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Emotion Regulation and Coping in Active Military Personnel: A Systematic Review

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ABSTRACT

Emotions significantly impact decision-making, teamwork, stress management, and resilience in high-pressure occupations such as the military, emergency services and competitive sports, making effective emotion regulation (ER) essential to performance and mental health. However, there are considerable knowledge gaps about ER in active-service military populations, particularly regarding the measures used to quantify ER, the variables studied, and identified relationships. Synthesising this literature is critical to progressing the ER research toward realistic solutions to enhancing performance and mental health in this population. This systematic review aimed to explore measurement tools, the variables examined alongside ER, and the relationship between ER and performance and military variables in active-service military personnel. Preregistered (PROSPERO; CRD42023358657) and adhering to PRISMA guidelines, this review focused on English peer-reviewed publications on ER or coping strategies in active-service military populations without date restrictions. Scopus, Web of Science, Military database, Medline and PsycINFO were last searched on 12/10/2022. Two reviewers screened studies, conducted data extraction and risk of bias assessment. A tabular synthesis method was used to systematically organise study details, ER measures, strategies, performance and military variables, outcomes, and quality. The literature search yielded 5780 studies, 46 of which were deemed relevant. The review identified 17 measurement tools, with the Coping Orientation to Problems Experienced Inventory (COPE) and Emotion Regulation Questionnaire being the most used. Psychological factors such as personality, resilience, and stress were most frequently examined (54%), while performance variables were studied in 3 (6.5%) and military variables in 6 (13%) of the source studies. Of the 10 performance and military variables examined, 50% were identified as being at high risk of bias, 30% moderate risk and 20% low risk. This review highlights a scarcity of published research on ER and performance and military variables in active-service military members. Overall, studies suggest that ER may be associated with performance and military variables in varying contexts and capacity. The review examines the implications of these

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relationships in detail. However, these studies vary in quality, the measurement tools used, and the variables assessed alongside ER, making synthesis challenging. The high risk of bias identified suggests that the relationships with ER should be interpreted with caution. This review suggests a link between ER and performance and military outcomes, however further research is needed to understand this nuanced relationship in the military context.

1 | Introduction

Emotions, integral to our daily lives, influence our actions, cognition, decision-making, teamwork, stress management, and resilience. Defined as a neurophysiological state consciously accessible as a simple, nonreflective feeling (Russell 2003, 148), emotions sit along two continuums; valence (pleasure) and arousal (intensity) (Russell 1980). Emotions of varying valence and intensity influence cognition (Citron et al. 2014; Mitchell and Phillips 2007), physiology (J. G. Jones and Hardy 1990; Mendes 2016), and social dynamics (Furley et al. 2015; Seiler et al. 2018) and can thereby significantly impact behaviour and job performance. For those in high-pressure occupations like military personnel, first responders, and athletes, these effects may be particularly important due to the high-stakes nature of their work.

To manage emotions, individuals employ coping and emotion regulation (ER) strategies. Coping refers to the process of thoughts and behaviours used to manage the demands of situations that are appraised as stressful (Folkman and Moskowitz 2004; S. E. Taylor and Stanton 2007) including responding with coping and ER strategies (Figure 1; S. E. Taylor 2018). ER specifically includes both conscious and unconscious strategies to modify emotional responses (Gross 2001). ER is goal-directed, seeks to upregulate or downregulate positive and negative emotions (Sheppes and Gross 2011), and can occur with or without the presence of a stressor. For instance, in high-pressure roles, ER may be used to manage anxiety due to stress during time-sensitive tasks or to suppress humour or excitement during formal ceremonies. This review focuses on

conscious ER strategies that can exist within coping models and operate in reaction to stressors or to emotions as shown in Figure 1. This can occur in a cyclical manner, whereby outcomes from ER can provoke the recommencement of the process, and whereby ER is influenced by various external and internal resources and contexts (Figure 1).

High-pressure occupations often have job demands involving heightened stress, uncertainty, and decision-making under time constraints. Thus, keeping oneself in an adaptive state of cognitive (such as situational awareness, lethal force decision-making), physiological (such as HR recovery) and affective functioning enables the individual to maintain performance (Andersen et al. 2024). While what is denoted as acceptable 'performance' is highly context and task specific, the literature has focused on a range of outcomes that are implicated by high-stakes job demands, such as decision-making. It is widely accepted that these demands exist for military personnel (Nindl et al. 2018; Tuppin et al. 2017) and are reflected in a plethora of research examining methods for enhancing personnel performance and mitigating deleterious outcomes such as attrition or injury (Dismukes et al. 2015; United States Marine Corps 2016). While much of the knowledge of these effects are contained within military organisations, similar occupations, demonstrate comparable effects. In medical teams, the high stakes and unpredictability of emergency care can amplify emotional responses, contributing to cognitive errors (Ali et al. 2017). Similarly, paramedics frequently face scenarios where managing their emotional responses is critical for effective decision-making (Duffee and Willis 2023). Beyond the task at hand, prolonged exposure to such challenging environments can

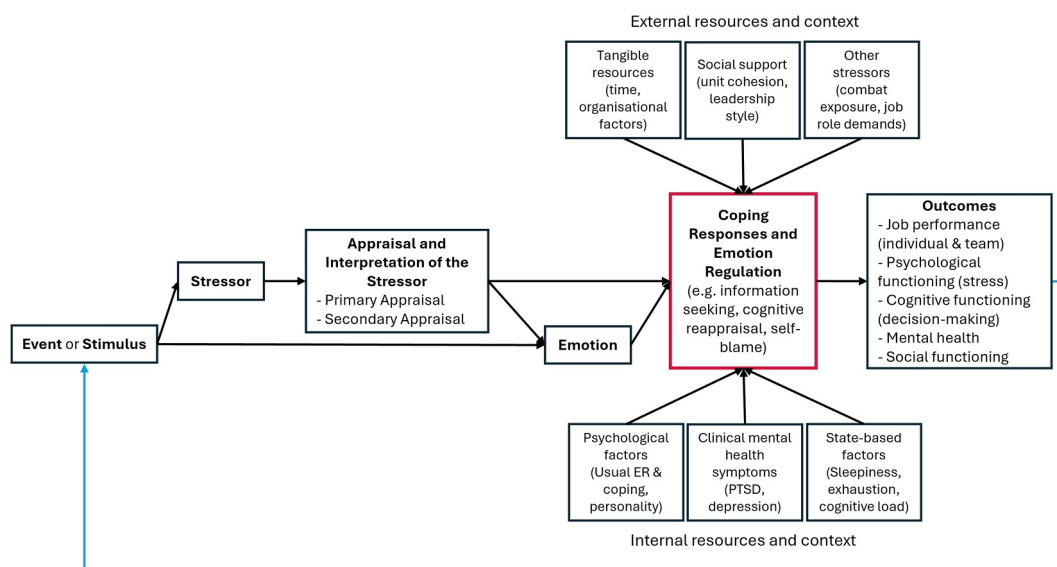


FIGURE 1 | Conceptual model of coping and emotion regulation, adapted from S. E. Taylor (2018) 'The Coping Process'.

result in emotional exhaustion (Kunzelmann and Rigotti 2021), a key factor in burnout (Maslach et al. 1997). Effective ER is therefore crucial for maintaining an emotional equilibrium in these contexts for both momentary performance and resilience for sustained performance.

Effective ER strategies are essential for achieving peak performance in high-pressure occupations (M. V. Jones 2003; Ruiz and Robazza 2021) such as the military. It has been suggested that ER is a key determinant of successful adaptation and mission outcomes, with evidence indicating that certain strategies like active problem-solving enhance resilience and adjustment (Palinkas and Suedfeld 2021; Smith et al. 2021). In the military, studies suggest that ineffective ER in active-service personnel increases the risk of developing mental health disorders such as psychological distress during military training (Dell et al. 2019) and worsening mental health outcomes, particularly among early career members (Dell et al. 2022). Using maladaptive coping has also shown a link with PTSD symptom severity (Short et al. 2018). These studies propose that ER could play a key role in performance in the moment, and in performance and mental health long-term.

Research on specific ER strategies employed by active-service military populations is important for several reasons. Firstly, the outcomes from this research may identify particular ER profiles that are more susceptible to poor performance or mental illness. For example, certain personality traits, coping factors and a range of other outcomes are related to adaptation in isolated, confined and extreme contexts (Bartone et al. 2018) and could be applied to military populations specifically. Similarly in athletes, research on coaching mental skills including ER has long been a focus to improve performance (Beatty and Janelle 2020; Birrer and Morgan 2010; Tamminen et al. 2021). Understanding these factors can help in selection and role identification, and in identifying where personalised training may be useful. Furthermore, these factors may assist in recognising concerns before they increase to injurious levels and provoke service leave. In this manner, personnel could be supported to sustain their role through role refinement, rather than leave the service. This is particularly key, considering the recruitment and retention difficulties defense forces face internationally, where attrition of military personnel is an extensive, and expensive challenge (Knapik et al. 2004; Leuprecht 2020). This research may thus be able to increase the resilience and capacity of individuals to conduct their challenging work without compromising their or others' safety.

