our protocol:

> Participant 1: *Especially in working with some of the younger boys, [effectiveness of using the protocol] comes down to having the emotional intelligence to be able to take criticism from peers.*
>
> Participant 2: (In agreement) *Yeah just being able to take it on the chin.*

This leader's perspective outlines the importance of the climate (e.g., psychological safety) and development of individual characteristics (e.g., openness, self-confidence) that underpin this barrier to protocol effectiveness.

Contextual facilitator to protocol. Although participants frequently referred to current team reflection norms as a perceived contextual barrier, they also commonly discussed current strengths of team reflection processes as key leverage points for the potential benefit of our protocol. Participants discussed current norms of conducting team reflections that matched the approach within our current protocol. For example, one participant outlined their preferred use of priming information within themselves (i.e., mentally preparing and gathering own thoughts prior to a debrief) to maximise the effectiveness of a team reflection. Our protocol offers an approach that leverages the preference by facilitating leader sensemaking prior to team discussion:

> *I'll try and prime information. Before I go to say something to my section, about what we're able to do, I'll sit down by myself and have a bit of a think about what I'm going to say. Take a bit of time and then you can go in and then be more effective. You can actually remember what's actually happened otherwise you're going to be sitting there trying to say 'so what did we do last night'?!*

Participants also discussed an openness to allowing their team to learn from event experience within field settings. The perceived importance of reflecting upon naturalistic experience supports the quality of information attained through completion of our protocol, as exemplified below:

> *I was trying to not limit any creativity and let them (team members) make some mistakes. Because I've found, it's very linear in the way that we train and the way we treat these things. But me, being on operations overseas I've seen as soon as you throw a wrench in the works, the people who haven't gone through random experiences just start to panic and break apart.*

This leader conveyed a personal approach of resisting the 'righting reflex' (Rollnick et al., 2010) that counters the typical scenario where trainees are given solutions to deal with difficult circumstances for which they become dependent on for future unanticipated events. Leaders' openness to encouraging realistic event experience facilitates protocol effectiveness by optimising the validity of events used to inform subsequent stages of reflection. Conversely, if leaders were to shelter team experiences, then this potential benefit of our protocol would unlikely be realised.

Protocol Implementation

Improvement for future implementation. Participants' perceptions of the implementation process were the least frequently discussed category of our coding framework, yet there were a couple of notable points. Regarding implementation improvements, several participants suggested that delivering the instruction process in the field rather than in the classroom may have enhanced their understanding of how best to utilise the tool 'on the ground' (e.g., tell-show-do-apply approach). For example, the following participant outlined that reviewing events in real-time with a researcher would have supported implementation:

> *If you (the researcher) are there (in the field), if you're actually talking to them (participants) we will better understand it. If I'm talking to you, I actually get how you feel. I get what the tool means, the critical aspects of it and how it resulted in bounce back or how it resulted in a degrade of performance*.

Positive perception of implementation. Participants outlined that complementing delivery of the protocol with evidence of past research within Army was a significant positive aspect of the implementation process. One participant expressed an initial interest and confidence in the protocol after hearing about the background work that had been conducted by the research team:

> *You've obviously done a lot of research into this protocol. You knew everything that you were talking about. We thought we were getting orders and then all of a sudden it's like 'oh yeah, by the way you're getting this free'. But to actually show that you've done the background work (in other areas of Army), you think 'alright these guys know what they're talking about'*.

This finding highlights the importance of gaining gain buy-in from end-users when testing new ideas and products by providing evidence of domain knowledge, as well as a clear rationale for why the work is being done and 'what's in it for them' (i.e., job relevance and cost-benefit). We believe this consideration is especially important when attempting to trial new concepts and ideas with end-users in organisational settings (such as the military) where mature systems, structure, and protocols are in place (e.g., chain of command, standard operating procedures, established use of after-action reviews and debriefs).

System Usability Scale

Satisfaction (items 1 & 10) and usefulness (items 4, 7, 8) perceptions (Lund, 2001). Participants' responses indicated a general satisfaction with the reflection protocol, with no participants signalling that the protocol purpose was unclear and only 30% disagreeing that they would recommend the protocol to others (see Figure S3). Participants' perceptions of the protocol usefulness were mixed. Between 20% and 50% of participants either strongly disagreed or disagreed with positively worded statements around usefulness. However, demographic data indicated this result to vary with respect to leadership experience. Specifically, leadership experience among participants varied greatly, with 60% having led only one or two teams prior to the field activity, whereas 30% of participants led between seven and ten teams (10% did not respond). Our results demonstrated that participants with less leadership experience scored the protocol usefulness higher when compared with more experienced leaders.

Learnability (items 3 & 5) and usability (items 2, 6, 9) perceptions (Brooke, 1986). Learnability item responses indicated that participants perceived the protocol to be easy to learn in its current state. Specifically, no participants perceived that they would need technical support to use the protocol and only 20% believed they would need to learn a lot of things to use the reflection tool (see Figure S3). Nevertheless, usability item responses indicated mixed responses regarding the user-friendliness of the protocol. Although 70% of respondents agreed it was easy to record and analyse event information, perceptions that components of 'STOP-Resource' model worked well together and participants' desire to use the protocol again were equally split between dis/agreement.

Discussion

The purposes of this study were to generate a theory-informed, co-designed resilience enhanced reflection protocol and explore its feasibility within a military population. Guided by a process evaluation framework (Moore et al., 2015), we conducted a non-randomised pilot study to understand perceptions of protocol usability, salient contextual factors, and the implementation process. Our findings provided preliminary support for the resilience enhanced approach to executing after action reviews, yet also shed light on avenues for adapting the approach to maximise

uptake and engagement in future deliveries. Briefly, these avenues for protocol refinement and adaptation are reflected by three overarching themes, namely: (i) targeting junior leaders and newly formed teams, particularly for newly promoted leaders to discover their command style and match it to personal, team, context and organisational characteristics; (ii) supporting the translation of event experiences into resilience resources at the team level; and (iii) integrating reflection processes within existing organisational and assessment practices.

Targeting Junior Leaders and Newly Formed Teams

Findings from focus group discussions outlined the suitability of the reflection protocol for newly formed leaders and teams. Participants discussed the benefit of this protocol for newly promoted leaders and leadership development and, in particular, fostering the discovery of command style. The development of a military leader's 'command style' was highlighted by participants as a priority during early stages of leadership development, which has been characterised by four features (i.e., style of decision, leadership, delegation, and orders; Webb et al., 2004), with a requirement to match one's leadership style to personal, team, context and organisational characteristics for optimal team performance (Tziner & Vardi, 1982) and resilience (Gucciardi et al., 2018). Leaders' use of the protocol, therefore, may support the navigation of this complex skill development stage via the systematic use of event experiences. Organisational norms are an important consideration here because our protocol represents a deviation from the traditional approach to reviewing individual and team performance within Army (and many other occupational contexts) and therefore a potential barrier to uptake among personnel. These norms likely develop alongside leadership experience and indicate that neophyte leaders' limited reflection experience potentially increases the protocol utility for them.

Participants also spoke to the utility of the protocol when leading newly formed teams. Similar to leader's command style, this finding presents the benefit of resilience enhanced reflections at the early stages of development. The potential for shared constructs (e.g., resilience) to develop soon after group formation (Allen & O'Neill, 2015) and the influence of leadership on

team learning following critical events within newly formed teams (Dufresne, 2013) indicate the benefit of shaping teams' reflection processes during formative stages. Together, these findings highlight a key mechanism of action to leverage within future protocol iterations and signal the promise of implementation within military domains populated by early-stage leaders (e.g., junior leader promotional courses) and recently formed units, that is, early development of leader and team resilience processes.