The extent of research on ER in active-service military populations remains unclear with three notable gaps. Firstly, numerous ER measurement tools exist, but no review has documented the range of tools used and whether the multitude of possible ER strategies have been comprehensively researched in active-service military or gaps remain. Secondly, it is essential to understand which variables have been studied in conjunction with ER in this population, yet no review has identified the frequency and focus of variables examined alongside ER. Thirdly, while research in other occupations suggests a link between ER and performance, no synthesis of the relationships between ER strategies and performance in active-service military exists.

This systematic review aims to address all three gaps by synthesising the literature to date to identify key findings and gaps in the ER literature in active-service military personnel that require further research.

More specifically, this review aims to:

1. Establish the self-report measurement tools that are used to assess ER strategies in studies with active-service members in the military.
2. Identify the variables that are examined alongside ER in studies with active-service members in the military as either predictors, outcomes or covariates.
3. Explore the relationships between ER strategies and performance and military variables within active-service members in the military.

2 | Methods

2.1 | Protocol Registration

This review is reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (2021) and registered with PROSPERO (ID CRD42023358657). Minor changes were made since registration, most notably narrowing the scope of Aim three (see Supporting Information S1 for details).

2.2 | Inclusion Criteria

Inclusion criteria were peer-reviewed, English publications in active-service military population that examined ER or coping strategies, globally, in quantitative or qualitative formats. ER and coping strategy self-report measurement tools had to assess what individuals do to influence their stress or emotions, such as 'how you control (i.e., regulate and manage) your emotions' (ERQ; Gross and John 2003). For example, we did not include measurement tools asking about affective states such as the PANAS (Watson et al. 1988) or generally about the outcomes associated with ER or emotion dysregulation, such as the Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer 2003). No restrictions were placed on the publication period. Studies with a mixed population of active-service military and another group in a single sample without differentiation were excluded.

2.3 | Literature Search

A computerised literature search was conducted, searching the following databases on 12/10/2022; Scopus, Web of Science, Military database, Medline and PsychInfo.

The search query for the titles, abstracts, and keywords consisted of two sets of terms. The first set included ER-related terms such as emotion regulation, emotional suppression, emotional control, emotion coping, and others, with appropriate

boolean operators separated by OR. The second set included military-related terms such as armed force, military, army marine corp, navy, air force and others with appropriate boolean operators separated by OR. The first and second sets of terms were combined with AND. A detailed search query is in Supporting Information S2.

The search results from each database were exported to [Covidence systematic review software](#) (Veritas Health Information), which removed duplicates. R.K. and T.W. independently screened all abstracts and then full texts for inclusion criteria. Disagreements were resolved through discussion between R.K., T.W., and the senior author, L.A.

2.4 | Data Extraction

R.K. extracted data from all studies. A random 25% of studies had blind data extraction by C.L. to ensure rater reliability. Consistency was > 90% and deemed sufficient for a single reviewer to extract the remaining data. Data was extracted by manually reviewing each manuscript and data items were recorded in a tabular format using Microsoft Excel (Microsoft Corp). The following data were extracted: publication information (authors/year), sample size, sample demographics, country of sample, sampling method, groups and demographics (if applicable), military-related experience, study design, ER measure, ER strategies measured, raw results from the ER measure, military and performance variables' relationship with ER (including statistical analyses and correlations).

2.5 | Strategy Synthesis

Strategies examined in each paper were listed and duplicates consolidated (see Supporting Information S4 for full list). Similar terms for a common strategy—for example, reappraisal and cognitive reappraisal—were grouped under a common heading to avoid inflation of the reported number of strategies analysed across all included papers. Due to a lack of theoretical consensus in the literature (Naragon-Gainey et al. 2017), strategies were not processed further.

2.6 | Quality Assessment

The risk of bias tool was adapted from Cochrane Risk of Bias Assessment Tool (Higgins et al. 2011), Viswanathan et al. (2008), and Effective Practice and Organisation of Care (EPOC) (2009). R.K. conducted a risk of bias assessment for all studies and a random 25% were blind assessed by C.L. for reliability. Consistency between bias assessments was > 90% and deemed sufficient for a single reviewer to rate all studies. For each criterion, studies were rated as: Yes, No, Unclear, or NA. Notably, questions were added regarding the reliability and validity of the ER measure and outcome measures. Further, questions were added regarding the reported internal consistency for the sample in the paper for both ER measures and the other outcome measures. Example questions include 'Were military/performance measures used to assess outcomes reliable

(e.g., internal consistency > 0.70) for a general population?', 'Were military/performance measures used to assess outcomes (e.g., construct validity) valid for a general population?'. All questions and ratings are in Supporting Information S3.

Qualitative studies were also assessed for risk of bias. Risk of bias questions about the validation of measures were replaced by questions adapted from CASP (Critical Appraisal Skills Programme (2018)) that assessed method and rigour. Questions that could apply to quantitative studies but that were not asked of quantitative studies in the risk of bias were not included to prevent unequal assessment between methodologies. The selected questions are in Supporting Information S3.

Areas that were relevant to bias were categorised and uniquely rated as being low, moderate or high risk. Across categories, studies were scored such that high risk was allocated 0, moderate 1, and low 2. Scores were added and divided by the relevant categories (e.g., only one study additionally included a qualitative analysis and thus was also evaluated based on the bias in this additional category). Cut-offs were ascribed and an overall risk of bias was established. Details are in Supporting Information S3.

3 | Results

A total of 5780 papers were identified and 3134 unique articles screened, resulting in 46 articles meeting inclusion criteria (for details see Figure 2).

3.1 | Study and Participant Characteristics

See Table 1 for study and participant characteristics, including ER measures, and the compared variables.

3.2 | Measurement Tools for Emotion Regulation

A total of 17 measurement tools were used across the 46 included studies. The most common measure used was the Emotion Regulation Questionnaire (Gross and John 2003) ($n = 12$, 26%), followed by the COPE (Carver 1997; Carver et al. 1989) ($n = 8$, 17%) (brief version $n = 6$, 13% and full version $n = 2$, 4%) and the Ways of Coping Questionnaire (Folkman et al. 1986) ($n = 5$, 11%).

Across the 46 included studies, six (13%) abbreviated the question set, such that a partial subscale or partial full scale was included that was not validated. Nine (20%) studies defined categories of ER strategies that were not originally recommended in the measure. Regarding categories, 32 studies detailed the strategies included in the analysis and 14 studies offered only categorical descriptions, such as 'positive coping style', without delineating their components. Studies examined 74 different strategy terms, which were consolidated into 32 standardised strategies (refer to Supporting Information S4) to facilitate clearer interpretation.

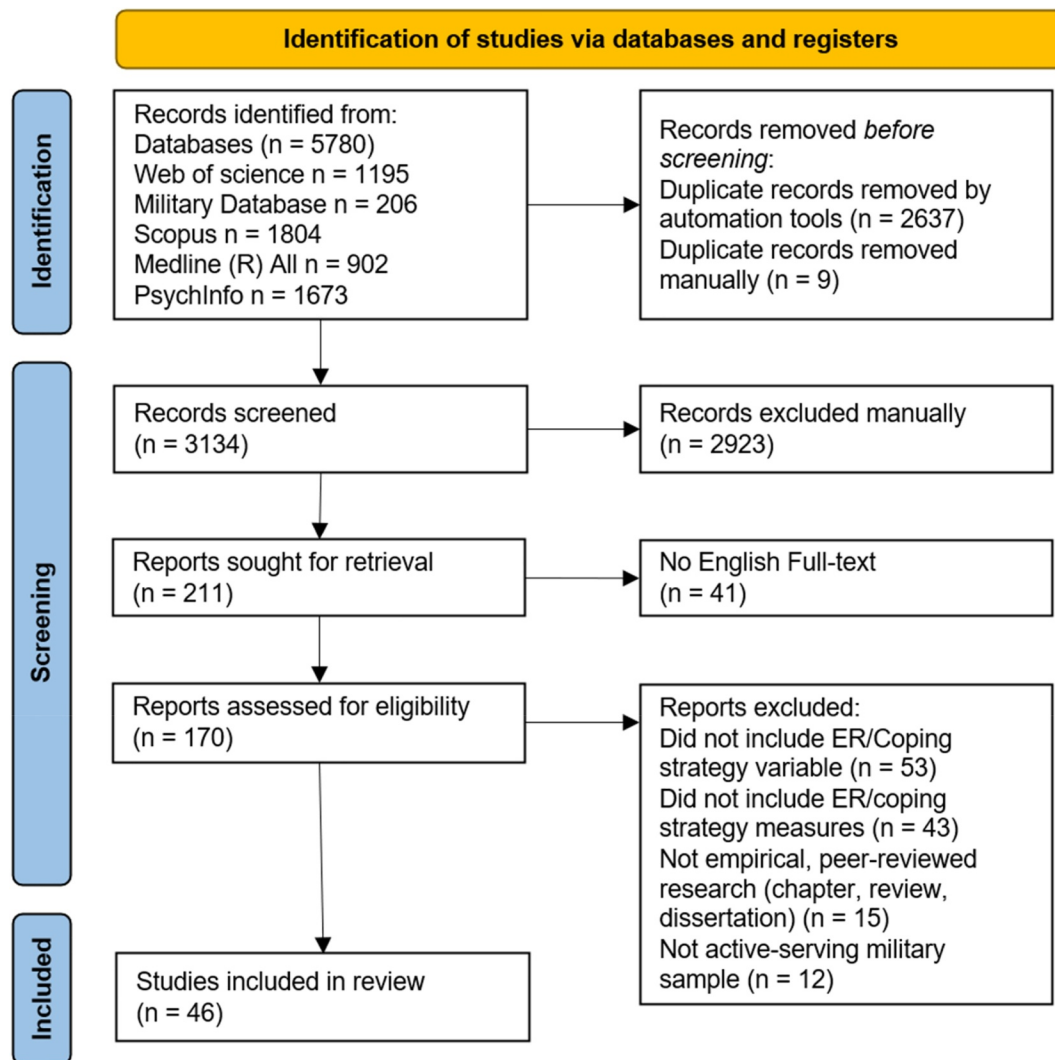


FIGURE 2 | Systematic review process and results from literature searches in Scopus, Web of Science, Military database, Medline and PsycINFO databases.

Across studies, 32 strategies were examined and each study investigated an average of 5.7 strategies (median of 4.5). Reappraisal and active coping appeared in 36 (77%) and 24 (51%) studies, respectively. Avoidance, acceptance, and expressive suppression were each examined in 10–14 (21%–30%) studies. The remaining 28 strategies were explored in only one to eight (2%–17%) studies.

3.3 | Variables Examined Alongside Emotion Regulation

The variables examined alongside ER were categorised according to the following groupings: Performance, Military, Physical/Health, Clinical mental health, Psychological, Social, Behavioural and Other (refer to Supporting Information S5). Performance variables included measures assessing specific job outcomes, such as training course completion, promotions, and mission success, while excluding variables related to job performance but not direct outcomes, like leadership style. Military variables included variables pertinent to the military context,

influencing various aspects of individual experiences and organisational dynamics within military settings. Physical/Health variables included variables pertaining to individuals' physical wellbeing and physiological functioning. Clinical mental health included assessing and understanding various aspects of clinical mental health functioning, including sub-clinical mental illness symptoms. Psychological variables included variables related to individuals' psychological functioning, encompassing various aspects of cognition, emotion, traits, and early life adversity. Social variables included various dimensions of social relationships, interactions, and support systems that influence individuals' wellbeing and functioning within social contexts. In this review, social variables also encompassed measures assessing significant others. Behavioural variables encompassed observable actions and responses exhibited by individuals, representing outward manifestations of their choices, decisions, and interactions with the environment, rather than internal psychological processes. 'Other' variables included those that did not align with the previous categories. As per Figure 1, these variables could be predictors (e.g., the event or stimulus), the internal and external resources or contexts that influence ER or the outcome.

TABLE 1 | Study characteristics, ER measures and variables examined with ER.

| Study | <i>n</i> (Fe (%), Ma (%) <i>M</i> age, SD age, range) | ER measures | Other variable(s) |
|-----------------------------------|--|--|--|
| Alarcon et al. (2012) | 338 (71 (21%), 267 (79%)), 33, ND, ND | COPE (Carver et al. 1989) | Leadership style |
| Ayoko et al. (2022) | Total <i>n</i> = 342 Followers: 315 (0 (0%), 315 (100%)), ND, ND, 99.7% participants were in the age group of 16–25 Leaders: 27 (0 (0%), 27 (100%)), ND, ND, 92.6% participants were also in the age group of 16–25. | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Leadership style |
| Bartkowiak et al. (2021) | 200 (16 (8%), 184 (92%)), 35, ND, 30–39 | Coping inventory for stressful situations (CISS-48; Endler and Parker 1990) | Burnout |
| Britt et al. (2017) | Total <i>n</i> = 2386 Iraq: 1670 (age range percentages, 18–24 (51.6%), 25–29 (26.0%), 30–39 (18.3%), 40+ (4.1%)) Afghanistan: 716 (age range percentages, 18–24 (68%), 25–29 (22.0%), 30–39 (9.4%), 40+ (0.7%)) | Brief COPE (Carver 1997; Carver et al. 1989) | Unit cohesion Combat exposure Self-blame Prayer/spirituality PTSD symptoms Depression symptoms |
| Cai et al. (2017) | 1477 (0 (0%), 1477 (100%)), 21.34, 3.33, 17–38 | Cognitive emotion regulation questionnaire (CERQ; Garnefski and Kraaij 2007) | Resilience Social support Stress |
| Cárdenas et al. (2020) | 26 (0 (0%), 26 (100%)), 42.15, 8.37, ND | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Physical fitness change |
| Crane et al. (2019) | 21 (7 (33%), 14 (66%)), 30.04, 6.70, 23–46 | Other—qualitative investigation, one focus group | |
| Cui et al. (2022) | 452 (29 (6.42%), 423 (93.58%), ND, ND, ND) (age range and percentages 18–20 (52%), 21–25 (38%), 25+ (11%)) | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Stress |
| de Kruijff et al. (2019) | Total <i>n</i> = 66 Sample 1 (battlefield casualties): 33 (2 (6%), 31 (94%)), 24.9, 6.8, ND Sample 2 (controls): 33 (2 (6%), 31 (94%)), 26.3, 6.1, ND | Cognitive emotion regulation questionnaire (CERQ) short form (Garnefski and Kraaij 2007) | Depression symptoms Anxiety symptoms |
| R. Delahaij and van Dam (2016) | Total <i>n</i> = 235 Sample 1 officer cadets: 116 (20 (17%), 96 (86%)), 20.4, ND, ND Sample 2 infantry recruits: 65 (0 (0%), 65 (100%)), 19.3, ND, ND Sample 3 marine recruits: 54 (0 (0%), 54 (100%)), 18.8, ND, ND | Coping inventory for stressful situations (CISS; Endler and Parker 1990) | Learning goal orientation Metacognitive awareness |
| V. D. Delahaij and Van Dam (2017) | Total <i>n</i> = 326 (used in analysis) Sample 1 (military self-defense exercise): 122 Sample 2 (military self-defense exercise): 130 Sample 3 (heliditch exercise): 74 *Note that the full original sample detailed <i>M</i> age and SD however this was not detailed for the <i>n</i> used in the analysis | Coping inventory for stressful situations (CISS; Endler and Parker 1990) Coping inventory for task stressors (Matthews and Campbell 1998) | Coping self-efficacy Challenge emotions Threat emotions Task-focused coping behaviour Emotion-focused coping behaviour |

(Continues)