Translating Event Experiences into Team-Level Resilience Resources

Our findings revealed the challenge of realising strategies to develop teamwork (i.e., resources element of protocol) following event analysis as one primary limitation of the protocol. Participants discussed the complicated nature of the protocol within focus groups, with quantitative data indicating an ease of understanding event information, but a challenge integrating this knowledge with the resource element of our protocol. Participants discussed two key barriers to protocol effectiveness. First, participants perceived themselves to hold limited control over teamwork development, expressing these resources to develop naturally over time, and instead focussing efforts on individual competency development (i.e., taskwork over teamwork, Marks et al., 2001). Second, consistent with past empirical work (i.e., task complexity increase hinders reflection effectiveness, Vashdi et al., 2013), the complex nature of tactical tasks was perceived to act as a barrier to team-level reflection. These findings underscore the need for future protocol adaptations to include clear guidance to inform appropriate resource selection following event analysis. For example, identifying when stressors are less of a problem for the team can assist with understanding what resources are supporting good outcomes. Additionally, participants' preference for an enhanced practical implementation style would further serve to address this challenge. In particular, the employment of a 'train the trainer' approach (i.e., indirect implementation via delivery to senior organisational members, Jha et al., 2020) or co-delivery model (e.g., military personnel together with subject matter experts; Mattie et al., 2020) offers a promising avenue for future implementation efforts. In sum, participants expressed the benefit of stimulating thought

regarding ‘why’ of team performance, yet there remains a need for future protocol adaptations and implementations to include guidance to inform resources selection and practical-based instruction. These findings also provide salient observations for future efforts that seek to develop reflection-based interventions to foster comparative team outcomes.

Integrating Reflection within Organisation and Assessment

Integrating the content and outcomes of the team reflection protocol with higher levels of the organisation was a common suggestion among participants. Interpretation of our data highlighted three related markers that signal future directions for protocol development. First, participants discussed the benefit of feeding reflection outcomes to higher echelons (e.g., from Platoon to Company commanders) to support leaders’ development of resilience resources and to foster organisational learning more broadly. For example, an awareness of team reflection outcomes would allow senior organisation members to recognise sub-optimal patterns (e.g., ineffective training outcomes by multiple leaders) and provide top-down guidance to mitigate specific threats to team functioning. From a knowledge management perspective (Alavi & Leidner, 2001), our protocol currently fosters knowledge creation at the team level, yet our findings demonstrate that application of this new knowledge will be facilitated via the transfer of information across organisation levels. Second, limited awareness of the protocol among senior non-commissioned officers and officers will likely discourage junior team leaders’ use of the protocol. For example, one participant felt they would be cautious to apply this novel protocol without senior individuals’ active encouragement. Future implementation should therefore expand presentation of the protocol background and rationale to senior staff of teams. This marker further supports the potential benefit of adopting a ‘train the trainer’ approach to implementation. Finally, meeting the demands of strict assessment criteria was found to limit resource selection within protocol completion. Participants discussed conflict between the resources considered ideal for team resilience development and those necessary for the immediate achievement of mission objectives. This observation indicates that greater alignment between assessment criteria (e.g., context specific/short term) and resilience

development (e.g., general resources/short to medium term) will benefit future protocol application. Specifically, adapting the protocol to leverage input of course assessors or integrating context specific cues (e.g., selection of relevant team resources, guiding performance markers) prior to activities may enhance this alignment and the protocol effectiveness.

Implications for Resilience Theory and Future Research

Our work contributes conceptually and empirically by integrating theory on team resilience, event systems, emergence, and team meta-learning via its translation into a tangible product that can be used for practice. In so doing, we also shine a spotlight on two conceptual and practical issues that may inform the next generation of scholarly work on team resilience. First and foremost is the need to address the question "resilience to what" in conceptual or practical work on resilience, which has been noted as a key weakness of scholarly work on resilience in organisational settings identified via systematic reviews of the literature (Kossek & Perrigino, 2016; Raetze et al., 2021). Specifically, participant reflections included a pre-established ease of event identification and utility of event characteristics (e.g., temporal, spatial) which highlighted the value of understanding event dynamics within current team resilience development approaches. In the absence of explicit knowledge on the meaningful threats to homeostasis or optimal functioning of a system that trigger the onset of resilience dynamics, it is impossible to speak with confidence about the salience of resources or protective factors that characterise a team's readiness to demonstrate resilience or the processes enacted that translate one's readiness into emergent resilience. Consistent with a core conceptual element of EST (Morgeson et al., 2015) and recent calls to "take events seriously" (Hoegl & Hartmann, 2021, p. 460), our work underscores the importance of interrogating the relative novelty, criticality, and disruptiveness of events as a means by which to assess systematically the salience of potential threats to homeostasis or optimal functioning for resilience theory and practice.