TABLE 1 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%) <i>M</i> age, SD age, range) | ER measures | Other variable(s) |
|----------------------------|---|---|--|
| deSouza and Feitosa (2015) | 36 (0 (0%), 36 (100%)), 29.84, 7.38, ND | Ways of coping checklist by (Folkman et al. 1986) | Job performance |
| Eid (2003) | Total <i>n</i> = 135 Sample 1 navy shipwreck cohort: 113 (5 (4%), 108 (96%)). Conscripts and mates <i>M</i> age = 21.6, SD = 1.67, officers <i>M</i> age = 29.8, SD = 5.52 T1 3 weeks, <i>n</i> = 82 T2 4 months, <i>n</i> = 74 T3 12 months, <i>n</i> = 67 Sample 2 army avalanche cohort: 147 (0, (0%), 147 (100%)), ND, ND, ND. Privates <i>M</i> age and SD ND, range ND, conscripts <i>M</i> age ND, SD ND, range 18–29 T1 2 weeks, <i>n</i> = 133 T2 4 months, <i>n</i> = 111 T3 12 months, <i>n</i> = 52 | Coping style questionnaire (CSQ-30: Endler and Parker 1990; Joseph et al. 1992) | PTSD symptoms |
| Giff et al. (2020) | Total <i>n</i> = 305 Service member: 154 (ND (2%), ND (98%)), 34.34, 8.32, ND Romantic partners: 151 (ND (98%), ND (2%)), 32.22, 8.09, ND | Ways of coping questionnaire—Revised (WOC-R; Folkman et al. 1986) | Partner ER Partner DASS Partner PTSD Depression, stress, anxiety PTSD symptoms |
| Gilbar et al. (2010) | Main sample: 168 (32 (19%), 129 (77%)), 25.36, 5.27, 17–45 Subsample who completed follow up: 68 (15 (22%), 52 (78%)) 26.21, 5.3, 17–45 | Brief COPE [20 items] (Carver 1997; Carver et al. 1989) | Perceived control over one's life (mastery) Stress appraisals Mental preparation Unit cohesion Psychological distress |
| Goldberg et al. (2022) | 311 (53 (17%), 258 (83%)), 29.00, 8.08, ND | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Depression symptoms Anxiety symptoms Alcohol use PTSD symptoms Total number of clinical elevations Mental help-seeking beliefs Treatment utilisation |
| Golenbock et al. (2017) | 8070 (1130 (14%), 6940 (86%)), 27.5, 8.1, ND | Army general achievement test: Emotional fitness scales | Health |
| Haase et al. (2016) | Total <i>n</i> = 35 Mindfulness-based mental fitness training: 19 (ND, ND), 22.35, 3.30, ND Control: 16 (ND, ND), 20.81, 1.10, ND | Response to stressful experiences scale (RSES; Johnson et al. 2011) | Group comparison (non-military) |
| John et al. (2014) | 21 (ND, ND), ND, ND, ND | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Group comparison (non-military) |
| Johnsen et al. (1998) | 26 (0 (0%), 26 (100%)), 22.3, ND, 19–29 | General coping questionnaire 30-item (Joseph et al. 1992) | Health Alcohol Psychological health |

(Continues)

TABLE 1 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%) <i>M</i> age, SD age, range) | ER measures | Other variable(s) |
|-------------------------------|---|---|--|
| Johnsen et al. (2002) | Army avalanche situation: 147 (0, (0%), 147 (100%)), ND, ND, ND. Privates <i>M</i> age ND and SD ND, range ND, conscripts <i>M</i> age ND, SD ND, range 18–29 T1 2 weeks, <i>n</i> = 133 T2 4 months, <i>n</i> = 111 T3 12 months, <i>n</i> = 52 | Coping style questionnaire (CSQ–30; Joseph et al. 1992) | Psychological health (GHQ-30) PTSD symptoms (IES) PTSD symptoms (PTSS-10) |
| Kelley et al. (2012) | 262 (2 (0.7%), 258 (99.2%)), age range <i>n</i> and percentages, 18–24 <i>n</i> = 139 (53.6), 25–29 <i>n</i> = 70 (27.0), 30–39 <i>n</i> = 38 (14.7), 40+ <i>n</i> = 12 (4.6), missing values <i>n</i> = 3 | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Childhood abuse |
| Kulenović and Buško (2006) | 421 (0 (0%), 421 (100%)), 21, 2.59, 18–27 | Other—bespoke measure on coping | Personality Stressor—primary appraisal |
| Lane et al. (2012) | 95 (0 (0%), 95 (100%)), 22.04, 4.16, ND | Emotion regulation of others and self scale (EROS; Niven et al. 2011) | Pleasant emotions Unpleasant emotions |
| LoSavio et al. (2021) | 254 (22 (8.7%), 232 (91.3%)), 33.11, 7.37, ND | Cognitive emotion regulation questionnaire (CERQ) short form (Garnefski and Kraaij 2007) | Childhood abuse |
| Marini et al. (2017) | National guard members: 175 (0 (0%), 175 (100%)) (33.4, 8.26, ND) Significant others: 175 (0 (0%), 175 (100%)), 32.3, 8.43, ND | Emotional approach to coping scale (EAC; Stanton et al. 2000) Strategic approach to coping scale (SACS; Dunahoo et al. 1998) | Partner coping Number of deployments Psychological health Combat exposure |
| McLean et al. (2019) | 216 (26 (12%), 190 (88%)), 32.78, 7.20, ND | Cognitive emotion regulation questionnaire (CERQ; Garnefski and Kraaij 2007) | PTSD symptoms |
| Mesko et al. (2013) | 120 (0 (0%), 120 (100%)), ND, ND, 31–45 | Coping responses inventory (CRI–Adult; Moos 1993) | Group comparison (other military) |
| Mikulincer and Florian (1995) | 92 (0 (0%), 92 (100%)), 18, ND, ND | Ways of coping checklist by (Folkman et al. 1986) | Attachment styles |
| Paskell et al. (2019) | Total <i>n</i> = 37 Military group: 22 (0 (0%), 22 (100%)), 27.25, 4.18, ND Sports group: 16 (0 (0%), 16 (100%)), 32.55, 5.86, ND | Brief COPE (Carver 1997; Carver et al. 1989) | Group comparison (sport) |
| Riulli and Savicki (2010) | 632 (ND (1%), ND (99%)) 27.7, ND, ND | COPE (Carver et al. 1989) | Psychological adjustment |
| Gomes and Afonso (2016) | 95 (5 (5%), 90 (95%)), 37.4, 10.3, 22–54 | Other—qualitative analysis was based on the COPE/measure (Carver et al. 1989) categories | Stress |
| Schall and Schütz (2019) | 492 (33 (6.7%), 459 (93.3%)), ND, ND 18–50. Age range percentages < 25 (51%), 26–30 (28%), 31–35 (11%), 36–40 (5%), 41–50 (5%) | Emotion regulation questionnaire (ERQ; Gross and John 2003); for the German translation, see Abler and Kessler (2009) Emotion management subscale from the MSCEIT (Mayer et al. 2002) (German adaptation by Steinmayr et al. (2011)) | Perceived stress Career stage ER knowledge |
| Serec et al. (2012) | 390 (48 (12%), 342 (88%)), 30.73, 7.61, 19–59 | Ways of coping checklist (Folkman et al. 1986) | Personality |

(Continues)

TABLE 1 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%) <i>M</i> age, SD age, range) | ER measures | Other variable(s) |
|----------------------------|--|--|---|
| Smits et al. (2022) | 72 (4 (5%), 68 (95%)), 35.05, 10.91, 18–60 | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Burnout |
| Sohail and Ahmad (2021) | 180 (0, (0%), 180 (100%)), ND, ND, 20–55. Age range <i>n</i> and percentages 20–25 <i>n</i> = 96 (53.4%), 26–30 <i>n</i> = 24 (13.3%), 31–40 <i>n</i> = 15 (8.3%), 41–50 (5.6%), 51–55 <i>n</i> = 35 (19%) | Emotion regulation questionnaire (ERQ; Gross and John 2003) | Happiness Resilience |
| Stanley et al. (2021) | 292 (89 (30.5%), 200 (68.5%), 3 (1%)), 28.67, 7.40. ND | Emotion regulation questionnaire (ERQ; Gross and John 2003) | ASD quotient social communication and interaction difficulties Repetitive behaviours Suicidal history |
| Talić et al. (2022) | T1. 106 (50 (47%), 56 (53%)) 23.6, 3.30, 19–33 T2. 63 (30 (48%), 33 (52%)), 23.5, 2.97, 19–33 Analysis both full data from both timepoints | Brief COPE (Carver 1997; Carver et al. 1989) | Interpersonal needs (thwarted belongingness, perceived burdensomeness) Loneliness Life satisfaction Stress Personality Organisational commitment Study satisfaction |
| M. K. Taylor et al. (2009) | 35 (0 (0%), 35 (100%)), 21.7, 2.1, ND | Ways of coping checklist (Folkman et al. 1986) | Stress Dissociative states PTSD symptoms |
| Tortello et al. (2021) | 13 (0, 0%, 13 (100%)), 34, 1, 32–35 | COPE measure. Short. was administered to assess how participants deal with stress (Carver 1997) Spanish version (Moran et al. 2010) | Defense: Mature versus immature Job content |
| Vie et al. (2016) | 10,000 (1600 (16%), 8400 (84%)), 30, 8.34, ND | Brief COPE (Carver 1997; Carver et al. 1989) Attributional style questionnaire (Peterson et al. 1982) | Recovery and stress Character strengths |
| Wagstaff and Weston (2014) | 12 (1 (8.3%), 11 (91.7%)), 36, ND, ND | Cognitive emotion regulation (Garnefski and Kraaij 2007)—9 items Emotion regulation questionnaire (Gross and John 2003) two items adapted Other—Qualitative interviews pre and post expedition | Frequency of strategy use Efficacy of strategy Mental fatigue Job performance Team performance |
| X. Wang et al. (2019) | 3146 (0 (0%), 3146 (100%)), 21.55, 3.05, ND | Emotion regulation questionnaire (ERQ)—for armymen (ERQ-A) | Depression symptoms Behavioural activation/inhibition scales |
| Z. Wang et al. (2020) | 489 (11 (2.2%), 478 (97.7%)) 22.3, ND, 18–38 | Trait coping* style questionnaire Chinese version (TCSQ; Jiang 1999) | Alcohol Smoking |

(Continues)

TABLE 1 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%) <i>M</i> age, SD age, range) | ER measures | Other variable(s) |
|------------------------|---|--|--------------------------------------|
| | | | Anxiety symptoms |
| | | | Sleep quality |
| | | | Role-physical |
| | | | Mental health |
| | | | Role-emotional |
| | | | Vitality |
| | | | Social functioning |
| | | | Group comparison (depressed vs. non) |
| Williams et al. (2002) | 443 (114 (26%), 329 (74%)), 19.8, 2.7, ND | Coping inventory for stressful situations (CISS; Endler and Parker 1990) | |
| Zhao et al. (2020) | 697 (0 (0%), 697 (100%)), 19.89, 1.86, 17–35 | Simple coping style scale (SCSQ; Xie 1998) | Optimism |
| | | | Resilience |
| | | | Self-comfort |
| | | | Self-improvement |
| | | | Toughness |
| | | | Objective support |
| | | | Social support |
| | | | Subjective support |
| | | | Support availability |

Note: Colour coding relates to other variable categorisation (see Supporting Information S5) as follows: Light blue = Clinical; Dark Blue = Psychological factor; Green = Social Factor; Orange = Military Variable; Yellow = Health; Purple = Behavioural, Pink = Performance; Grey = Other. Abbreviations: Fe = female, *M* = mean, Ma = male, *n* = number, ND = not detailed, SD = standard deviation.

Psychological variables were the most common, with 39 unique variables examined by 26 (57%) unique studies, including personality, resilience, stress and burnout. This was followed by Clinical mental health which contained 11 unique variables and was examined by 14 (30%) unique studies. Clinical mental health contained variables such as PTSD symptoms, psychological health, depression symptoms and anxiety symptoms. Table 1 details the full list of variables, uncategorised.

3.4 | Relationship Between Emotion Regulation Strategies and Performance and Military Variables

Tables 2 and 3 illustrate the studies that examined performance and military variables alongside ER, respectively. ER measures, outcomes measures, analysis, results and risk of bias rating are detailed.

There were three performance variables examined by three (6%) unique studies with one variable, performance evaluation (self-report), examined by more than one study (Gilbar et al. 2010; Wagstaff and Weston 2014). Performance evaluation, measured by self-report was negatively correlated with emotion-focused coping and avoidance-focused coping but was not significantly associated with problem-focused coping. When controlling for gender, age and education, however, these results were no longer significant. In contrast, Wagstaff and Weston (2014) found that participants perceived their ER

strategy selection to have a high impact on their performance. Regarding team performance, it was found that expressive suppression and acceptance were perceived as effective strategies, based on the assumption that expressing negative emotions would be detrimental to team morale. However, this result was nuanced, in that it was also found that the regular use of expressive suppression was found to have negative team consequences, affecting team morale and performance. In this way, perceptions of ER effectiveness were significantly correlated with team performance. There was no difference in frequency of using adaptive and maladaptive ER strategies, and both were used to manage team cohesion to support team performance.

There were six unique military variables examined by six (13%) unique studies. Combat exposure (Britt et al. 2017; Marini et al. 2017) and unit cohesion (Britt et al. 2017; Gilbar et al. 2010) were examined by more than one study. Britt et al. (2017) found a correlation between combat exposure and self-blame, and showed that higher levels of self-blame coping magnified the relationship between combat exposure and PTSD symptoms. Additionally, the authors found that positive emotion-focused coping buffered personnel from the effect of combat exposure on PTSD symptoms (after controlling for rank and unit cohesion, combat exposure and positive emotion-focused coping). Marini et al. (2017) however, did not find an interaction between service-member avoidance or emotional expression, combat exposure or psychological health.

TABLE 2 | Study characteristics, ER measures, examined strategies and their relationship with military variable outcomes.

| Study | <i>n</i> (Fe (%), Ma (%)) <i>M</i> age, range | ER strategies examined | ER measure | Military variable | Military measure | Analysis | Outcome | Risk of bias |
|----------------------|--|---|--|-------------------|---|---|---|----------------------|
| Marini et al. (2017) | National guard members: 175 (0 (0%), 175 (100%)) 33.4, 8.26, ND Significant others: 175 (0 (0%), 175 (100%)), 32.3, 8.43, ND | Emotional expression, avoidance | Emotional approach to coping scale (EAC) ^a , emotion expression subscale Strategic approach to coping scale (SACS) ^b , avoidance subscale | Combat exposure | Operationally defined using a series of 7 items from the 2008 department of defence survey of health related behaviours (HRB) among active-duty military personnel (see source paper; Bray et al. 2009) | Latent moderated structural (LMS) equations Interactions with service members' combat exposure | Service member avoidance × service member combat exposure predicting service members' psychological health (unstandardised coefficient = 0.06, <i>p</i> = 0.60) Service member emotion expression × service member combat exposure on service members' psychological health (unstandardised coefficient = 0.07, <i>p</i> = 0.51) | 86% Moderate risk |
| Britt et al. (2017) | Total: 2386 Iraq: 1670 (age range percentages, 18–24 (51.6%), 25–29 (26.0%), 30–39 (18.3%), 40+ (4.1%)) Afghanistan: 716 (age range percentages, 18–24 (68%), 25–29 (22.0%), 30–39 (9.4%), 40+ (0.7%)) | Positive emotion-focused coping (positive reframing, acceptance, humour), self-blame, prayer/spirituality | Brief COPE ^c | Combat exposure | 34-Item combat exposure scale based on prior research (Hoge et al. 2004) | Correlation Hierarchical regression analyses predicting PTSD symptoms (controlling for rank and unit cohesion) Interaction: Positive emotion-focused coping × combat exposure Interaction: Self-blame coping × combat exposure Interaction: Prayer/spirituality × combat exposure Simple slopes, positive emotion-focused coping × combat exposure predicting PTSD symptoms (controlling for rank and unit cohesion, combat exposure, and positive emotion-focused coping) Simple slopes, self-blame coping × combat exposure predicting PTSD symptoms (controlling for rank and unit | Iraq: Emotion-focused coping (–0.01, <i>p</i> > 0.05), self-blame (0.06, <i>p</i> < 0.05), prayer/spirituality (–0.04, <i>p</i> > 0.05) Afghanistan: Emotion-focused coping (0.03, <i>p</i> > 0.05), self-blame (0.10, <i>p</i> < 0.05), prayer/spirituality (0.03, <i>p</i> > 0.05) Iraq: (Standardised coefficient = –0.091, <i>p</i> < 0.01) Afghanistan (standardised coefficient = –0.147, <i>p</i> < 0.01) Iraq: (Standardised coefficient = –0.078, <i>p</i> < 0.01) Afghanistan (standardised coefficient = –0.070, <i>p</i> > 0.05) Iraq: (Standardised coefficient = –0.035, <i>p</i> > 0.05) Afghanistan (standardised coefficient = –0.023, <i>p</i> > 0.05) At two levels of positive emotion-focused coping | 50% High risk |

(Continues)

TABLE 2 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%)) M age, range SD age, range | ER strategies examined | ER measure | Military variable | Military measure | Analysis | Outcome | Risk of bias |
|-------|--|---------------------------|------------|----------------------|---------------------|--|---|-----------------|
| | | | | | | cohesion, combat exposure, and self-blame coping) Simple slopes, prayer/spirituality coping × combat exposure predicting PTSD symptoms (controlling for rank and unit cohesion, combat exposure, and self-blame coping) Final regression to test for independence in Iraq sample. (Controlling for rank, unit cohesion, combat exposure, positive emotion-focused coping, and self-blame coping) Positive emotion-focused coping Self-blame coping Overall interpretation | Iraq [low: t (1961) = 13.394, $p < 0.001$], [high: t (1961) = 6.817, $p < 0.001$], Afghanistan [low: t (547) = 10.919, $p < 0.001$], [high: t (547) = 5.576, $p < 0.001$] Combat exposure-PTSD symptoms slope was steeper under low levels of positive emotion-focused coping At two levels of self-blame coping Iraq [high t (1957) = 12.604, $p < 0.001$, and low, t (1957) = 6.733, $p < 0.001$]. Afghanistan: Non significant result Iraq and Afghanistan: Non significant result Standardised Standardised coefficient = -0.075 , $p < 0.01$) coefficient = -0.071 , $p < 0.01$) Regression: Positive emotion-focused coping buffered soldiers from the PTSD symptoms associated with increased combat exposure Self-blame magnified the combat exposure-PTSD symptom relationship in Iraq sample | |