The second contribution is the need to place higher demands on the temporal elements of emergent resilience in theory and practice than is currently available. From a definitional and

conceptual standpoint, resilience is most often considered a dynamic concept (Raetze et al., 2021), yet the temporal nuances that characterise emergent resilience is absent from theory and therefore remain unknown. Intuitively, processes surrounding and contributing to emergent resilience can span multiple 'clock time' scales; from seconds to minutes, from hours to days, and weeks to months. Time scale decisions for studying resilience including when to assess and the number, frequency, and timing of assessments of key concepts should be matched to a well-specified theory of the temporal dynamics of emergent resilience, rather than based on methodological or practical considerations such as statistical power or feasibility (Hopwood et al., 2021). In the absence of a temporally rich theory of emergent resilience, we and others (Raetze et al., 2021) contend that events that pose meaningful threats to homeostasis or optimal functioning provide us with the best window into the temporal dynamics because the nature of these emergent processes depends primarily on the trigger itself. As a relatively broad example, exactly what a team does and the resources they utilise will likely differ between events that are acute or chronic in nature. Thus, our translation of event time and space features of EST into practical strategies for accessing these temporal dynamics addresses the limitations of 'one size fits all' approaches and provides guidance for researchers who wish to unpack key temporal elements of emergent resilience systematically in their work.

Conclusion

We translated theory on event systems and complex systems thinking into a tangible reflection protocol that is contextualised to the defining feature of resilience, namely the stressor or adversity event that trigger emergent resilience, and engaged military stakeholders in this first iteration of the work to co-design an implementation framework that maximises pragmatic usefulness. Broadly, the resilience enhanced approach to after action reviews is likely best completed after specific training exercises or by individual leaders as part of their self-development (e.g., professional military education) when they have sufficient time to review and reflect on their performance, rather than during a busy training activity. Harnessing and integrating the expertise

and experiences of end-users, leadership, and subject matter experts via user-centred designs represents an ideal approach to developing and implementing organisational practices that are accepted and effective for human performance. Nevertheless, we acknowledge that our protocol here is only a starting point; additional work is required to understand usability, salient contextual factors, and applicability for teams in different organisational settings to shed light on avenues for adapting the approach to maximise scalability.

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Table 1. Overview of coding framework (Note: sub-categories denoted by italicised text).

Category	Definition	Positive Examples
Perceptions of protocol	This category is applied to comments that relate to the tool itself (e.g., tool structure, content, or completion).	N/A
Opportunity for protocol development	Captures comments that resemble potential avenues to enhance the effectiveness of the protocol (e.g., changes to content, structure, application of the tool).	*It makes sense but like obviously my experience would be different to these guys, but doing something [for] new leaders maybe this could be a bit more beneficial.*
Strength of protocol	Comments that explicitly mention positive elements of the protocol in its current state.	*I think it (the protocol) does well in identifying the problems…*
Weakness of protocol	Comments that mention negative or undesirable features of the protocol in its current state.	*Just from a practical use out in the field environment, carrying this [protocol] around, trying to keep the water off it, that type of thing is going to be very difficult for us.*
Contextual considerations	This category is applied to any comments that are external to the tool or implementation process, that is, factors perceived to influence tool effectiveness within the broader context.	N/A
Contextual barrier to protocol	Comments that refer to any feature outside of the protocol and implementation that limit the effectiveness of this intervention.	*Because out in the exercise yard, you don't really have time to sit down and you know, break everything down and say what went wrong and what didn't.*
Contextual facilitator to protocol	Comments that refer to any feature outside of the protocol and implementation that enhance the effectiveness of this intervention.	*A bit more open environment…* *And like honest criticism is the best one. So, no use beating around bushes.*
Implementation process	This category is applied to comments referring to how the tool was implemented (e.g., nature of introduction to the tool or process of tool delivery).	*You kind of knew everything that you were talking about. We thought we were getting orders and then all of a sudden, it's like oh yeah, by the way you're getting this free. But to actually show that you've done the background work, it kind of like 'alright these guys know what they're talking about'.*