(Continues)

TABLE 2 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%)) <i>M</i> age, SD age, range | ER strategies examined | ER measure | Military variable | Military measure | Analysis | Outcome | Risk of bias |
|--------------------------|--|---|---|-------------------|---|---|---|----------------------|
| Gilbar et al. (2010) | Main sample: 168 (32 (19%), 129 (77%)), 25.36, 5.27, 17–45 Subsample who completed follow up: 68 (15 (22%), 52 (78%)) 26.21, 5.3, 17–45 | Problem focused coping (active coping, planning, suppression of competing activities), emotion focused coping (instrumental support, emotional support, ventilation), avoidance focused Coping (mental disengagement, behavioural, disengagement, denial) Reappraisal, expressive suppression | Brief COPE ^{c,d} | Unit cohesion | Assessed with a measure developed by Podsakoff and MacKenzie (1994) | Correlation Moderated regression Combat exposure × coping strategies as predictors of PTSD symptoms Rank and unit cohesion were entered in step 1, combat exposure and the specific coping strategy were entered in step 2, and the interaction term was entered in step 3. Correlation | Iraq: Emotion-focused coping (0.28, $p < 0.05$), self-blame (-0.11 , $p < .05$), prayer/spirituality (0.08, $p < 0.05$) Afghanistan: Emotion-focused coping (0.30, $p < 0.05$), self-blame (-0.04 , $p > 0.05$), prayer/spirituality (0.06, $p > 0.05$) Results as above Problem-focused coping ($r = 0.19$, $p < 0.05$, $d = 0.38$), Emotion-focused coping ($r = -0.26$, $p < 0.01$, $d = 0.55$), Avoidance-focused coping ($r = -0.20$, $p < 0.05$, $d = 0.40$) | 79% Moderate risk |
| | | | | | | | 29% High risk | |
| Schall and Schütz (2019) | 492 (33 (6.7%), 459 (93.3%)), ND, ND 18–50 Age range | Reappraisal, expressive suppression | Emotion regulation questionnaire (ERQ) ^{e,f} | Career stage | Established early versus late career via non-hierarchical K- | Kruskal-wallis test for correlations between early and late career clusters across variables | Emotion regulation knowledge → reappraisal Early career cluster: 0.23, $p < 0.01$ | 100% Low risk |

(Continues)

TABLE 2 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%)) M age, range SD age, range | ER strategies examined | ER measure | Military variable | Military measure | Analysis | Outcome | Risk of bias |
|------------------------|---|--|-------------------------|--|---|---|---|-------------------------|
| | percentages < 25 (51%), 26–30 (28%), 31–35 (11%), 36–40 (5%), 41–50 (5%) | | | | means cluster analysis with age, occupational tenure, and job position as clustering criteria. | Hierarchical regression analysis with the variables career stage (early vs. late), emotion-regulation knowledge, and the interaction of these variables, moderated by reappraisal and suppression as predictors of soldiers' perceived stress. Standardised regression coefficients Indirect path: Emotion regulation → reappraisal/ Suppression → perceived stress. | Late career cluster: 0.07, $p > 0.05$ Reappraisal → perceived stress Early career cluster: –0.11, $p < 0.05$ Late career cluster: –0.06, $p > 0.05$ Emotion regulation knowledge → suppression Early career cluster: –0.11, $p < 0.01$ Late career cluster: –0.09, $p > 0.05$ Reappraisal → perceived stress Early career cluster: 0.29, $p < 0.01$ Late career cluster: 0.14, $p > 0.05$ | |
| Talić et al. (2022) | T1. 106 (50 (47%), 56 (53%)) 23.6, 3.30, 19–33 T2. 63 (30 (48%), 33 (52%)), 23.5, 2.97, 19–33 Analysis both full data from both timepoints | Active coping (active coping, planning), avoidance coping (self distraction, denial, substance use, behavioural disengagement, self blame), social support (seeking emotional support, seeking instrumental support, venting), positive cognitive | Brief COPE ^c | Organisational commitment (bond or linking of the individual to the organisation (Mathieu and Zajac 1990)) | 6 items of the COMMIT (Felfe and Pundt 2012) | Correlation | T1 Active coping ($r = 0.05$, $p > 0.05$) Avoidant coping ($r = -0.18$, $p > 0.05$) Social support ($r = -0.06$, $p > 0.05$) Positive cognitive restructuring ($r = 0.12$, $p > 0.05$) T2 Active coping ($r = 0.03$, $p > 0.05$) Avoidant coping ($r = -0.12$, $p > 0.05$) Social support ($r = -0.16$, $p > 0.05$) Positive cognitive restructuring ($r = -0.02$, $p > 0.05$) | 79% Moderate risk |

(Continues)

TABLE 2 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%)) M age, range SD age, range | ER strategies examined | ER measure | Military variable | Military measure | Analysis | Outcome | Risk of bias |
|-------|--|---|------------|----------------------|---------------------|----------|---------|-----------------|
| | | restructuring (positive cognitive restructuring, humour, acceptance) | | | | | | |

Abbreviations: Fe = female, M = mean, Ma = male, *n* = number, ND = not detailed, SD = standard deviation.

^aEAC (Stanton et al. 2000).

^bSACS (Dunahoo et al. 1998).

^cBrief COPE (Carver 1997; Carver et al. 1989; Folkman et al. 1986).

^d20-Items.

^eEmotion Regulation Questionnaire (Gross and John 2003).

^fGerman translation (Abler and Kessler 2009).

The remaining studies explored career stage, organisational commitment and unit cohesion. Schall and Schütz (2019) investigated career stage, finding that ER knowledge was a significant predictor of perceived stress among those in early career, but not late career stages and that this relationship was partly explained by a greater tendency to use reappraisal instead of suppression. Talić et al. (2022) study reported that there was no significant relationship between organisational commitment and ER strategies. Finally, two studies investigated unit cohesion, Britt et al. (2017) found that unit cohesion was significantly positively correlated with emotion-focused coping and negatively correlated with self-blame. In contrast, Gilbar et al. (2010) found that unit cohesion was significantly negatively correlated with emotion-focused coping, avoidance-focused coping, and positively correlated with problem-focused coping.

4 | Discussion

4.1 | Overview

This systematic review sought to investigate ER in an active-service military population. Specifically, this review identified the measures used across studies, the variables examined alongside ER and the relationships between ER and performance and military variables as currently outlined in the literature. Synthesis suggests that ER research in active-service military personnel is highly varied in terms of the variables examined, measures used and that there are limited studies examining ER and performance and military variables. The few studies that have examined performance and military variables with ER strategies in this review suggest that ER strategies may have an impact on the short- and long-term performance of individuals and teams, which can ultimately affect mission success. However, without replicated research of high risk of bias studies and the consistent use of measurement tools, these claims remain to be confirmed. Below, we discuss some of the key gaps in research to help guide future research.

4.2 | Measurement of ER

Various measures were used, however several of these measures were not psychometrically evaluated, raising uncertainty about their validity and reliability and, consequently, the integrity of their ER results. Some studies used bespoke ER or coping strategy inventories required for their study (e.g., Kulenović and Buško 2006; Wagstaff and Weston 2014) and these were variably validated, with some providing reliability estimates but limited evidence of validity, others relying on previous research using the same measure to suggest psychometric integrity, or using an abbreviated version of a full psychometrically valid scale (Ayoko et al. 2022). That is, while measures that have been well validated were used in several studies (such as the ERQ (Gross and John 2003), the COPE (Carver 1997) and Ways of Coping Questionnaire (Folkman et al. 1986)), they were adapted, translated and at times not tested for reliability within the study sample. In this review, unclear psychometric properties were a major contributor to increased risk of bias scores. While

TABLE 3 | Study characteristics, ER measure and their relationship with performance variable outcomes.

| Study | <i>n</i> (Fe (%), Ma (%), SD age, range) | ER strategies examined | ER measure | Military variable | Job performance or military measure | Analysis | Outcome | Risk of bias |
|----------------------------|--|---|--|--------------------------------------|--|--|--|---------------|
| deSouza and Feitosa (2015) | 36 (0 (0%), 36 (100%), 29.84, 7.38, ND) | Confrontation, distancing, self control, social support, accepting responsibility, escape avoidance, problem-solving, positive reappraisal | Ways of coping checklist ^a | Job performance | Completing versus quitting the jungle operations course of the Brazilian army | Nonparametric Mann–Whitney <i>U</i> test | Self control ($p < 0.05$, $d = 0.69$) and positive reappraisal ($p < 0.05$, $d = 0.74$) No significant difference for confrontation, distancing Social support, accepting responsibility, escape avoidance, problem-solving, between training course completers versus non-completers | 100% Low risk |
| Gilbar et al. (2010) | Main sample: 168 (32 (19%), 129 (77%), 25.36, 5.27, 17–45) Subsample who completed follow up: 68 (15 (22%), 52 (78%) (26.21, 5.3, 17–45)) | Problem-focused coping (active coping, planning, suppression of competing activities), emotion-focused coping (instrumental support, emotional support, ventilation), avoidance-focused coping (mental disengagement, behavioural, disengagement, denial) | Brief COPE ^{b,c} | Performance evaluation (self-report) | Two items—‘to what extent were you satisfied with your performance during the disengagement task?’, ‘to what extent did your involvement in the disengagement task contribute to your fellow soldiers?’ (1–5 scale; 1 very little, 5 a great deal) | Correlations between ER at T1 and T2 performance evaluation Multiple regression analyses between ER at T1 and T2 performance evaluation (controlling for gender, age, and education) | Problem-focused coping ($r = 0.06$, $p > 0.05$) Emotion-focused coping ($r = -0.38$, $p < 0.01$) Avoidance focused coping ($r = -0.41$, $p < 0.01$) Problem focused coping (standardised coefficient = 0.00 , $p > 0.05$) Emotion-focused coping (standardised coefficient = -0.16 , $p > 0.05$) Avoidance focused coping (standardised coefficient = -0.24 , $p > 0.05$) | 29% High risk |
| Wagstaff and Weston 2014 | 12 (1 (8.3%), 11 (91.7%), 36, ND, ND) | Rumination, catastrophizing, self blame, other-blame, acceptance, positive reappraisal, putting into perspective, positive | Cognitive emotion regulation questionnaire ^{d,e} emotion regulation questionnaire ^{f,g} | Performance evaluation (self-report) | Self-report item on a 10-point likert scale (1 = very poor, 10 = very high) | Pearson's correlations <i>T</i> Tests Qualitative data analysed with content analysis | Daily diary ratings indicated that participants generally viewed their emotion regulation strategy selection to have a high impact on their own self-assessed performance ($M = 7.36$, $SD = 1.59$) Emotion regulation effectiveness ($r = 0.56$, $p = 0.01$) | 63% High risk |

(Continues)

TABLE 3 | (Continued)

| Study | <i>n</i> (Fe (%), Ma (%), M age, SD age, range) | ER strategies examined | ER measure | Military variable | Job performance or military measure | Analysis | Outcome | Risk of bias |
|-------|---|---|------------|----------------------|---|----------|--|---------------------|
| | | refocusing, planning, reappraisal, expressive suppression | | Team performance | | | <p>Emotion regulation effectiveness ($r = 0.54, p < 0.01$)</p> <p>Participants' perceptions of team performance were significantly lower on days when a team member reported their most prevalent emotion to be anger ($M = 6.67, SD = 1.40$) than contentment ($M = 8.45, SD = 0.93$), $t(9) = -3.85, p = 0.004$</p> <p>Need to initially suppress negative emotions and engage in further appraisal before acting to optimise emotion-related communication and team dynamics</p> <p>Expressive suppression and acceptance were viewed as effective strategies by many of the team, who generally believed that expressing negative emotions would be detrimental to team morale</p> <p>Data and participant interviews demonstrated that people initially suppressed negative emotions and engaged in further appraisal before acting to optimise emotion-related communication and team dynamics</p> <p>Regular use of expressive suppression was reported to have negative intrapersonal and interpersonal consequences, affecting team morale and performance</p> | 63% High risk |

Abbreviations: Fe = female, M = mean, Ma = male, *n* = number, ND = not detailed, SD = standard deviation.

^aWays of Coping Checklist (Folkman et al. 1986).

^bBrief COPE (Carver 1997; Carver et al. 1989).

^c20-Items.

^dCognitive Emotion Regulation Questionnaire (Garnefski and Kraaij 2007).

^e9-Items.

^fEmotion Regulation Questionnaire (Gross and John 2003).

^g2-Items, adapted.

research in active-service military personnel and similar occupations may require brief measures suited for quick assessment in the field, the integrity of results depend on the measure's ability to assess the target construct as intended. Therefore, reporting on psychometric properties in studies that use adapted measures will be integral to progressing knowledge in the field.

Strategies were frequently amalgamated in diverse ways to construct higher-level strategies, resulting in variations in the constituents of strategy categories. While such amalgamation can be encouraged, as Carver (1997) suggests, the disparate combinations of strategies across studies lead to discrepancies in higher-level categorisations and strategy groupings. For instance, Alarcon et al. (2012) and Britt et al. (2017) utilised different strategy questions from the COPE inventory to assess similar higher-level categorisations (emotion-focused coping) and self-selected categorised constituents. Gilbar et al. (2010), also employing the COPE, conducted a principal component analysis (PCA) to determine the higher-level categorisations of a set of strategies. Thus, even within a single measure, higher-level categorisation can substantially differ in strategy constituents, as well as the methods employed to determine such categorisation. This makes the interpretation and comparability of results challenging as a seemingly similar category may be comprised of different strategy questions, even in the same measure. This issue extends to the diverse theoretical perspectives in the ER literature, which may not reflect the diverse range of strategies used in everyday life (Naragon-Gainey et al. 2017).

A broad spectrum of strategies were assessed across the measures used, however, the frequency of each strategy varied significantly, rendering comparisons challenging. Several studies did not detail the strategies included in their analysis of the ER category, and consequently, the specific strategies encompassed within these categories remain ambiguous, impeding the synthesis of findings across studies. However, the diversity of strategies studied is noteworthy, particularly considering the increasing recognition of the significance of ER flexibility (the ability to dynamically switch between ER strategies to adapt to changing situational demands). Despite this, it is pertinent to acknowledge the considerable variability in the terminology employed for each strategy, necessitating their aggregation for synthesis purposes in this review. For instance, 10 distinct terms for reappraisal were consolidated into a single category, highlighting the challenge of effectively categorising measures that likely capture reappraisal in disparate ways. This complexity is compounded by the wide array of variables examined alongside these strategies, further complicating the synthesis of results within the limited existing literature.

4.3 | Variables Examined Alongside ER

Performance variables were scarcely examined alongside ER, with only three studies examining this relationship. Of those outcomes examined, performance evaluation was measured via daily self-report, team performance via daily self-report and retrospective interview and job performance via an objective measure, pass or fail score on a training course. Two studies

examined performance evaluation. The lack of research on ER and performance in active-service military personnel is notable, given its recognised importance in achieving mission outcomes in high-pressure environments in other fields (Tamminen et al. 2021). This may be due to a variety of reasons. For example, organisational priorities and funding availability can change the extent to which research is supported. Notwithstanding, publications in academic spaces may not reflect the research and practices occurring within the organisation, and there may be a preference to reduce open-access knowledge from which other organisations can benefit, and favour secrecy (Arora et al. 2018).

Only six studies in this review examined the relationship between ER and military variables, such as unit cohesion, combat exposure and number of deployments. Unit cohesion and combat exposure were both examined by more than one study (Britt et al. 2017; Gilbar et al. 2010 and Britt et al. 2017; Marini et al. 2017, respectively). While results were mixed, these factors likely play a mediating or moderating role in the relationship between ER and outcomes such as performance and should therefore be integrated in studies with active-service military personnel more widely. In this sample, understanding military specific components provides context to the stressors faced by personnel and could thus provide insight into the ER factors that are key for both maintaining mental health and task performance. For example, the relationship between ER and PTSD is moderated by trauma exposure, whereby the severity of PTSD differs according to the ER strategy used and the level of trauma exposure (Britt et al. 2017). Specifically, using self-blame magnified the relationship between combat exposure and PTSD. Thus, in the military sample, incorporating combat exposure may be key to understanding this nuanced relationship and gaining deeper insights into how contextual factors and ER strategies align to inform targeted interventions.

Furthermore, ER serves as a pivotal transdisciplinary factor within the mental health literature (Aldao et al. 2016), contributing significantly to the understanding of various disorders. Among these, PTSD stands out as one of the most extensively discussed and prevalent mental health conditions among military personnel. In this review, clinical mental health was looked at by 30% of studies, however, only six papers focused on ER and PTSD symptoms. This is a notable scarcity given the high prevalence of PTSD research within the veteran population. This research has found that ER strategy use can differentiate between those with and without PTSD diagnosis (Khan et al. 2023), difficulties with ER are related to PTSD severity (Spies et al. 2020) (for further details, see meta-analysis (Seligowski et al. 2015)), and initial PTSD severity (Rooney et al. 2022). Difficulties in ER with PTSD have wide-reaching impacts on other factors such as social functioning, leading to family dysfunction (Janssen et al. 2022). However, the causal and directional links between PTSD and ER are unclear (McLean and Foa 2017; Price et al. 2006; Tull et al. 2020). That is, are certain ER strategies used more likely to lead to the development of PTSD symptoms or does developing PTSD symptoms change the way one uses ER strategies? Part of this lack of clarity is because few studies are examining ER in active-service military populations, and few of those are longitudinal (DiGangi et al. 2013). Indeed, there have been calls for

longitudinal analysis to delineate this relationship, and while some have begun to elucidate this in other samples (Pencea et al. 2020; Rooney et al. 2022), further work in the active-service military population is required to understand its application to the military field.

4.4 | Relationship Between Performance and Military-Related Variables

Although research is limited, studies examining the relationship between ER, performance, and military variables reveal some notable findings. Uniformly, studies found that ER strategy selection and efficacy impacted self-rated and objective performance. Specifically, ER may influence performance through other mediating variables, such as mental fatigue. This, amongst other findings, reveals and underscores the necessity of applying ER strategies flexibly according to context, demonstrating their utility in various contexts. Additionally, ER strategies, such as self-blame, may act as mediators that can impact long-term mental health and performance. Despite the importance of these themes, research on these relationships in military personnel remains sparse. While three studies have investigated performance outcomes—focusing on course completion, team performance, and performance evaluation—the findings are limited, quality varied, and should be interpreted with caution. Nonetheless, their demonstrated connection with ER indicates potentially promising areas for future research.

The relationship between ER strategies and performance may also be better explained through their effect on other factors. For example, Wagstaff and Weston (2014) showed that short-term use of suppression can manage immediate reactions, but continuous use may increase mental fatigue and reduce emotional tolerance, impacting interpersonal relationships and team dynamics. Broadly, acceptance is generally considered adaptive (Schäfer et al. 2017), while expressive suppression has mixed results (Schäfer et al. 2017; Schraub et al. 2011). This complexity is evident in various contexts, such as sports, where suppression has negatively affected performance on a cycling time trial (Wagstaff 2014). Thus, factors such as the purpose of using a strategy, duration of use, and context likely influence its impact on performance. Given the modifiable nature of ER, further research is needed to explore how optimising these strategies can alleviate the toll on individuals in demanding environments.

As demonstrated, ER strategies may be miscategorised according to categories such as adaptive and maladaptive, suggesting that the context and temporal quality of their use is key to their efficacy. In the military context, the controllability of the stressor has been well identified as a contextual key to whether a strategy may be adaptive or maladaptive. Park et al. (2004) identified that problem-focused strategies are better suited for controllable stressors, while emotion-focused strategies are better suited for uncontrollable stressors. For military personnel, job demands and stressors are often uncontrollable (Britt et al. 2017; Dell et al. 2019), however, emotion-focused strategies as a category can vary.

One key example of this is demonstrated in the relationship between ER strategies and unit cohesion in this review. Self-reported unit cohesion was shown to be related to ER, however, results differed according to the unique strategies. Specifically, Gilbar et al. (2010) demonstrated that emotion-focused coping which comprised instrumental support, emotional support and ventilation, was negatively correlated with unit cohesion. In contrast, Britt et al. (2017) showed that emotion-focused coping was significantly positively correlated with unit cohesion where emotion-focused coping comprised reappraisal, acceptance and humour. While these contrasting results make sense on the strategy level, the group level is unhelpful, leaving it ambiguous as to which strategy was helpful and unhelpful in these contexts. Thus, as in other areas of the literature, the instability of these categories makes it difficult to truly understand the complex relationships that may exist between various strategies and their contextual application.

The few studies that included military variables suggest a key link to ER. Britt et al. (2017) demonstrated that combat exposure greatly impacts ER and mental health outcomes. Assessing emotion-focused coping as a combination of questions on reappraisal, acceptance and humour, Britt et al. (2017) found that high compared to low use of emotion-focused coping differentially impacted PTSD symptoms in individuals exposed to high combat exposure, but not low combat exposure. Here, high emotion-focused coping was related to higher PTSD symptoms. That is, emotion-focused coping buffered soldiers from the adverse effects of combat exposure. Similarly, high self-blame was related to higher PTSD symptoms in high but not low combat exposure participants, or in other words, self-blame use magnified the combat exposure–PTSD symptom relationship. These findings are in line with the broader literature where combat exposure is often correlated with PTSD, and detail that avoidance and suppression are typically over-used, and reappraisal is underused (Boden et al. 2013). Career stage may be an additional variable of importance as Schall and Schütz (2019) in this review demonstrated that higher ER knowledge was associated with lower perceived stress among soldiers, which was partially explained by a greater tendency to use reappraisal instead of suppression. This suggests that training in reappraisal may bolster early career members against stress, who are the most at risk for mental health concerns (Dell et al. 2019). However, Marini et al. (2017) did not find an interaction between coping and combat exposure and psychological health. While the variables of interest and their measurement tools differ, suggesting multiple possible reasons for this discrepancy, more comprehensive research is needed to account for these variables in the population. This would help identify key relationships that might be overlooked and highlight potential points for intervention.

The generalisability of the findings on the relationship between ER and performance in military contexts from this review must be considered within the limitations of the existing research, which is variable and of mixed quality. The studies reviewed show significant heterogeneity in outcomes and measurement methodologies, underscoring the need for more empirical investigations to clarify these relationships. The risk of bias

ratings were most affected by psychometric issues with the measurement of performance or military variables, and ER. In some cases, measures were shortened for practicality, such as in field research which presents unique challenges (e.g., Wagstaff and Weston 2014). In other cases, single-item measures were used to fit the research context (e.g., Gilbar et al. 2010). Despite the methodological restrictions, their psychometric properties remain unevaluated and therefore impact the interpretation and generalisability of results. Notwithstanding, two studies with a low risk of bias still demonstrated a relationship between ER and performance variables (deSouza and Feitosa 2015; Schall and Schütz 2019). Future research should focus on selecting and operationalising measures for each variable and outcome to ensure methodological coherence, thereby facilitating meaningful comparisons across studies.

4.5 | Implications and Recommendations

ER remains a possible contributing factor in maintaining the wellness and performance of individuals entering and working in the military. As mental health becomes a greater priority for defense forces, with recruitment and attrition being everpressing issues, ER assessment and possibly intervention are unexplored avenues that comparative occupations have more fully addressed, with promising results. Therefore, this review gives substance to recommending further research focused on the contextual factors at play, and to the relevance of ER strategies to active-service military personnel.

Research in this area will help articulate the contexts in which ER is challenging, and bolster training and support for personnel to manage these situations. In cross-sectional first-responder research, it has been suggested that ER strategies are incorporated into occupational training for psychological safety, particularly in early career stages (Tan et al. 2023). Aligned with this, military personnel in their first five years of service are the most likely to develop a mental health concern (Dell et al. 2019), and the emergence of this occurs in their first three to four years, sometimes without deployments (Dell et al. 2019). This is also the time that personnel are most likely to leave the organisation, leading to significant attrition rates soon after a significant investment in training and associated costs. Therefore, it is in the organisation's best interest to invest in psychological skills, or early assessment to identify and intervene with those who may be at particular risk and understand the contexts in which their personnel may need increased support. Indeed, Dell et al. (2019) report that maladaptive coping strategies are a modifiable factor that could be targeted to reduce the psychological distress experienced in the early career stage.

4.6 | Limitations

This review aimed to conduct a comprehensive literature search, covering both ER and coping strategies. To avoid retrieving irrelevant studies, keywords used in isolation, such as 'cope' or 'coping' were not included. This may mean that a select few studies that only used these terms in combination with our

military search terms (refer to Supporting Information S2) may have been missed.

4.7 | Conclusion

This review revealed that while there has been research on ER in active-duty military contexts for some years, it has varied methodological quality and findings. The most frequently studied variables were related to clinical mental health, such as PTSD, aligning with research on military veterans, while very few studies explored performance and military-specific variables. Military variables will be important to include in future research to understand the impact of ER in the unique active-military population. Studies showed a potential link between ER and performance and suggested that mediating variables may help to explain the relationship. Notwithstanding, there was significant variation in the ER measures used, the range of variables examined, and the overall quality of studies, meaning that the current results need to be interpreted with caution and warrant further research. This review suggests that ER is a promising area for further research to understand its impact on the performance and mental health of individuals and teams.

Author Contributions

R.K. contributed to conceptualization, data curation, formal analysis, investigation, methodology, writing – original draft preparation, and writing – review and editing. C.L. and T.W. contributed to investigation and writing – review and editing. M.Y., E.A., J.W. contributed to conceptualization, and writing – review and editing and provided supervision. L.A. contributed to conceptualization, methodology, formal analysis, writing – review and editing and provided supervision.

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Ethics Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.